Europhysics Conference on High-Energy Physics 2011

Report of Contributions
Test of Chiral Perturbation Theory with $K^e_4$ decays at NA48

The NA48/2 collaboration has accumulated ~45000 semi-leptonic $K$ charged decays to $\pi^0\pi^0e^+\nu$, increasing the world available statistics by more than two orders of magnitude. Low background contamination and very good $\pi^0$ reconstruction bring the first precise measurement of the Branching Fraction and decay Form Factor at the percent level. Concurrently, more than one million $K$ charged decays to $\pi^+\pi^-e^+\nu$ ($K_{e4^-}$) have been analyzed, leading to an improved determination of the Branching Fraction by a factor of 3 and detailed Form Factor studies. Comparison of both $K_{e4}$ modes decay properties allows a test of chiral symmetry relations and ChPT predictions at unprecedented level.

Primary authors: BLOCH-DEVAUX, Brigitte (Turin); BALEV, Spasimir (CERN)

Presenter: GOUDZOVSKI, Evgueni

Track Classification: QCD
Automation of One-Loop Scattering Amplitudes with Golem/Samurai

Friday, 22 July 2011 18:05 (20 minutes)

There are several solutions on the market for the automated computation of multi-particle scattering amplitudes at the one-loop level. In this presentation I will review the results obtained in the past year and describe the main features of the Golem/Samurai approach, that employs a d-dimensional extension of the OPP reduction method, in combination with an automated generation of amplitudes via Feynman diagrams.

Primary author: Dr OSSOLA, Giovanni (New York City College of Technology - CUNY)
Presenter: Dr OSSOLA, Giovanni (New York City College of Technology - CUNY)
Session Classification: Top and Electroweak Physics
Track Classification: Top and Electroweak Physics
Soft-gluon resummation in top-quark production at hadron colliders

Thursday, 21 July 2011 12:40 (20 minutes)

Techniques and results concerning soft gluon resummation at the level of total and differential cross sections in top-quark pair production at hadron colliders are presented. In particular, the theoretical framework underlying resummation at NLO+NNLL level for differential cross sections is briefly reviewed, and the consequences for observables such as the total inclusive pair-production cross section, the invariant mass and transverse momentum distributions, and the forward-backward asymmetry are discussed.

Primary author: PECJAK, Ben (Johannes Gutenberg-Universitaet Mainz)
Presenter: PECJAK, Ben (Johannes Gutenberg-Universitaet Mainz)
Session Classification: Top and Electroweak Physics
Track Classification: Top and Electroweak Physics
In this talk I review the consequences of radiative flavour violation in the MSSM. Since self-energies can be chirally enhanced and therefore of order one it is possible to generate the light-quark masses and the CKM matrix via loops. In the case of CKM generation in the down-sector constraints from b->s gamma, and in the case of CKM generation in the up-sector from epsilon_K, are observed. In the second case the rare decay K-> pi nu nu receives sizable contributions while in the first case additional contributions to B_s->mu mu via neutral Higgs penguins occur. These Higgs penguins can also contribute to Bs mixing and are capable to explain the observed CP asymmetry. In conclusion I show that for SUSY masses around 1 TeV radiative flavour-violation is an interesting solution to the SUSY flavour and CP problem.

Primary authors: Dr CRIVELLIN, Andreas (ITP Bern); Dr SCHERER, Dominik (TTP Karlsruhe); Dr HOFER, Lars (Universität Würzburg); Prof. NIERSTE, Ulrich (TTP Karlsruhe)

Presenter: Dr CRIVELLIN, Andreas (ITP Bern)

Session Classification: Flavour Physics and Fundamental Symmetries

Track Classification: Flavour Physics and Fundamental Symmetries
Probing dark energy with the Large Synoptic Survey Telescope (LSST).

Friday, 22 July 2011 17:30 (15 minutes)

The Large Synoptic Survey Telescope (LSST) system will produce a 6-band wide and deep field astronomical survey of over 20,000 square degrees of the southern sky using an 8.4-meter ground-based telescope. Each patch of sky will be visited about 1000 times in ten years. Its camera will be the world largest one, with 3200 Megapixels. It will cover a huge 9.6 square degree field of view, and will consequently produce an impressive amount of data 30 terabytes per night.

Science objectives of the LSST include dark energy, solar system, optical transients and galactic structure.

After having presented in details the experiment, I will mainly focus on showing how the nature of dark energy can be investigated by LSST through multiple probes, all using the same survey data. The two most powerful of these are weak gravitational lens tomography and baryon acoustic oscillations (BAO). I will emphasize on BAO and present the expected LSST accuracy on dark energy parameters reconstruction.

Primary author:  Ms GORECKI, alexia (LPSC)

Presenter:  Ms GORECKI, alexia (LPSC)

Session Classification:  Cosmology and Gravity

Track Classification:  Cosmology and Gravity
The Daya Bay Reactor Neutrino Experiment

The Daya Bay Neutrino Experiment, located in Shenzhen, China, will be probing the last unknown neutrino mixing angle $\theta_{13}$ with a sensitivity of 0.01 or better in $\sin^2 2\theta_{13}$ at 90% C.L. through a measurement of the relative rates and energy spectra of reactor antineutrinos at different baselines. This measurement will provide a better understanding of the neutrino mixing matrix and give directions to future measurements of leptonic CP violation effects and the neutrino mass hierarchy. An overview on the experiment and its current progress will be presented.

**Primary author:** Mr YEH, Yung-Shun (Institute of Physics, National Chiao Tung University)

**Co-author:** Prof. LIN, Guey-Lin (Institute of Physics, National Chiao Tung University)

**Presenter:** Mr YEH, Yung-Shun (Institute of Physics, National Chiao Tung University)

**Track Classification:** Neutrino Physics
The $\bar{\nu}_e-e^-$ elastic scattering cross-section was measured with a CsI(Tl) scintillating crystal array having a total mass of 187 kg. The detector was exposed to an average reactor neutrino flux of $6.4 \times 10^{12}$ cm$^{-2}$s$^{-1}$ at the Kuo-Sheng Nuclear Power Station in Taiwan.

The experimental design, conceptual merits, detector hardware, data analysis and background understanding of the experiment will be discussed. We will present final results with 29882/7369 kg-days of Reactor ON/OFF data, on the cross-section and the standard electroweak parameters $\sin^2 \theta_W$ and $(g_V,g_A)$ measurements, the test on charged-current neutral-neutral interference, as well as limits on neutrino magnetic moments and charge radius squared [1].

We will also present constraints on non-standard interactions (NSI) of neutrino and Unparticle Physics (UP) in $\bar{\nu}_e-e^-$ interaction channel [2] based on this data set as well as our previous data sets with ULE-HP Ge detectors which were used for the measurements of neutrino magnetic moment [3] and Dark Matter, WIMP searches [4].


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**Primary author:** Prof. DENIZ, Muhammed (Taiwan Academia Sinica; Turkey Karadeniz Technical University)

**Presenter:** Mr SELCUK, Bilmis (Middle East Technical University, Ankara, Turkey)

**Session Classification:** Neutrino Physics

**Track Classification:** Neutrino Physics
Phenomenological consequences from the equivalence between two-brane worlds and noncommutative two-sheeted spacetimes

We show that at low energy, any multidimensional universe containing two branes can be described as a two-sheeted spacetime in the formalism of the noncommutative geometry. This equivalence implies a model-independent phenomenology.

Matter swapping between two branes is predicted through fermionic oscillations at very low energy. This phenomenon can be experimentally studied with present-day technology and could allow to test the braneworld hypothesis. An experimental setup is suggested, which relies on the Hänsch frequency-comb technique and the use of a polarized ultracold neutron gas.

Some tracks are also suggested to study the phenomenological consequences at the typical energy scale involved in modern colliders.

**Primary author:** Dr SARRAZIN, Michael (University of Namur (FUNDP))

**Co-author:** Dr PETIT, Fabrice (BCRC (Mons, Belgium))

**Presenter:** Dr SARRAZIN, Michael (University of Namur (FUNDP))
CP violation and cold electroweak baryogenesis in the Standard Model

Generating sufficient amount of CP violation that would account for the observed matter-antimatter asymmetry in the universe is a long-standing problem in particle physics. It is a common lore that new physics beyond the Standard Model is needed for this purpose. This claim is based on earlier perturbative estimates of effective CP violation in the bosonic sector of the Standard Model induced by the quark CKM mixing as well as on the fact that the current lower limit on the Higgs boson mass rules out the possibility of a strongly first-order electroweak phase transition. We argue that within the cold electroweak baryogenesis scenario, there is still space for the baryon asymmetry to be generated solely from known electroweak physics. Sakharov’s condition of being sufficiently far off equilibrium is satisfied by coupling the Higgs boson to a new field such as the inflaton. It is this coupling rather than a thermal electroweak transition what triggers the change of the sign of the Higgs boson mass squared in the fast expanding early universe. On the Standard Model side, we further develop the program initiated by Shaposhnikov, Smit, and others. We carry out a nonperturbative calculation of the lowest effective CP violating operator in the boson sector at nonzero temperature. By inspecting the temperature dependence of the effective coupling, we conclude that sizeable CP violation can be achieved, and sufficient baryon asymmetry thus generated, at temperatures of the order of the charm quark mass.

Primary author: Dr BRAUNER, Tomas (Bielefeld University)

Co-authors: Dr VUORINEN, Aleksi (Bielefeld University); Dr TRANBERG, Anders (Niels Bohr Institute); Dr TAANILA, Olli (University of Helsinki)

Presenter: Dr BRAUNER, Tomas (Bielefeld University)

Track Classification: Flavour Physics and Fundamental Symmetries
NLO QCD and electroweak corrections to Higgs strahlung off W/Z bosons at Tevatron and the LHC with HAWK

Thursday, 21 July 2011 17:35 (15 minutes)

Higgs strahlung off W/Z bosons at Tevatron and the LHC, ppbar/pp -> WH/ZH, is an important process class for discovering a light Higgs boson. In the talk, first results on electroweak (and QCD) corrections for these reactions are shown that support the full differential information and the decays of the W/Z bosons, i.e. the actually considered processes are ppbar/pp -> l nu H / l l H. The precise knowledge of differential distributions is particularly important in view of the fact that reconstructing Higgs strahlung at the LHC has to proceed via the investigation of “fat b jets” of highly boosted Higgs bosons and that electroweak corrections usually show strong variations in transverse-momentum distributions. Both results and details of the calculation, which is embedded in the HAWK Monte Carlo generator first designed for Higgs production via vector-boson fusion, are presented.

Primary author: Prof. DITTMAIER, Stefan Dittmaier (University of Freiburg)

Co-authors: Dr MUECK, Alexander (RWTH Aachen); Prof. DENNER, Ansgar (University of Wuerzburg); Dr KALLWEIT, Stefan (PSI Villigen)

Presenter: Prof. DITTMAIER, Stefan Dittmaier (University of Freiburg)

Session Classification: Higgs and New Physics
Towards global analysis of $b \rightarrow s l^+l^-$ decays

Friday, 22 July 2011 12:00 (15 minutes)

The final data sets of BaBar, Belle and CDF as well as the current run of LHCb are about to significantly improve the experimental knowledge on rare $B$-decays governed by $b \rightarrow s l^+l^-$. In view of this, we will present new tests of the electroweak short-distance couplings in the Standard Model and beyond, including a general set of non-standard interactions. Especially, the angular analysis of $B \rightarrow K^+ l^+l^-$ provides a large number of new observables which allow to efficiently disentangle short-distance (new) physics from long-distance QCD effects. The potential to test the Standard Model and specific non-standard interactions will be discussed, focusing on the high-dilepton invariant mass region, which is complementary to the low-dilepton mass region. Results of a model-independent analysis are presented, using current constraints from $B \rightarrow K l^+l^-$ and $B \rightarrow K^+ l^+l^-$ for both regions in combination with other rare $B$-decays.

Primary author: Dr BOBETH, Christoph (TU München - IAS/Excellence Cluster Universe, Germany)

Co-authors: Mr WACKER, Christian (TU Dortmund, Germany); Mr VAN DYK, Danny (TU Dortmund, Germany); Mr BEAUJEAN, Frederik (Max-Planck-Institut fur Physik, Munich, Germany); Prof. HILLER, Gudrun (TU Dortmund, Germany)

Presenter: Dr BOBETH, Christoph (TU München - IAS/Excellence Cluster Universe, Germany)

Session Classification: Flavour Physics and Fundamental Symmetries

Track Classification: Flavour Physics and Fundamental Symmetries
Charmonium and Charmonium-like States with BABAR

Friday, 22 July 2011 12:30 (15 minutes)

We present a search for the X(3872) produced in $B \rightarrow \psi\pi\pi K$ and $B \rightarrow \psi\pi\pi\pi0 K$ ($\psi=J/\psi$ or $\psi(2S)$) using 427 $fb^{-1}$ of BaBar data. We present updated mass and width measurements for the Y(4260)$\rightarrow J/\psi\pi\pi$ produced in Initial State Radiation events using 454 $fb^{-1}$ of data. We report the study of the B meson decays $B^+ \rightarrow J/\psi\phi K^+$ and $B^- \rightarrow J/\psi\phi K_S$, and of charged and neutral B decays to $\chi_c1 K\pi$. We describe a detailed study of charmonium states produced in two-photon collisions and decaying to $K_S K\pi$ and $KK\pi\pi\pi0$. We present a high statistics measurement of the mass and width of the etac(2S) state.

Primary author: Dr ROBERTSON, Steven (IPP/McGill)
Presenter: GUIDO, Elisa
Session Classification: QCD
Track Classification: QCD
Recent BABAR Studies of Bottomonium States

Friday, 22 July 2011 12:15 (15 minutes)

We present a study of the radiative transitions from decays of the Y(2S) and Y(3S) resonances using photons that have converted into an e^+e^- pair, obtaining precise measurements of the branching fractions for $\chi_b(1,2P)\rightarrow\gamma Y(1S)$ and $\chi_b(2P)\rightarrow\gamma Y(2S)$ transitions and search for radiative decay to the $\eta_b(1S)$ and $\eta_b(2S)$ states. We present a search for the spin-singlet partner of the chib(1P) triplet, the $hb(1P)$ state of bottomonium in the transitions $Y(3S)\rightarrow\pi^0\,hb$ and $Y(3S)\rightarrow\pi^+\pi^-\,hb$ using a data sample of 122 million $Y(3S)$ events.

Primary author: Dr ROBERTSON, Steven (IPP/McGill)

Presenter: GUIDO, Elisa

Session Classification: QCD

Track Classification: QCD
Recent BABAR Charm Physics Results

We report recent BABAR charm physics results, including CP violation studies in $D^+ \to K\bar{s}_0\pi^+$ and $D^+ \to K\bar{s}_0 \pi^+ \pi^-$, a study of the Dalitz plot of $D_{s}^+ \to K^+K^-\pi^+$, measurements of the mass and width of the $D_{s1}(2536)^+$, measurements of charm semileptonic and leptonic branching fractions, and searches for non-hadronic rare $D$ decays.

Primary author: Dr ROBERTSON, Steven (IPP/McGill)
Presenter: Mr MARTINELLI, Maurizio
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
Charmless Hadronic B Decays with BABAR

Thursday, 21 July 2011 11:00 (15 minutes)

We present recent BABAR results on charmless hadronic B decays. In particular, we measure the branching fractions, longitudinal polarization fraction $f_L$ and charge asymmetry in $B \rightarrow \rho(\pi_0)K^*$ events, and report results of studies of $B \rightarrow \phi \phi K$ and $B_0 \rightarrow K^0 \pi^0 \pi^0$. We also present the results of a recent study of the inclusive branching fractions of $B$-meson decays to charmless final states containing a charged or neutral kaon.

**Primary author:** Dr ROBERTSON, Steven (IPP/McGill)

**Presenter:** PUCCIO, Eugenia

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
We present recent BABAR results of searches for rare decays with new physics sensitivity. In particular, we present the results of searches for $B \rightarrow \gamma \gamma$ and the lepton and baryon number violating modes $B \rightarrow \Lambda(c)$ and $B \rightarrow K/\pi \tau \ell$. We also describe recent searches for the charm decays $D \rightarrow X \ell \ell$, $D^0 \rightarrow \gamma \gamma$ and $D^0 \rightarrow \ell^+ \ell^-$. 

Primary author: Dr ROBERTSON, Steven (IPP/McGill)  
Presenter: GRAUGES, Eugeni  
Session Classification: Flavour Physics and Fundamental Symmetries  
Track Classification: Flavour Physics and Fundamental Symmetries
Semileptonic B and Charm Decays with BABAR

Thursday, 21 July 2011 17:30 (15 minutes)

We present recent results of studies of semileptonic B and charm decays from BABAR. In particular, we describe a recent measurement of the $B \to D(\ast)\tau \nu$ branching fraction, and a study of $B_s$ production and semileptonic decays using BABAR data collected above the Upsilon(4S).

We also discuss the determination of $|V_{ub}|$ from exclusive $B \to \pi/\rho \ell \nu$ and from fully inclusive measurements and present recent branching fraction measurements of $B \to \Lambda_{c} \bar{p} X \ell \nu$, $B \to D K \ell \nu$ and $D^{+} \to K^{-}\pi^{+} e \nu$.

Primary author: Dr ROBERTSON, Steven (IPP/McGill)
Presenter: Mr FRANCO SEVILLA, Manuel
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
Searches for Light New Physics with BABAR

Friday, 22 July 2011 16:45 (15 minutes)

We present the results of direct searches for light new physics with BABAR. In particular, we describe studies of narrow Upsilon and B decays with sensitivity to possible light pseudoscalar Higgs bosons and invisibly decaying dark matter candidates. We also present results of searches for hidden sector gauge and Higgs bosons.

Primary author: Dr ROBERTSON, Steven (IPP/McGill)
Presenter: LUSIANI, Alberto
Session Classification: Higgs and New Physics
Recent BABAR Tau Physics Results

Thursday, 21 July 2011 10:00 (15 minutes)

We report recent BABAR results in tau physics, including a search for CP violation in tau -> Ks0 pu nu, a search for second class currents in the process tau -> K/pi eta nu, and discuss recent results of exclusive branching fraction measurements related to V_us.

Primary author: Dr ROBERTSON, Steven (IPP/McGill)
Presenter: Mrs ADAMETZ, Aleksandra
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
The Asymptotic Safety Program for Quantum Gravity

*Saturday, 23 July 2011 10:00 (30 minutes)*

Weinberg’s asymptotic safety scenario proposes that gravity constitutes a consistent and predictive Quantum Field Theory within Wilson’s generalized framework of renormalization. The key ingredient in the construction is a non-trivial fixed point of the gravitational renormalization group flow which controls the UV behavior of the theory and renders it safe from unphysical divergences. This talk gives a pedagogical introduction to the main tool available for investigating this conjecture, the functional renormalization group equation for gravity, before reviewing the evidence supporting this conjecture.

**Primary author:** Dr. SAUERESSIG, Frank (Institut für Physik, Johannes Gutenberg Universität Mainz)

**Presenter:** Dr. SAUERESSIG, Frank (Institut für Physik, Johannes Gutenberg Universität Mainz)

**Session Classification:** Non-Perturbative QFT and String Theory
Recent BABAR results on CP violation in B decays

Thursday, 21 July 2011 11:15 (15 minutes)

We report on the study of the decay B+ -> D0(D0bar) K+ where the D0 or D0bar decaying to Kpipi0, with the Atwood Dunietz and Soni (ADS) method. We measure the ratios Rads, R+, and R- that, since the processes B+ -> D0barK+ and B+ -> D0K+ are proportional to Vcb and Vub, respectively, are sensitive to rB and to the weak phase gamma. We also report the results of CP violation studies of B->Dcp pi+pi- and B0->D0.

Primary author: Dr ROBERTSON, Steven (IPP/McGill)
Presenter: Mr DERKACH, Denis
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
Recent BABAR measurements of hadronic B branching fractions

*Thursday, 21 July 2011 17:45 (15 minutes)*

We report on recent results of measurements of hadronic B decay branching fractions from BABAR. These results include $B_0 \rightarrow D(0)h_0$ (*where $h_0$ is a neutral hadron*), $B \rightarrow D(D(0))K$, $B \rightarrow D(\bar{p})p$ and $B^- \rightarrow D(K_s)0Ks0$.

**Primary author:** Dr ROBERTSON, Steven (IPP/McGill)

**Presenter:** Mr GAZ, Alessandro

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
Radio signals of particle dark matter

Thursday, 21 July 2011 17:00 (15 minutes)

In most of particle dark matter (DM) models, the DM candidate injects sizable fluxes of high-energy electrons and positrons through its annihilations or decays. Emitted in regions with magnetic field, they in turn give raise to a synchrotron radiation, which typically covers radio and infrared bands. We discuss the possibility of detecting signatures of Galactic and extra-galactic DM in the isotropic total intensity and small-scale anisotropies of the radio background.

Primary author: Dr REGIS, Marco (University of Turin and INFN)

Presenter: Dr REGIS, Marco (University of Turin and INFN)

Session Classification: Astroparticle Physics

Track Classification: Astroparticle Physics
Recent results on hadrons via Initial State radiation at BABAR

Friday, 22 July 2011 12:45 (15 minutes)

We report on latest results obtained at BABAR studying low energy $e^+e^-$ annihilations, produced via initial state radiation. Hadronic cross sections are the experimental input for calculation of the muon anomalous magnetic moment, while the study of the final states and intermediate structures with unprecedented accuracy can reveal new states and their properties. In particular, an updated measurement, using the total data set taken by BABAR, of the cross sections for $e^+e^- \rightarrow h+h^-h^+h'^-$ (where $h,h' = \pi,K$), and of the study of the $Y(2175) \rightarrow \phi f_0(980)$ resonance, will be presented.

**Primary author:** Dr ROBERTSON, Steven (IPP/McGill)

**Presenter:** HAFNER, Andreas

**Session Classification:** QCD

**Track Classification:** QCD
Supersymmetry with trilinear R-parity violation at the LHC

Saturday, 23 July 2011 09:30 (15 minutes)

Adding trilinear R-parity violating terms to a supersymmetric scenario, has large implications for collider phenomenology. We show that a large fraction of parameter space yields a scenario reminiscent of the standard MSSM but where the neutralino instead of escaping the detector, decays to standard model particles. This would give rise to spectacular multi-lepton and/or multi-jet events.

Since the neutralino can decay through any of the 45 trilinear R-parity violating terms allowed by gauge invariance, this allows us to study the hierarchy of these couplings.

The prospects of measuring these hierarchies are in general good; especially in the case of the purely leptonic LLE type operators, here invariant mass distributions allow us to measure all relevant couplings. For the semileptonic LQD type operators, the prospects are in most cases also very good. The more problematic couplings to measure, are those involving tau flavour and the ones with a third-generation Q operator. The latter case leads to neutralino decay to neutrino plus jets, for which the conclusive identification of the operator is difficult.

The UDD type operators will typically give three jets, but may in some cases lead to interesting signals, such as a top plus jets if the operator is of top flavour and the neutralino is sufficiently heavy.

Primary authors: Prof. CHOUDHURY, Debajyoti (University of Delhi); Prof. LOLA, Magda (University of Patras); Mr BOMARK, Nils-Erik (University of Bergen); Prof. OSLAND, Per (University of Bergen)

Presenter: Mr BOMARK, Nils-Erik (University of Bergen)

Session Classification: Higgs and New Physics
UHECR by lightest nuclei in Nearby Universe and its parasite neutrino traces

UHECR do not arrive from Virgo, do cluster in a spread way around Cen A, do show a nuclei composition. The recent arrival event maps do not confirm an Super Galactic plane arrival as expected on early 2007. To solve the puzzle we suggest a light nuclei UHECR nature whose fragmentation on flight from Virgo make them suppressed, whose spread bending on galactic plane agrees with Cen A cluster, whose short arrival makes them very local ones. Their UHECR fragments may trace their rare clustering. A few rare galactic signals may be also present. UHE neutrinos will be mostly at PeVs and not much at EeVs energy range. Making upward Tau Airshower rare and detectable only nearby (a few km) fluorescence telescopes.

Primary author:  Dr FARGION, Daniele (Physics Departm Rome 1 INFN 1)

Presenter:  Dr FARGION, Daniele (Physics Departm Rome 1 INFN 1)

Track Classification:  Astroparticle Physics
The expected Deep Core atmospheric neutrino spectra: theory facing earliest data?

Atmospheric neutrino may trace cosmic rays spectra, muon and electron neutrino secondaries and their final upgoing nature after mixing inside the Earth. The muon flavor change is oscillating in all directions and they are maximal in vertical axis at 24 GeV; the upgoing muon neutrino rate and the neutral current or tau or electron showers at tens GeV should combine in a very tuned way in future Deep Core spectra. We obtained our preliminary spectra to be compared with soon published Deep Core data. Eventual neutrino CPT violation traces might be also observable.

**Primary author:** Dr FARGION, Daniele (Physics Departm Rome 1 INFN 1)

**Presenter:** Dr FARGION, Daniele (Physics Departm Rome 1 INFN 1)

**Track Classification:** Neutrino Physics
The dynamic of diffractive structure functions at high energies

We describe the most recent H1 and ZEUS diffractive DIS data obtained by various methods with very large uncertainties associated with the treatment of proton dissociation processes and compare them in detail. We consider pomeron as an object with parton distribution function, evolving according to the DGLAP equations. Having performed a global t analysis, we achieve a very good description of all available measurements by extracting sets of quark and gluon distributions for the pomeron. The gluon distributions are found to be quite different for methods of H1 and ZEUS. We predict charm and longitudinal proton diffractive structure function. Our results are compared with other analysis from the literature.

Primary author: Dr TAHERI MONFARED, Sara (Semnan university)

Presenter: Prof. KHORRAMIAN, Ali N. (Semnan university and IPM)

Track Classification: QCD
An overview of the Polarized Electrons for Polarized Positrons (PEPPo) experiment

Recently, the nuclear and high-energy physics communities have shown a growing interest in the availability of high current, highly-polarized positron beams. The Polarized Electrons for Polarized Positrons (PEPPo) experiment planned at the Jefferson Lab (JLab) aims to measure the transfer of polarization from a low energy (< 10 MeV) highly spin polarized electron beam to positrons.

A sufficiently energetic polarized photon or lepton incident on a target may generate, via bremsstrahlung and pair creation processes within a solid target foil, electron-positron pairs that should carry some fraction of the initial polarization. This approach has been successfully tested using polarized photons created with a multi-GeV un-polarized electron beam, resulting in positrons with polarization ~80%. Although the pair creation yield is reduced at low energy, recent advances in high current (> 1 mA) spin polarized electron sources at Jefferson Lab offer the perspective of creating polarized positrons from a low energy electron beam. A successful demonstration of this technique would provide an alternative scheme to produce low energy polarized positrons and information useful to optimize the design of polarized positron sources using sub-GeV electron beams.

An overview and status of the PEPPo experiment will be presented, along with some of the motivations in the context of the JLab physics program.

Primary author: DUMAS, Jonathan (LPSC)
Presenter: DUMAS, Jonathan (LPSC)
Track Classification: Accelerators
Results and physics implications of the precision measurement of the 7Be solar neutrino flux performed with the Borexino detector

Friday, 22 July 2011 14:30 (15 minutes)

Borexino is a massive, calorimetric liquid scintillator detector installed at the underground Gran Sasso Laboratory. With its unprecedented radiopurity levels achieved in the core of the detection medium, it is the only real time experiment in operation able to study solar neutrino interactions in the challenging sub-MeV energy region. The recent precise measurement of the 7Be solar neutrino flux, characterized by a total uncertainty amounting to less than 5%, will be described, as well as the accurate determination of the corresponding day/night asymmetry. These results, besides constituting the most precise experimental evaluations concerning low energy solar neutrinos obtained to date, provide also a unique opportunity to probe and validate the favored neutrino oscillation paradigm in the so far untested Vacuum regime. Furthermore, they have also important implications in term of allowed regions in the oscillation parameters space. Other very interesting outcomes of the experiment, specifically the low threshold investigation of 8B solar neutrinos and the detection of geo-neutrinos from the Earth, will be summarized, too. Finally, the potential physics reach of a neutrino/anti-neutrino source measurement in Borexino will be highlighted, with special emphasis to its impact in the current experimental scenario characterized by several intriguing hints of possible short baseline oscillations involving eV scale sterile neutrinos.

Primary author: Dr RANUCCI, Gioacchino (INFN)
Presenter: Dr RANUCCI, Gioacchino (INFN)
Session Classification: Neutrino Physics
Track Classification: Neutrino Physics
On the coherent inelastic binary and multiparticle processes in the ultrarelativistic hadron–nucleus, photon–nucleus and nucleus–nucleus interactions

The coherent inelastic processes of the type $a \to b$, which may take place in the interaction of hadrons and $\gamma$ quanta with nuclei at very high energies (the nucleus remains the same), are theoretically investigated. For taking into account the influence of matter inside the nucleus, the optical model, based on the conception of the refraction index, is used. Analytical formulas for the effective cross section $\sigma_{coh}(a \to b)$ are obtained, taking into account that at ultrarelativistic energies the main contribution into $\sigma_{coh}(a \to b)$ is provided by very small transferred momenta in the vicinity of the minimal longitudinal momentum transferred to the nucleus. It is shown that the cross section $\sigma_{coh}(a \to b)$ may be expressed through the “forward” amplitudes of inelastic scattering $f_{a+N \to b+N}(0)$ and elastic scattering $f_{a+N \to a+N}(0)$, $f_{b+N \to b+N}(0)$ on a separate nucleon, and it depends on the ratios $L_a/R$ and $L_b/R$ ($L_a$ and $L_b$ are the mean free paths in matter inside the nucleus for the particles $a$ and $b$, respectively, $R$ is the nuclear radius). In particular, when $L_a/R >> 1$, but $L_b/R << 1$ (or $L_a/R << 1$, but $L_b/R >> 1$), $\sigma_{coh}(a \to b)$ is equal to the ratio of the “forward” cross sections of inelastic scattering $a+N \to b+N$ and elastic scattering of the particle $b$ (or $a$) on a nucleon, multiplied by the cross section of scattering on the "black" nucleus $R^2$. When both the conditions $L_a/R >> 1$ and $L_b/R >> 1$ are satisfied, $\sigma_{coh}(a \to b)$ is proportional to the factor $R^4/k^2$, where $k$ is the initial energy of the particle $a$ in the laboratory frame.

The above formalism is generalized also for the case of coherent inelastic multiparticle processes on a nucleus of the type $a \to \{b_1, b_2, b_3 \ldots b_i\}$, and for the case of coherent processes at collisions of two ultrarelativistic nuclei.

Primary author: Dr LYUBOSHITZ, Valery (Joint Institute for Nuclear Research (Dubna, Russia))

Co-author: Dr LYUBOSHITZ, Vladimir (Joint Institute for Nuclear Research (Dubna, Russia))

Presenter: Dr LYUBOSHITZ, Valery (Joint Institute for Nuclear Research (Dubna, Russia))
Possible effect of mixed phase and deconfinement upon spin correlations in the $\Lambda \bar{\Lambda}$ pairs generated in relativistic heavy-ion collisions

Spin correlations for the $\Lambda \bar{\Lambda}$ and $\Lambda \Lambda$ pairs, generated in relativistic heavy ion collisions, and related angular correlations at the joint registration of hadronic decays of two hyperons, in which space parity is not conserved, are analyzed. The correlation tensor components can be derived from the double angular distribution of products of two decays by the method of "moments". The properties of the "trace" of the correlation tensor (a sum of three diagonal components), determining the relative fractions of the triplet states and singlet state of respective pairs, are discussed. Spin correlations for two identical particles ($\Lambda \Lambda$) and two non-identical particles ($\Lambda \bar{\Lambda}$) are considered from the viewpoint of the conventional model of one-particle sources. In the framework of this model, correlations vanish at sufficiently large relative momenta. However, under these conditions, in the case of two non-identical particles ($\Lambda \bar{\Lambda}$) a noticeable role is played by two-particle annihilation (two-quark, two-gluon) sources, which lead to the difference of the correlation tensor from zero. In particular, such a situation may arise when the system passes through the "mixed phase".

**Primary author:** Dr LYUBOSHITZ, Valery (Joint Institute for Nuclear Research (Dubna, Russia))

**Co-author:** Dr LYUBOSHITZ, Vladimir (Joint Institute for Nuclear Research (Dubna, Russia))

**Presenter:** Dr LYUBOSHITZ, Valery (Joint Institute for Nuclear Research (Dubna, Russia))
Status of the KATRIN experiment

Saturday, 23 July 2011 09:55 (15 minutes)

The KATRIN experiment is the next generation tritium beta decay experiment which aims for a direct, model-independent measurement of the electron neutrino mass with 200 meV/c^2 sensitivity (90% C.L.). This corresponds to an improvement of the sensitivity by one order of magnitude in comparison to current results of tritium beta decay neutrino mass experiments. KATRIN uses a high-luminosity windowless gaseous tritium source, a superconducting electron transport and tritium retention section, two spectrometers working as electrostatic filters and a detector section to measure the integrated beta electron energy spectrum.

In order to reach the design sensitivity of KATRIN, the tritium source needs a high activity (10^11 Bq) and the main source parameters (Temperature, gas inlet, isotopic purity) have to be stabilized to the 10^-3 level. The transport and retention section adiabatically guides the electrons from the source to the spectrometers while reducing the tritium flow rate by 14 orders of magnitude. The electrostatic spectrometers are based on the MAC-E principle and act as a high pass energy filter with 0.93 eV energy resolution at 18.6 keV retarding voltage. Electrons with high enough energy to pass the MAC-E filters are detected by a detector system with < 1 mHz background rate.

The KATRIN experiment is currently being setup at the Karlsruhe Institute of Technology (KIT). An overview of the experiment and the status of the commissioning of the mayor components will be given.

We acknowledge the BMBF Verbundforschung and the DFG SFB/TR27 for partly funding this work.

Primary author: Mr FISCHER, Sebastian (For the KATRIN Collaboration - Karlsruhe Institute of Technology)

Presenter: Mr FISCHER, Sebastian (For the KATRIN Collaboration - Karlsruhe Institute of Technology)

Session Classification: Neutrino Physics

Track Classification: Neutrino Physics
First SND detector results on hadron cross sections at VEPP-2000 e+e- collider

Saturday, 23 July 2011 09:00 (15 minutes)

The results of the first data taking run in the 1-2 GeV range with SND detector at VEPP-2000 e+e- collider are presented. The reported data are based on the integrated luminosity of 5.5pb$^{-1}$. The preliminary results on multihadron cross sections, e.g., $e^+e^-\rightarrow\pi^+\pi^-\pi^0$, $2\pi^0\gamma$, $\pi^+\pi^-\pi^0\pi^0$ are obtained. The future program is discussed.

Primary author: Dr DIMOVA, Tatyana (Budker Institute of Nuclear Physics, Novosibirsk, Russia)

Presenter: Dr DIMOVA, Tatyana (Budker Institute of Nuclear Physics, Novosibirsk, Russia)

Session Classification: Top and Electroweak Physics

Track Classification: Top and Electroweak Physics
Pseudoscalar-photon mixing in an expanding Universe

We establish the equation of motion of pseudoscalar particles coupled to an electromagnetic field in a classical gravitational background through the use of conformal time and flat geometry. We show that in general the expansion of the universe leads to larger mixing than in a stationary universe. We also show that for a broad range of parameters, one can obtain a resonance mixing, i.e. a region in which the mixing becomes maximum.

Primary author: Dr MANDAL, Subhayan (University Of Liege)
Co-author: Prof. CUDELL, Jean-Rene (University Of Liege)
Presenter: Dr MANDAL, Subhayan (University Of Liege)
Hadronic Molecules in Charmonium Spectrum

The discovery of the $J/\psi$ meson in 1974 was the experimental confirmation of the existence of the charmed quark introduced theoretically in 1970 by Glashow, Iliopoulos and Maiani to explain the cancellation of loop diagrams in $K^0$ weak decays. Consisting of a charmed $c$ quark and a $\bar{c}$ antiquark the $J/\psi$ particle became the starting point of a whole family of bound states called charmonium.

A further milestone in the knowledge of the charmonium structure began in 2002 with the new data coming from high luminosity experiments at B factories. Since then more than ten new states have been observed, most of them being difficult to understand in a quark-antiquark framework. Meson-antimeson molecular states may represent an alternative explanation to these states.

Meson-antimeson pairs containing one heavy and one light quark can exchange pions which may contribute to bind the system. In Ref.-[1] we have performed a calculation of the $X(3872)$ state as a $DD^*$ molecule in the framework of a constituent quark model [2]. The one pion exchange interaction is not enough to bind the system and only when we mix the molecular state with the $\chi_{c1}(2P)$ $q\bar{q}$ pair we get the $X(3872)$ as a bound state. The original $\chi_{c1}(2P)$ $q\bar{q}$ pair acquires a significant $DD^*$ component and can be identified with the $X(3940)$.

Following these ideas we have started a program to study the influence of possible molecular structures in the charmonium spectrum. Based on the formalism developed by Baru et al. [3], we perform a coupled channel calculation in which the mass and the width of the resonances can be determined nonperturbatively. The interactions in the molecular channels are calculated using the Resonating Group Method and the $q\bar{q}$ interaction of Ref.-[2]. Two and four quark states are coupled through the $3^3P_0$ mechanism.

We focus on the $0^{++}$ and $1^{--}$ sectors. In the first one, coupling the $DD, J/\psi\omega$, $D_sD_s$ and $J/\psi\phi$ channels to the $2^3P_0$ $q\bar{q}$ pair we obtain two states compatibles with the $X(3915)$ and the $Y(3940)$ mesons.

In the $1^{--}$ sector we include the $3^3S_1$ and $2^3D_1$ charmonium states coupled to $DD$, $DD^*$, $D^*D^*$, $D_sD_s$, $D_sD_s^*$ and $D_s^*D_s^*$. In this calculation we obtain the controversial Y(4008) as a new molecular state and two $c\bar{c}$ states dressed by the molecular components. One important outcome of the calculation is that the new $\psi(4040)$ has a bigger probability of $2^3D_1$ state and the $\psi(4160)$ of the $3^3S_1$ state. To test this new structure, we calculate the decay branching ratios measured by BABAR [4]. As already notice the result using the bare states are in clear disagreement with the experiment while we find a good agreement for the couple channel calculation.

References:

\item{[4]} B. Aubert et al., Phys. Rev. D 79, 092001 (2009)

Primary author: Prof. FERNANDEZ, Francisco (University of Salamanca)
Co-authors: Prof. ENTEM, David R. (University of Salamanca); Mr ORTEGA, Pablo G. (University of Salamanca)
Presenter: Prof. FERNANDEZ, Francisco (University of Salamanca)

Track Classification: QCD
Testing string vacua in the lab: large extra dimensions and hidden photons

Saturday, 23 July 2011 11:45 (15 minutes)

We present examples of string compactifications with an anisotropic shape of the extra dimensions which are very promising to make contact with current experiments since they allow the existence of micron-sized extra dimensions, TeV scale strings and hidden Abelian gauge bosons with a kinetic mixing with the ordinary photon.

Primary author:  Dr CICOLI, Michele (DESY, Hamburg)
Presenter:  Dr CICOLI, Michele (DESY, Hamburg)
Session Classification:  Non-Perturbative QFT and String Theory
D and B meson production at the LHC in the GM-VFN scheme at NLO

We calculate transverse momentum ($p_T$) distributions for the inclusive hadroproduction at next-to-leading order in the general-mass variable-flavor-number scheme. We present results for the ATLAS, CMS, LHCb and ALICE experiments and compare with first data.

**Primary author:** SCHIENBEIN, Ingo (LPSC)

**Presenter:** SCHIENBEIN, Ingo (LPSC)

**Track Classification:** QCD
The search for a permanent neutron electric dipole moment with ultracold neutrons (UCN) is one of the prominent experiments to test CP-violation at the low-energy precision frontier. Extensions to the SM can provide enough CP violation to accommodate for the observed baryon asymmetry of the universe, while at the same time predicting nEDM values in the range of 10^{-26} to 10^{-28} ecm. This is just below the present upper bound of 2.9*10^{-26} ecm [1] which was limited mostly by counting statistics. An improved nEDM measurement is very timely and complements direct searches for new physics at the Large Hadron Collider. The nEDM Collaboration of 15 European institutes [2] prepares its first data taking phase at the high intensity superthermal UCN source at PSI [3] aiming to improve the nEDM sensitivity by a factor five within two years. The final goal of the collaboration is a factor 50 improvement with a newly designed instrument. Our research and development efforts with the present and future nEDM apparatus and connected systematics will be presented.


Primary author: Dr ZSIGMOND, Geza
Presenter: Dr ZSIGMOND, Geza
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
Probing nuclear parton densities and parton energy loss processes through photon + heavy-quark jet production in p-A and A-A collisions

Thursday, 21 July 2011 17:00 (15 minutes)

We present a detailed phenomenological study of the associated production of a prompt photon and a heavy quark jet (charm or bottom) in proton-nucleus (p-A) and nucleus-nucleus (A-A) collisions. The dominant contribution to the cross-section comes from the gluon–heavy-quark (gQ) initiated subprocess, making this process very sensitive to the gluon and the heavy-quark nuclear parton densities. We show that the future p-A data to be collected at the LHC should allow one to disentangle the various nPDF sets currently available. In heavy-ion collisions, the photon transverse momentum can be used to gauge the initial energy of the massive parton which is expected to propagate through the dense QCD medium produced in those collisions. The two-particle final state provides a range of observables (jet asymmetry, photon-jet pair momentum, among others), through the use of which a better understanding of parton energy loss processes in the massive quark sector can be achieved, as shown by the present phenomenological analysis carried out in Pb-Pb collisions at the LHC.

**Primary author:** Dr STAVREVA, Tzvetalina (LPSC)

**Co-authors:** Dr ARLEO, Francois (LAPTH); Dr SCHIENBEIN, Ingo (LPSC)

**Presenter:** Dr STAVREVA, Tzvetalina (LPSC)

**Session Classification:** Ultrarelativistic Heavy Ions
Progress in the construction of the Mice cooling channel and first measurements

Saturday, 23 July 2011 12:40 (15 minutes)

The muon ionization cooling experiment (MICE) is a strategic R&D project intending to demonstrate the only practical solution to prepare high brilliance beams necessary for a neutrino factory or muon colliders. MICE is under development at the Rutherford Appleton Laboratory (UK). It comprises a dedicated beam line to generate a range of input emittance and momentum, with time-of-flight and Cherenkov detectors to ensure a pure muon beam. The emittance of the incoming beam is measured in the upstream magnetic spectrometer with a sci-fiber tracker. A cooling cell will then follow, alternating energy loss in Li-H absorbers and RF acceleration. A second spectrometer identical to the first and a second muon identification system measure the outgoing emittance. In the 2010 run the beam and most detectors have been fully commissioned and a first measurement of the emittance of a beam with particle physics (time-of-flight) detectors has been performed. The analysis of these data should be completed by the time of the Conference. The next steps of more precise measurements, of emittance and emittance reduction (cooling), that will follow in 2011 and later, will also be outlined.

Primary author: PALLADINO, Vittorio (INFN)
Presenter: Dr DOBBS, Adam (Imperial College London)
Session Classification: Accelerators
Track Classification: Accelerators
Nuclear corrections in neutrino–nucleus DIS and their compatibility with global NPDF analysis

Thursday, 21 July 2011 15:00 (15 minutes)

We perform a global chi^2-analysis of nuclear parton distribution functions using data from charged current neutrino-nucleus deep-inelastic scattering (DIS), charged-lepton-nucleus DIS, and the Drell-Yan (DY) process. We show that the nuclear corrections in nu-A DIS are not compatible with the predictions derived from l^+A DIS and DY data. We quantify this result using a hypothesis-testing criterion based on the chi^2 distribution which we apply to the total chi^2 as well as to the chi^2 of the individual data sets. We find that it is not possible to accommodate the data from nu-A and l^+A DIS by an acceptable combined fit. Our result has strong implications for the extraction of both nuclear and proton parton distribution functions using combined neutrino and charged-lepton data sets.

Primary author: Dr YU, Ji Young (LPSC)
Presenter: Dr YU, Ji Young (LPSC)
Session Classification: QCD
Track Classification: QCD
In July 2008 the BESIII experiment in Beijing recorded the first hadronic event from e+e- collisions at the BEPCII storage ring. Since then over 100 million psi(2S) and over 200 million J/psi events, as well as a data sample corresponding to an integrated luminosity of about 2.9fb-1 at the psi(3770) resonance have been accumulated. This provides the opportunity to improve the precision on many existing measurements in the charm region and has led to striking new results in the light quark sector. The talk reviews recent results focusing on the first two years of BESIII operation and previews future expectations.

**Primary author:** Prof. DONG, Liaoyuan (Institute of High Energy Physics, Beijing)

**Presenter:** Prof. DONG, Liaoyuan (Institute of High Energy Physics, Beijing)

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
Crossing symmetry in the pi-pi D- and F-wave scattering amplitudes and new precise results for the S-wave amplitude

Recently presented new-one subtracted dispersion relations with imposed crossing symmetry condition for the pi-pi S- and P-wave scattering amplitudes and the well known Roy’s equations with two subtractions have led to a set of many partial wave amplitudes in very wide energy range [1]. They allow for e.g. a very precise and unambiguous determination of scattering lengths and parameters of the still puzzling $f_0(600)$ (often called sigma) and $f_0(980)$ resonances in the S wave. In this talk these parameters will be presented.

Similar one subtracted dispersion relations for the D and F waves have also been recently derived and presented [2].

Here, general structure of these equations with imposed crossing symmetry condition and results of their first practical application in the testing of the input amplitudes obtained in [1] will be presented.

It will be seen that these equations are very demanding i.e. produce D and F wave output amplitudes with very small errors.

This significantly increases the accuracy of determined amplitudes and indirectly can further improve the precision of parameters in the other waves, such as S and P.

These new dispersion relations, together with the previous ones for the S and P waves form a complementary set of theoretical constraints that imposed on the experimental amplitude can define them clearly and precisely.

The analysis is based only on unitarity, analyticity and crossing symmetry.


Primary author: Dr KAMINSKI, Robert (Institute of Nuclear Physics Polish Academy of Sciences)

Presenter: Dr KAMINSKI, Robert (Institute of Nuclear Physics Polish Academy of Sciences)

Track Classification: QCD
Results from the NA62 Gigatracker prototype: a lowmass and sub-ns time resolution silicon pixel detector

Friday, 22 July 2011 11:45 (15 minutes)

The Gigatracker (GTK) is a hybrid silicon pixel detector developed for NA62, the experiment studying ultra-rare kaon decays at the CERN SPS. Three GTK stations will provide precise momentum and angular measurements on every track of the high intensity NA62 hadron beam with a time-tagging resolution of 150 ps. Multiple scattering and hadronic interactions of beam particles in the GTK has to be minimized to keep background events at acceptable levels, hence the total material budget is fixed to 0.5% X0 per station. In addition the calculated fluence for 100 days of running is $2 \times 10^{14}$ 1 MeV neq/cm$^2$, comparable to the one expected for the inner trackers of LHC detectors in 10 years of operation. These requirements pose challenges for the development of an efficient and low-mass cooling system, to be operated in vacuum, and on the thinning of read-out chips to 100 μm or less.

The most challenging requirement is represented by the time resolution, which can be achieved by carefully compensating for the discriminator time-walk. For this purpose, two complementary read-out architectures have been designed and produced as small-scale prototypes: the first is based on the use of a Time-over-Threshold circuit followed by a TDC shared by a group of pixels, while the other uses a constant-fraction discriminator followed by an on-pixel TDC. The readout pixel ASICs are produced in 130 nm IBM CMOS technology and bump-bonded to 200 μm thick silicon sensors.

The Gigatracker detector system is described with particular emphasis on recent experimental results obtained from laboratory and beam tests of prototype bump-bonded assemblies, which show a time resolution of less than 200 ps for single hits.

Primary authors:  Dr FANTECHI, Riccardo (CERN and INFN Pisa);  Dr GARBOLINO, sara (INFN)

Presenter:  Dr GARBOLINO, sara (INFN)

Session Classification:  Detector R & D and Data Handling

Track Classification:  Detector R & D and data handling
The expected results from the LHC experiments will give us an idea of the physics at the TeV scale. A lepton-collar at these energies will then be required to complement the information from the LHC, and to fully understand the physics. The Compact Linear Collider (CLIC) with a center of mass energy of up to 3 TeV is a suitable concept for such a future $e^+e^-\rightarrow \gamma$-linear-collider.

The detector requirements for precision measurements at multi-TeV-energies in general and the special experimental conditions at the CLIC accelerator open a rich field of detector R&D opportunities. These requirements go beyond those for a detector at the ILC. Nevertheless, the R&D work that is being performed for the ILC detectors is an excellent starting point for these studies.

The specific challenges are for example the use of dense calorimeter absorber materials for excellent jet energy resolutions up to the highest energies and low material silicon detectors with small pixel sizes. In addition, the high machine-induced-background levels in combination with the short time of only 0.5 ns between two bunch crossings at CLIC will require time-stamping capabilities throughout all sub-detectors.

Preliminary results from the studies for the CLIC conceptual design report and ongoing R&D projects will be presented.
Charmed-Meson Decay Constants from Improved QCD Sum Rules

The decay constants of the heavy pseudoscalar mesons D and D_s are revisited within a recently developed novel approach to dispersive QCD sum rules relying on an unprejudiced implementation of quark–hadron duality. The proposed modifications of standard sum-rule techniques are assessed by applying our prescriptions to quantum mechanics, where exact solutions may be easily found by simply solving the Schrödinger equation. The striking similarity of the extraction procedures of bound-state parameters in potential models and in QCD gives us confidence in the reliability of our improvements and in their applicability to hadron phenomenology. The implications of the adopted definition of the heavy-quark masses are scrutinized and the MS-bar quark-mass scheme is identified as the optimal choice for our purposes. Our concepts prove to reconcile the sum-rule predictions for the charmed-meson decay constants with the findings of both lattice QCD and experiment.

**Primary author:** Dr LUCHA, Wolfgang (Austrian Academy of Sciences)

**Co-authors:** Dr MELIKHOV, Dmitri (Austrian Academy of Sciences); Dr SIMULA, Silvano (INFN)

**Presenter:** Dr LUCHA, Wolfgang (Austrian Academy of Sciences)

**Track Classification:** QCD
Parton distribution functions from DIS data

In this article we present the results of our QCD analysis for proton structure function $F_2^p(x, Q^2)$ in order to determine the parton distributions at next-to-leading order (NLO) of QCD. We also study the heavy quark contributions to the proton structure function $F_2^i(x, Q^2)$, with $i = c, b$ within the framework of the so called 'fixed flavor number scheme' (FFNS) parton model predictions at high energy colliders which is fully predictive in the heavy quark sector where the heavy quark flavors are produced entirely perturbatively from the initial light ($u, d, s$) quarks and gluons - in full agreement with present experiments. The results in the fixed-flavor scheme are compared with those of the general-mass variable-flavor-number scheme, fixed-flavor scheme and other prescriptions used in global fits of PDFs. We use a wide range of the inclusive neutral-current deep-inelastic-scattering (DIS) world data in the present QCD analysis. Our results are in very good agreement with the recent measurements of $F_2^p(x, Q^2)$.

Primary author: Prof. KHORRAMIAN, Ali N. (Semnan university and IPM)

Co-authors: Mr KHANPOUR, Hamzeh (Semnan university); Dr ATASHBAR, shahin (IPM)

Presenter: Prof. KHORRAMIAN, Ali N. (Semnan university and IPM)

Track Classification: QCD
Indirect Dark Matter Searches with the MAGIC Telescopes

Thursday, 21 July 2011 17:15 (15 minutes)

MAGIC is a ground-based system of two, 17 m diameter Imaging Atmospheric Cherenkov Telescopes (IACT) located in the Canary island of La Palma. MAGIC-I has been operational since 2004 and it already achieved the lowest energy threshold among the current generation of IACTs. In 2009 it was joined by MAGIC-II, and together, in the stereoscopic mode, they allow for the observations of significantly improved sensitivity, lower energy threshold and better energy and angular resolution.

The search for Dark Matter (DM) with MAGIC consists of looking for the signatures of very-high energy (VHE) gamma-rays that originate from the annihilation of hypothetical DM particles. The gamma-ray spectrum resulting from that process should bear distinctive features (like spectral line or cut-off), correlated to the DM particle mass, which, according to some models, in the case of WIMPs should be in the VHE range and, therefore, detectable by IACTs. However, identification of these features, though they are universal, is a challenge, since the potential DM signal usually remains invisible under the dominant gamma-radiation from conventional astrophysical objects. For this reason, we direct our search with MAGIC to the objects with large amounts of DM, like Galactic Center, the dwarf spheroidal galaxies and galaxy clusters.

Here we report on the indirect DM searches performed with MAGIC so far, and also present the prospects for the future stereoscopic observations. We discuss how these results can be used to set constrains on DM parameter’s space of certain supersymmetric models.

Primary author: Ms ALEKSIĆ, Jelena (IFAE)
Presenter: Ms ALEKSIĆ, Jelena (IFAE)
Session Classification: Astroparticle Physics
Track Classification: Astroparticle Physics
Towards exact field theory results for the Standard Model on fractional D6-branes

Saturday, 23 July 2011 12:30 (15 minutes)

Fractional D6-branes on toroidal orbifold backgrounds are known to be able to accommodate the particle spectrum and gauge group of the Standard Model, but up to now exact results for their low-energy effective action are missing. In this talk, I will discuss how the conceptual ansatz for the field theory on the torus is generalised to those orbifold backgrounds on which the Standard Model spectrum can be realised on fractional branes.

**Primary author:** HONECKER, Gabriele (Universitaet Mainz)

**Presenter:** HONECKER, Gabriele (Universitaet Mainz)

**Session Classification:** Non-Perturbative QFT and String Theory
DAEdALUS: using multiple accelerators to determine CP violation in the neutrino sector

Measurement of delta, the CP violating phase in the neutrino mixing matrix, is a crucial next step in our understanding of the universe. It appears as a $\pm \sin(\delta)$ term in the expression for the rate of oscillation from muon to electron neutrinos: CP violation makes the rate for $\nu_{\mu}$ to $\nu_{e}$ transitions different from $\bar{\nu}_{\mu}$ to $\bar{\nu}_{e}$ bar. However delta can be determined by measuring either of these rates: DAEdALUS proposes to use the second.

The oscillation depends on $L/E$, and we maintain strict control of $E$ by using decay-at-rest $\pi^+$ mesons which provide a source of muon antineutrinos up to 53 MeV, with very low electron antineutrino contamination. For a good measurement one needs three values of $L$ corresponding to $0$, $\pi/4$ and $\pi/2$ of an oscillation. The near measurement establishes the total rate; the medium one the oscillation wavelength, and the far one, at the oscillation peak, the amplitude. Rather than building a source and three detectors, we propose a single detector, shared with LBNE, a large Gadolinium loaded water Cerenkov at the underground DUSEL facility, and, at different distances, three sources from different accelerators. These machines need to deliver protons with an energy of order 1 GeV, and to run at several Megawatts. The requirements are similar to those of proposed ADSR systems, and there are opportunities for synergies in their development. We outline the technical challenges of producing such high currents, with the proposed possible solutions. These include stacked cyclotrons, the MultiMegawatt cyclotron, the Compact Superconducting Cyclotron, and the FFAG. We discuss the timescale for possible results, and how they would complement those of LBNE.

Primary author: BARLOW, Roger (Huddersfield University)

Presenter: BARLOW, Roger (Huddersfield University)

Track Classification: Accelerators
Limits for the noncommutative space-time parameter in the noncommutative standard model

We discuss the limits on the scale of noncommutative (NC) parameter $\Lambda_{NC}$ via studying $t\bar{t}$ pair production in noncommutative extension of the standard model (SM) using the Seiberg-Witten maps and the star product to the first order of the noncommutative parameter $\Theta_{\mu\nu}$.

Primary author:  GHEGAL, Linda (LPMPs Mentouri University, Constantine, ALGERIA.)
Presenter:  GHEGAL, Linda (LPMPs Mentouri University, Constantine, ALGERIA.)
First results on the event-by-event fluctuations and correlations in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$-TeV

Thursday, 21 July 2011 15:00 (15 minutes)

Fluctuations of thermodynamic quantities are fundamental for the study of the QGP phase transition. Among the several observables calculated on an event-by-event basis, the different measures of the charge and mean transverse momentum fluctuations are of particular interest since they are considered to be indicators of the existence and of the order of this transition as well as of the thermalization in central A-A events. We will review the first results from the event-by-event physics program of the ALICE experiment in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$-TeV. The experimental results will be compared to previously published data and available model predictions. The implications of the evolution of the fluctuations after the hadronization will be discussed and quantified.

Primary author: Dr CHRISTAKOGLOU, Panos (NIKHEF)
Presenter: Dr CHRISTAKOGLOU, Panos (NIKHEF)
Session Classification: Ultrarelativistic Heavy Ions
Directly Coupled Scintillator Tiles and Silicon Photomultipliers

Scintillator tiles directly coupled to photo-sensors (without wavelength shifting fiber) offer greatly simplified construction for highly granular detectors. The performance of these detectors requires uniform response across the surface of the scintillator. Flat and shaped scintillator tiles directly coupled to silicon photo-multipliers have been investigated with both a radioactive source and high energy protons. We present results which indicate that, as expected, flat cells have high response near the photo-sensors while shaped cells have a much more uniform response, suggesting cells can be tailored to ensure uniform response. We also present results demonstrating that the response of the cells to a source and to beam particles are in qualitative agreement. Investigations into fully integrated electronics and directly coupled scintillators and photo-sensor readout modules are reported.

Primary author: Prof. BLAZEY, Gerald (Northern Illinois University)

Co-authors: Dr DYCHKANT, Alexandre (Northern Illinois University); Prof. CHAKRABORTY, Dhiman (Northern Illinois University); Mr COLE, Stephen (Northern Illinois University); Dr ZUTSHI, Vishnu (Northern Illinois University)

Presenter: Prof. CHAKRABORTY, Dhiman (Northern Illinois University)

Track Classification: Detector R & D and data handling
The KLOE experiment at the $\phi$ factory DAΦNE in Frascati (near Rome) is the first to have employed Initial State Radiation (ISR) to precisely determine the $e^+e^-\to\pi^+\pi^-(\gamma)$ cross section below 1 GeV. Such a measurement is particularly important to test the Standard Model calculation for the $(g-2)$ of the muon, where a long standing $3\sigma$ discrepancy is observed.

In 2005 and 2008 KLOE has published a measurement of the $\pi^+\pi^-$ cross section with the photon emitted at small angle, and a new independent measurement with the photon emitted at large angle using data taken in 2006 at a collision energy of 1 GeV (i.e. 20 MeV below the $\phi$-peak) has been accepted for publication.

While these measurements were normalized to the DAΦNE luminosity using large angle Bhabha scattering, a new analysis has been performed which derives the pion form factor directly from the $\pi^+\pi^-\gamma(\gamma)/\mu^+\mu^-\gamma(\gamma)$ ratio.

We present the KLOE results and discuss future prospects for these measurements as well as their impact on the evaluation of the hadronic contribution to the muon anomaly.

**Primary author:** Dr VENANZONI, Graziano (INFN - Laboratori Nazionali di Frascati)

**Presenter:** Dr VENANZONI, Graziano (INFN - Laboratori Nazionali di Frascati)

**Session Classification:** Top and Electroweak Physics

**Track Classification:** Top and Electroweak Physics
The global electroweak fit and constraints on new physics

Friday, 22 July 2011 15:40 (15 minutes)

In the global fit of the Standard Model using Gfitter, electroweak precision observables as well as constraints from direct Higgs searches are compared with state-of-the-art electroweak predictions. We use the most recent results for direct Higgs searches, including updates on precision measurements such as MW and mtop from Tevatron and LHC experiments. Moreover, the Gfitter results for the oblique parameters are presented coherently together with constraints on various new physics models, including Little Higgs models, Extra Dimensions, Technicolour and Four Generations.

Primary author: Dr SCHOTT, Matthias (CERN)

Co-authors: Dr HOECKER, Andreas (CERN); Mrs LUDWIG, Dorte (DESY); Dr STELZER, Joerg (DESY); HALLER, Johannes (Uni. Goettingen); Dr MOENIG, Klaus (DESY); GOEBEL, Martin (DESY); Dr BAAK, Max (CERN)

Presenter: Dr SCHOTT, Matthias (CERN)

Session Classification: Higgs and New Physics
The Thermal Properties of Pseudoscalar Heavy Quarkonium

In this study, we investigated the temperature dependence of mass and leptonic decay constants for pseudoscalar heavy quarkonium states. We take into account the additional operators in the Wilson expansion at finite temperature and calculate thermal spectral density in the QCD side. Analysis of obtained thermal QCD sum rules shows that at critical temperature, the decay constant decreases approximately 65% and this situation can be considered as a sign of transition to quark-gluon-plasma (QGP) phase. The results at zero temperature are in a good consistency with the existing experimental values as well as predictions of the other nonperturbative approaches.

Primary author: Prof. VELI VELIEV, Elşen (Department of Physics, Kocaeli University)

Co-authors: Dr SUNDU, Hayriye (Department of Physics, Kocaeli University); Dr AZIZI, Kazem (Physics Division, Faculty of Arts and Sciences, Dogus University); Ms AKŞIT, Nurcan (Faculty of Education, Kocaeli University)

Presenter: Prof. VELI VELIEV, Elşen (Department of Physics, Kocaeli University)

Track Classification: QCD
Deeply Virtual Compton Scattering at HERMES

Friday, 22 July 2011 17:00 (15 minutes)

The HERMES experiment at DESY, Hamburg used the HERA 27.6GeV electron/positron polarised beam to study the structure of the nucleon. Deeply Virtual Compton Scattering (DVCS) provides access to Generalised Parton Distributions via measured azimuthal asymmetries at HERMES. Data was collected from 1995 to 2007 with unpolarised and both longitudinally and transversely polarised gas targets (H, D and heavier nuclei), which has been analysed to provide the most diverse set of DVCS azimuthal asymmetries. A Recoil Detector was installed in 2005-2006, which has provided improved exclusivity of the beam spin asymmetry measurement. The latest DVCS results from HERMES will be presented including the first result from the Recoil Detector.

Primary author: Ms BOWLES, Jennifer (University of Glasgow)

Presenter: Ms BOWLES, Jennifer (University of Glasgow)

Session Classification: QCD
GasToF: Picosecond resolution timing detector using MCP-PMTs

Development of GasToF, a picosecond resolution Cherenkov gas detector using the fastest single anode MCP-PMTs, is reviewed including its various design options. New results obtained from measurements at the CERN test-beams in August and September 2010 are presented. In particular, the measured timing resolution of about 5 ps is discussed in depth. This is confronted with detailed modelling of the response of Hamamatsu R3809 and Photek 210 tubes and recent results obtained at a fast laser test stand. The next GasToF development stage using the multi-anode MCP-PMTs is then described, and the outlook for future developments is given, including the applications in medical instrumentation.

**Primary author:** PIOTRZKOWSKI, Krzysztof (UCLouvain)

**Presenter:** PIOTRZKOWSKI, Krzysztof (UCLouvain)

**Track Classification:** Detector R & D and data handling
Low Energy Signatures of the TeV Scale See-Saw Mechanism

Saturday, 23 July 2011 11:40 (15 minutes)

We study a type I see-saw scenario where the right-handed (RH) neutrinos, responsible for the light neutrino mass generation, lie at the electroweak scale. Under certain conditions, the strength of the charged (CC) and neutral current (NC) weak interactions of the Standard Model particles with the heavy RH neutrinos can be large enough to allow the production of the latter at the LHC, opening also the possibility of observing other low energy signatures of the new physics in the electroweak precision observables as well as in searches for rare leptonic decays or neutrinoless double beta decay. We show that the present bound on the $\mu \rightarrow e + \gamma$ decay rate makes very difficult the observation of the heavy RH neutrinos at the LHC or the observation of deviations from the Standard Model predictions in the electroweak precision data. We also show that all present experimental constraints on this scenario still allow i) for an enhancement of the rate of neutrinoless double beta decay, which thus can be in the range of sensitivity of the GERDA experiment even when the light Majorana neutrinos possess a normal hierarchical mass spectrum, and ii) for the predicted $\mu \rightarrow e + \gamma$ decay rate to be within the sensitivity range of the MEG experiment.

Primary authors: Prof. IBARRA, Alejandro (TUM); Dr MOLINARO, Emiliano (CFTP - IST); Prof. PETCOV, Serguey (SISSA)

Presenter: Dr MOLINARO, Emiliano (CFTP - IST)

Session Classification: Neutrino Physics

Track Classification: Neutrino Physics
Prospects for constraining WIMP properties with ton-scale Dark Matter direct detection experiments

We investigate the reconstruction capabilities of Dark Matter properties from future ton-scale direct detection experiments using several targets. Adopting realistic values for the exposure, energy threshold and resolution of Dark Matter experiments which will come online within 10 years, the degree of complementarity between different targets is quantified. While a measurement of the Dark Matter mass and inelastic parameter are promisingly robust, it turns out that the different couplings can only be loosely constrained. In our work, the uncertainty in the astrophysical parameters controlling the local Dark Matter density and velocity distribution is included self-consistently and translates into a significant downgrading of accuracy. However, we show that, under certain assumptions, future direct detection experiments can achieve self-calibration of some astrophysical parameters, and they will be able to constrain the Dark Matter mass with only very weak external astrophysical constraints.

Primary author: PATO, Miguel (ITP Zurich)
Presenter: PATO, Miguel (Università Padova / IAP Paris / ITP Zurich)
Track Classification: Astroparticle Physics
At LHC, top-quark pair production is an important process to test the Standard Model and search for new physics. I discuss an analytical approach to the virtual corrections at NNLO in QCD. Some technical details will be given for the methods employed in the calculation.

**Primary author:** VON MANTEUFFEL, Andreas (University of Zurich)

**Co-authors:** FERROGLIA, Andrea (New York City College); STUDERUS, Cedric (University of Bielefeld); BONCIANI, Roberto (Universite Joseph Fourier, Grenoble); GEHRMANN, Thomas (University of Zurich)

**Presenter:** VON MANTEUFFEL, Andreas (University of Zurich)

**Session Classification:** Top and Electroweak Physics

**Track Classification:** Top and Electroweak Physics
Pion elastic and pi-gamma form factors at large momentum transfers

Friday, 22 July 2011 10:00 (15 minutes)

We study the pion elastic and the pi-gamma transition form factors at large values of the momentum transfers making use of the existing experimental data and two theoretical approaches: (i) the local-duality QCD sum rules and (ii) quantum-mechanical potential models with an interaction consisting of Coulomb and confining parts in which case the ground-state form factors satisfy factorization theorems similar to those in QCD.

For the pion elastic form factor, we show that the existing data at $Q^2=1-6 \text{ GeV}^2$ lead to important consequences for the behaviour of the form factor at larger momentum transfers, up to asymptotically large values. For the pi-gamma form factor, we discuss possible dynamical mechanisms which could explain mysterious BaBar data for this form factor at $Q^2=10-30 \text{ GeV}^2$.

Primary authors: Dr MELIKHOV, Dmitri (HEPHY, Vienna, Austria & SINP, Moscow, Russia); Ms BALAKIREVA, Irina (SINP, Moscow, Russia); Dr LUCHA, Wolfgang (HEPHY, Vienna, Austria)

Presenter: Dr MELIKHOV, Dmitri (HEPHY, Vienna, Austria & SINP, Moscow, Russia)

Session Classification: QCD

Track Classification: QCD
A Novel Pixel Vertex Detector for the Belle II Experiment at SuperKEKB

Friday, 22 July 2011 15:15 (15 minutes)

With the completion of the first-generation experiments at asymmetric $e^+e^-$ colliders (BaBar and Belle) studying CP violation in the B-meson system, a new era of high luminosity machines is at the horizon. We report here on the plans for future experiments on CP violation and searches for physics beyond the Standard Model at the upgraded KEKB machine in Japan (SuperKEKB”), providing an almost two orders of magnitude higher instantaneous luminosity. Due to the much higher backgrounds expected at SuperKEKB, a massive upgrade of the Belle detector (Belle II”) is necessary. In particular, the tracking detectors, the Central Drift Chamber and the Silicon strip vertex detector need to be replaced. Due to the expected large occupancy close to the beam pipe a pixel detector is mandatory at SuperKEKB for the precise vertex determination. We report here on the design and construction of a novel silicon pixel detector for Belle II, based on the DEPFET-technology. The DEPFET ("depleted p-channel field effect transistor") pixel provides a high signal to noise ratio and therefore allows for thin sensors, down to 50 microns. The principles of the DEPFET technology will be explained as well as the construction of large pixel matrices where the readout ASICs are mounted at the ends of the sensors, outside of the acceptance region for particle detection. The sensors are monolithic and self-supporting and are arranged in two layers to make up the detector structure. Some details concerning the readout, mechanics and cooling schemes are also presented. Finally, we show some simulations on the expected performance of this unique vertex detector, which should be ready for installation in Belle II by the end of 2014.

**Primary author:** KIESLING, Christian (Max-Planck-Institute for Physics)

**Presenter:** KIESLING, Christian (Max-Planck-Institute for Physics)

**Session Classification:** Detector R & D and Data Handling

**Track Classification:** Detector R & D and data handling
Status and prospects of the EDELWEISS direct WIMP search

Thursday, 21 July 2011 15:00 (15 minutes)

EDELWEISS is a direct search for WIMP dark matter using cryogenic heat-and-ionization germanium detectors. We report the final results of the second stage of the experiment, EDELWEISS-II, obtained with an array of ten 400 g detectors equipped with interleaved electrodes for the rejection of surface events. Limits on the elastic and inelastic cross-sections of spin-independent interactions of WIMPs were derived from a total exposure of 384 kg.day, obtained following fourteen months of continuous operation at the Laboratoire Souterrain de Modane. We also present the prospects of EDELWEISS-III, which plans to accumulate more than 3000 kg.day of data with 40 new 800 g detectors. All the surfaces of these new detectors are fully covered with interleaved electrodes, resulting in an increase of fiducial mass and of the rejection capabilities.

Primary author: GASCON, Jules (Universite de Lyon, Universite Lyon 1, CNRS/IN2P3)

Presenter: GASCON, Jules (Universite de Lyon, Universite Lyon 1, CNRS/IN2P3)

Session Classification: Astroparticle Physics

Track Classification: Astroparticle Physics
Search for Neutrinoless Double Beta Decay with CUORE

The Cryogenic Underground Observatory for Rare Events (CUORE) is an experiment to search for neutrinoless double beta decay (0nuDBD) in Te-130 and other rare processes. The observation of 0nuDBD would indicate that neutrinos are Majorana particles and would provide information about the absolute neutrino mass scale. CUORE is a bolometric detector composed of 988 TeO2 crystals, with the total mass of about 750 kg of natural Tellurium. We will discuss the status of the CUORE experiment, including recent R&D efforts, anticipated sensitivity, and present the most recent results from Cuoricino, the predecessor experiment operated in Gran Sasso National Laboratories in Italy.

Primary author: Prof. KOLOMENSKY, Yury (UC Berkeley/LBNL)
Presenter: FERRI, Elena (University of Milano Bicocca and INFN, Sezione di Milano-Bicocca)

Track Classification: Neutrino Physics
Direct Dark Matter and Axion Detection with CUORE

Thursday, 21 July 2011 15:15 (15 minutes)

The Cryogenic Underground Observatory for Rare Events (CUORE) is an experiment to search for neutrinoless double beta decay in Te-130 and other rare processes. CUORE is a bolometric detector composed of 988 TeO2 crystals, with the total mass of about 1 tonne. The large detector mass, low backgrounds, and the low energy threshold of a few keV make the experiment well suited for direct detection of galactic dark matter particles and solar axions. We discuss the development of a novel low-energy trigger that enables such searches, and present the preliminary results from a test run with four CUORE-like crystals at Gran Sasso National Laboratories in Italy.

Primary author: Prof. KOLOMENSKY, Yury (UC Berkeley/LBNL)

Presenter: Mrs MAIANO, Cecilia (University of Milano Bicocca and INFN, Sezione di Milano-Bicocca)

Session Classification: Astroparticle Physics

Track Classification: Astroparticle Physics
Combined upper limit on Standard Model Higgs boson production in $\boldsymbol{p}\boldsymbol{p}$ collisions at $\sqrt{s} = 1.96$ TeV at D0

Friday, 22 July 2011 09:45 (15 minutes)

We present the combination of the searches for the Standard Model Higgs boson at a center-of-mass energy of $\sqrt{s} = 1.96$ TeV, using up to $8.5 \text{ fb}^{-1}$ of data collected with the D0 detector at the Fermilab Tevatron collider. The major contributing processes include associated production ($W H \rightarrow \ell \nu bb$, $ZH \rightarrow \nu \nu bb$, $ZH \rightarrow \ell \ell bb$, and $WH \rightarrow WWW$) and gluon fusion ($gg \rightarrow H \rightarrow WW^{(*)}$). The significant improvements across the full mass range resulting from the larger data sets, improved analyses and inclusion of additional channels are discussed. The combination of all channels results in significantly improved sensitivity across the 100-200 GeV mass range, and in particular around 160 GeV.

Primary author: Dr VERZOCCHI, Marco (Fermilab - PPD Division)

Presenter: GREDER, sebastien (IPHC)

Session Classification: Higgs and New Physics
Study of the dijet invariant mass distribution in $W$+2jet candidate events in $p+p$ collisions at $\sqrt{s} = 1.96$ TeV

*Thursday, 21 July 2011 09:45 (15 minutes)*

We present a study of the dijet invariant mass spectrum in events with at least two jets produced in association with a $W$ boson, using data collected with the D0 detector which correspond to an integrated luminosity of 4.3 fb$^{-1}$. We perform a detailed comparison of the observed distribution with the background prediction, taking into account systematic uncertainties, to check the presence of an excess in the 120-160 GeV region recently claimed by the CDF Collaboration.

**Primary author:** Dr VERZOCCHI, Marco (Fermilab - PPD Division)

**Presenter:** Dr SEKARIC, Jadranka (University of Kansas)

**Session Classification:** Higgs and New Physics
Anomalous like-sign dimuon charge asymmetry at D0

Thursday, 21 July 2011 15:30 (15 minutes)

We present an improved measurement of the charge asymmetry $A$ of like-sign dimuon events in 9 fb$^{-1}$ of $p\bar{p}$ collisions recorded with the D0 detector at a center-of-mass energy $\sqrt{s} = 1.96$ TeV at the Fermilab Tevatron collider. From $A$, we extract the like-sign dimuon charge asymmetry in semileptonic $b$-hadron decays. We also study the dependence of charge asymmetry on muon impact parameter. Additional constraints on the $CP$ violation in the $B$ meson sector are also derived from a measurement of the flavor-specific semileptonic asymmetry in the $B^0_d \to \mu D + X$ channel.

Primary author: Dr VERZOCCHI, Marco (Fermilab - PPD Division)
Presenter: BORISSOV, Guennadi
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
Measurement of three-jet differential cross sections

We present the first measurement of the inclusive three-jet differential cross section as a function of the invariant mass of the three jets with the largest transverse momenta in an event in $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ TeV. The measurement is made in different rapidity regions and for different jet transverse momentum requirements and is based on a data set corresponding to an integrated luminosity of 0.7 fb$^{-1}$ collected with the D0 detector at the Fermilab Tevatron Collider. The results are used to test the three-jet matrix elements in perturbative QCD calculations at next-to-leading order in the strong coupling constant. The data allow discrimination between parametrizations of the parton distribution functions of the proton.

**Primary author:** Dr VERZOCCHI, Marco (Fermilab - PPD Division)

**Presenter:** Dr SVOISKY, Peter (University of Oklahoma)

**Session Classification:** QCD

**Track Classification:** QCD
Azimuthal decorrelations and multiple parton interactions in \( \gamma + 2 \text{ jet} \) and \( \gamma + 3 \text{ jet} \) events in \( p\bar{p} \) collisions at \( \sqrt{s} = 1.96 \text{ TeV} \)

**Saturday, 23 July 2011 10:00 (15 minutes)**

Samples of inclusive \( \gamma + 2 \text{ jet} \) and \( \gamma + 3 \text{ jet} \) events collected by the D0 experiment with an integrated luminosity of about 1-fb\(^{-1}\) in \( p\bar{p} \) collisions at \( \sqrt{s} = 1.96 \text{ TeV} \) are used to measure cross sections as a function of the angle in the plane transverse to the beam direction between the transverse momentum \( p_T \) of the \( \gamma \)+leading jet system (jets are ordered in \( p_T \)) and \( p_T \) of the other jet for \( \gamma + 2 \text{ jet} \), or \( p_T \) sum of the two other jets for \( \gamma + 3 \text{ jet} \) events.

The results are compared to different models of multiple parton interactions (MPI) in the \{sc pythia\} and \{sc sherpa\} Monte Carlo (MC) generators.

The data indicate a contribution from events with double parton (DP) interactions and are well described by predictions provided by the \{sc pythia\} MPI models with \( p_T \)-ordered showers and by \{sc sherpa\} with the default MPI model.

The \( \gamma + 2 \text{ jet} \) data are also used to determine the fraction of events with DP interactions as a function of the azimuthal angle and as a function of the second jet \( p_T \).

**Primary author:** Dr VERZOCCHI, Marco (Fermilab - PPD Division)

**Presenter:** Prof. SKACHKOV, Nikolay (Joint Institute for Nuclear Research)

**Session Classification:** QCD

**Track Classification:** QCD
New results in exclusive hard reactions

(continued)

Exclusive hard reactions have seen much recent progress, both theoretically and experimentally. I shall first review some new results on the Transition distribution amplitudes (TDAs) which appear in the QCD factorized amplitude of some “backward” exclusive processes (ref: Phys.Rev. D82, 094030, 2010 and papers in preparation). I will also show new results on NLO QCD corrections for timelike deeply virtual Compton scattering (ref: Phys.Rev.D83, 034009, 2011) and emphasize their importance for extracting generalized parton distributions.

Primary author: Dr PIRE, bernard (cpht polytechnique)

Co-authors: Dr WAGNER, Jakub (SINS); Dr SEMENOV TIAN SHANSKY, Kirill (CPHT Polytechnique); Dr SZYMANOWSKI, Lech (SINS)

Presenter: Dr PIRE, bernard (cpht polytechnique)

Session Classification: QCD

Track Classification: QCD
Proton decay and wavefunctions in F-theory GUTs

Saturday, 23 July 2011 11:30 (15 minutes)

We study proton decay in Grand Unified Models based on F-theory. We calculate the coupling of the heavy Higgs triplet modes to the light quark generations. This coupling plays an essential part in dimension 5 proton decay and we show that it is very different from the associated Yukawa coupling.

Primary author: Dr PALTI, Eran (Ecole Polytechnique)
Presenter: Dr PALTI, Eran (Ecole Polytechnique)
Session Classification: Non-Perturbative QFT and String Theory
Searches for Supersymmetry in Hadronic Final States with the CMS Detector at the LHC

Saturday, 23 July 2011 11:20 (20 minutes)

We present the results of searches for Supersymmetry in all-hadronic final states with jets and missing transverse energy, including the cases of jets identified as b-jets, the decay products of top quarks and hadronically decaying tau leptons. The searches are performed using data collected by the CMS experiment at the LHC in pp-collisions at a center-of-mass energy of 7 TeV. Various data-driven techniques used to measure the Standard Model backgrounds are discussed. The results are interpreted in a range of Supersymmetric scenarios.

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)
Presenter: Mr AUTERMANN, Christian (Hamburg University)
Session Classification: Higgs and New Physics
The Transverse Gauge Links in Soft-Collinear Effective Field Theory

Thursday, 21 July 2011 12:30 (15 minutes)

Soft-Collinear Effective Theory (SCET) has been in covariant gauges. We argue that SCET, as it stands, is not capable to define in a gauge invariant way certain non-perturbative matrix elements that are an integral part of many factorization theorems. Those matrix elements involve two quark or gluon fields separated not only in light-cone direction but also in the transverse one. This observation limits the range of applicability of SCET. To remedy this we argue that one needs to introduce a new Wilson line as part of the SCET formalism, that we call T. We discuss how to modify SCET Lagrangian applicable in both classes of gauges: regular and singular ones. This extends the range of applicability of SCET. The new Lagrangian must be used to obtain factorization theorems in cases where the transverse momenta of the particles in the final states are not integrated over, such as semi-inclusive deep inelastic scattering, Drell-Yan and the Higgs production cross-section at low transverse momentum. By doing so all non-perturbative matrix elements appearing in the factorized cross-sections are gauge invariant.

Primary author: SCIMEMI, Ignazio (Uiv. Complutense de Madrid)
Presenter: SCIMEMI, Ignazio (Uiv. Complutense de Madrid)
Session Classification: QCD
Track Classification: QCD
Inclusive Search for Squarks and Gluinos using the Razor Kinematic Variable

We search for heavy particles pair produced in 7 TeV proton-proton collisions with data collected by the CMS detector in 2011 at the CERN Large Hadron Collider. The search is sensitive to generic SUSY models provided superpartner particles are kinematically accessible, with minimal assumptions on properties of the Lightest Superpartner Particle (LSP). The baseline selection is inclusive requiring only two or more reconstructed jets. We test the kinematic consistency of the selected events with the hypothesis of heavy particle pair production using the dimensionless razor (R) variable. After rigorous data-driven background modeling and background rejection based on R, the new physics signal is characterized by a broad peak in the distribution of MR, where MR is an event-by-event indicator of the heavy particle scale. The results are interpreted in the light of the constrained minimal supersymmetric extension of the standard model as well as the more generic Simplified Model Spectra (SMS).

**Primary author:** Dr KRAMMER, Manfred (HEPHY, Vienna)

**Presenter:** MOTT, Alex
Search for new physics with same-sign isolated dilepton events with jets and missing transverse energy at CMS

The results of searches for Supersymmetry in events with two same-sign isolated leptons, hadronic jets, and missing transverse energy in the final state are presented. The searches use pp collisions at 7 TeV collected in 2011 by the CMS experiment.

Primary author:  Dr KRAMMER, Manfred (HEPHY, Vienna)
Presenter:  MILENOVIC, Predrag (ETH Zurich, Switzerland)
Measurements of forward energy flow and forward jet production with CMS

Saturday, 23 July 2011 11:00 (15 minutes)

We present measurements of the forward (3 < |eta| < 5) energy flow in minimum bias events and in events with either hard jets or W and Z bosons produced at central rapidities, as well as measurements of the inclusive forward jet cross section and of associated production of forward and central jets. The dijet "k-factor", defined as the ratio of the inclusive to the exclusive dijet cross section, is measured as function of rapidity separation. Results are compared to MC models with different parameter tunes for the description of the underlying event and to perturbative QCD calculations, the PYTHIA and HERWIG parton shower event generators, as well as to the CASCADE Monte Carlo

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)
Presenter: JUNG, Hannes
Session Classification: QCD
Measurement of inelastic, diffractive and exclusive processes in pp collisions with CMS

Saturday, 23 July 2011 11:15 (15 minutes)

A measurement of the total, inelastic pp cross section at 7 TeV, based on the observation of pile-up events, is presented.

Measurements of soft and hard diffractive processes obtained with the CMS detector at various centre-of-mass energies are presented and compared with the PYTHIA6, PHOJET and PYTHIA8 Monte Carlo generators. The ratio of diffractive to inclusive jet production is obtained and the rapidity gap survival probability is estimated from the comparison of data to predictions of the POMPYT generator.

A measurement of exclusive production of muons pairs in pp collisions at sqrt(s) = 7 TeV is also presented. Single differential cross sections are obtained as function of the dimuon transverse momentum, invariant mass and acoplanarity for dimuon pairs with an invariant mass above 11 GeV. Data are compared to predictions of the LPAIR Monte Carlo model.

Primary author:  Dr KRAMMER, Manfred (HEPHY, Vienna)
Presenter:  HOLLAR, Jonathan Jason
Session Classification:  QCD
A Search For The Higgs Boson in the Mode \( H \rightarrow \tau \tau \)

Friday, 22 July 2011 11:15 (15 minutes)

We present results from a search for the Higgs Boson in the channel \( H \rightarrow \tau \tau \) with the CMS detector using data accumulated in the 2010 & 2011 running of the LHC at \( \sqrt{s} = 7 \) TeV

Primary authors: Dr KRAMMER, Manfred (HEPHY, Vienna); GENNAI, Simone (CERN/INFN)

Presenter: GENNAI, Simone (CERN/INFN)

Session Classification: Higgs and New Physics
A Search For The Higgs Boson In The Channel H → Gamma Gamma With The CMS Detector

Friday, 22 July 2011 12:00 (15 minutes)

We present results from a search for the SM Higgs Boson in the channel H → Gamma Gamma with the CMS detector using data accumulated in the 2010 & 2011 running of the LHC at sqrt s = 7 TeV

Primary authors:  DEL RE, Daniele (Universita’ ”Sapienza” & INFN Rome); Dr KRAMMER, Manfred (HEPHY, Vienna)

Presenter:  DEL RE, Daniele (Universita’ ”Sapienza” & INFN Rome)

Session Classification:  Higgs and New Physics
Combined Results on SM Higgs Search With The CMS Detector

Friday, 22 July 2011 15:20 (20 minutes)

We report on the combined results from several searches for the SM Higgs boson conducted by the CMS experiment with the data accumulated during the 2010 & 2011 running of the LHC at $\sqrt{s} = 7$ TeV.

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)
Presenter: KORYTOV, Andrey
Session Classification: Higgs and New Physics
Measurement of the Differential Isolated Prompt Photon Production Cross Section in pp Collisions at sqrt(s)= 7 TeV

Saturday, 23 July 2011 09:00 (15 minutes)

A measurement of the differential cross section for the inclusive production of isolated prompt photons in proton-proton collisions at a center-of-mass energy sqrt(s)=7 TeV is presented. The data sample corresponds to an integrated luminosity of 36/pb recorded by the CMS detector at the LHC. Photons are required to have a pseudorapidity |η|<2.5 and ET>25 GeV. Photon candidates are identified by using the ratio of the energy measured in the electromagnetic calorimeter to momentum measured in the tracker for converted photons, and isolation measured in the tracker and calorimeters. The measured cross section is presented as a function of photon transverse energy ET in four pseudorapidity regions. It is compared with next-to-leading-order perturbative QCD calculations.

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)
Presenter: CHANON, Nicolas Pierre
Session Classification: QCD
Track Classification: QCD
Measurement of Underlying Event using Drell-Yan Process

A measurement of underlying events (UE) using Drell-Yan (DY) process around Z-resonance, is performed in proton-proton collision at centre of mass energy \( \sqrt{s} = 7 \, \text{TeV} \) using data collected by CMS experiment at the LHC during the year 2010 and corresponding to an integrated luminosity of 36 \( \text{pb}^{-1} \). Experimentally, it is difficult to separate hard and soft components in most of the collisions in a clean way. The DY process with muonic final state \( (q\bar{q} \rightarrow \mu\mu) \) provides an excellent way to study UE activity by easily separating out the hard interaction part from the soft components. The physics observables which are sensitive to the UE, the densities of average multiplicity and the average scalar sum of the transverse momenta of the charged particles in the directions opposite and transverse to the dimuon system have been studied. A slow growth in these variables are observed with increase in energy scale of the event defined by the transverse momentum of the di-muon system. The data is corrected to the particle level to remove the effects of the detector resolution and then compared with the prediction of various current parametrizations in QCD Monte-Carlo.

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)

Presenter: BANSAL, Sunil (University of Antwerp, Antwerpen, Belgium)

Track Classification: QCD
Inclusive jet and dijet cross-section measurements in CMS

Thursday, 21 July 2011 09:45 (15 minutes)

We present inclusive jet and dijet cross-section measurements in proton-proton collisions at a center-of-mass energy of 7 TeV at the CERN LHC, using the 2010 data collected by the CMS experiment. The data are compared to NLO pQCD predictions and are found to be in good agreement.

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)
Presenter: ROSE, Keith Jarid
Session Classification: QCD
Track Classification: QCD
Soft QCD results from CMS

Studies of hadron production in pp collisions, including charged particle transverse momentum, pseudorapidity and event-by-event multiplicity distributions at sqrt(s) = 0.9, 2.36 and 7 TeV are shown. Measured spectra of identified strange hadrons, reconstructed based on their decay topology, are also presented. Comparisons to several QCD Monte Carlo models and tunes are discussed. Results on two-particle angular correlations over a broad range of pseudorapidity and azimuthal angle in pp collisions are presented at sqrt(s) = 0.9 and 7 TeV. In high multiplicity events, a pronounced structure emerges in the two-dimensional correlation function for particle pairs with intermediate transverse momentum of 1-3 GeV/c. Furthermore, Bose-Einstein correlations between identical particles are measured in samples of proton-proton collisions at sqrt(s) = 0.9 and 7 TeV. Finally, a measurement of the underlying activity in scattering processes with a pT scale in the several GeV region is also presented.

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)
Presenter: CHAO, Yuan
Track Classification: QCD
Multijet measurements with the CMS detector at 7TeV

Thursday, 21 July 2011 10:00 (15 minutes)

We present measurements sensitive to QCD multijet production using data from proton-proton collisions at $\sqrt{s} = 7$ TeV collected with the CMS detector at the CERN LHC. The hadronic event shapes, the dijet azimuthal decorrelation and the ratio of the 3 jet to 2 jet production cross-sections confront the QCD multijet dynamics at a previously unexplored kinematic regime. The data are compared to various QCD Monte Carlo models.

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)
Presenter: Prof. KOKKAS, Panagiotis (University of Ioannina - Greece)
Session Classification: QCD
Track Classification: QCD
Jet Shapes at CMS

Using 36 pb⁻¹ of proton-proton collisions at a center-of-mass energy of 7 TeV collected by the CMS detector at the Large Hadron Collider at CERN, we have performed studies of the jet transverse structure. The fractional transverse momentum distribution as a function of the distance from the jet axis, is used to define the differential and the integrated jet shape variables. The unfolded jet-shape observables are compared to predictions from QCD parton shower Monte-Carlo generators with different parameter sets of PYTHIA and HERWIG++. The measurement covers a rapidity range up to |y|=3 and a transverse momentum range between 15 GeV and 1 TeV.

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)
Presenter: Dr KURT, Pelin (Vanderbilt University)

Track Classification: QCD
Measurement of J/Psi and Psi(2S) production at $\sqrt{s}=7$ TeV with the CMS experiment

Friday, 22 July 2011 15:00 (15 minutes)

This talk presents the J/psi and psi(2S) differential cross sections in pp collisions at 7 TeV, as a function of transverse momentum and in several rapidity ranges, on the basis of the 2010 data collected by CMS. The B to J/psi and B to psi(2S) fractions will also be presented, and compared to other measurements as well as to theory calculations.

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)
Presenter: PALLA, Fabrizio
Session Classification: QCD
Track Classification: QCD
Measurement of $\Upsilon(nS)$ production at 7 TeV with the CMS experiment

The $\Upsilon$ production cross section in proton-proton collisions at $\sqrt{s} = 7$ TeV is measured using a data sample collected with the CMS detector at the LHC. We also report the measurement of the $\Upsilon(1S)$, $\Upsilon(2S)$, and $\Upsilon(3S)$ differential cross sections as a function of transverse momentum and rapidity.

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)

Presenter: Mr ROHRINGER, HERBERT (Inst HOCHENERGIEPHYSIK WIEN AUSTRIA)

Track Classification: QCD
Search for $B_{s,d} \rightarrow \mu\mu$ with the CMS experiment

Friday, 22 July 2011 11:30 (15 minutes)

The rare decays $B_{s,d} \rightarrow \mu\mu$ provide an excellent test of the flavor sector of the Standard Model with sensitivity to many new physics models. We report on a search for these decays with the CMS experiment using data collected until Summer 2011.

Primary authors: Dr. KRAMMER, Manfred (HEPHY, Vienna); LANGENEGGER, Urs (PSI)
Presenter: LANGENEGGER, Urs (PSI)
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
Alignment and Calibration of the CMS Detector

Fast and efficient methods for the calibration and the alignment of the detector are a key asset to exploit the physics potential of the CMS detector.

The CMS experiment has set up a powerful framework for alignment and calibration, which is based on dedicated skims providing a highly compact dedicated input for the various workflows computing the constants. This includes a prompt calibration concept, which allows for a fast turnaround of the calibration process which is instrumental to ensure timely preparation of results for conferences and publications.

The presentation reviews the design of the system, reports on the experience gained during its operation including results from selected workflows.

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)
Presenter: CERMINARA, Gianluca (CERN)
Session Classification: Detector R & D and Data Handling
Track Classification: Detector R & D and data handling
Higgs bosons in the Next-to-Minimal Supersymmetric Standard Model

Friday, 22 July 2011 16:30 (15 minutes)

We review possible properties of Higgs bosons which are specific to the NMSSM as light CP-even scalars consistent with LEP bounds, decays into a pair of light CP-odd scalars, and enhanced branching ratios into two photons. The status of analyses to detect such unconventionally decaying Higgs bosons is discussed.

Primary author: ELLWANGER, Ulrich (LPT Orsay)
Presenter: ELLWANGER, Ulrich (LPT Orsay)
Session Classification: Higgs and New Physics
Leptogenesis in neutrinophilic Higgs doublet models

Friday, 22 July 2011 16:50 (15 minutes)

We show that in a class of two Higgs doublet model, where one Higgs doublet generates masses of quarks and charged leptons whereas the other Higgs doublet with a tiny vacuum expectation value generates neutrino Dirac masses, large Yukawa couplings lead to a large enough CP asymmetry of the right-handed neutrino decay. Thermal leptogenesis suitably works at low energy scale as keeping no enhancement of lepton number violating wash out effects.

Primary author: Dr SETO, Osamu (Hokka-Gakuen University)
Co-author: Prof. HABA, Naoyuki (Osaka University)
Presenter: Dr SETO, Osamu (Hokka-Gakuen University)
Session Classification: Cosmology and Gravity
Track Classification: Cosmology and Gravity
Measurement of rates of jets produced in association with W and Z bosons with the CMS detector

Friday, 22 July 2011 12:05 (20 minutes)

We present studies of the associated production of jets with vector bosons in pp collisions at 7-TeV center-of-mass energy at the LHC, based on data recorded by the CMS detector at the LHC in 2010 and 2011. The jet multiplicity distributions are efficiency corrected and unfolded. The studies extend to the measurement of b-jets in association with Z bosons, and of charm-jets in association with W bosons, which bring important information of the b and s-quark densities in the proton at LHC energies.

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)
Presenter: Ms GROTHE, Monika (Univ. of Wisconsin)
Session Classification: Top and Electroweak Physics
Track Classification: Top and Electroweak Physics
Study of diboson production at the LHC with the CMS detector

Friday, 22 July 2011 17:00 (30 minutes)

We present studies of diboson production in pp collisions at 7 TeV center-of-mass energy based on data recorded by the CMS detector at the LHC in 2010 and 2011. These include precise measurements of W and Z production in association with a photon and of WW production, as well as possible first observations of WZ and ZZ productions at the LHC. The results are interpreted in terms of constraints on anomalous triple gauge couplings.

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)
Presenter: MARIONNEAU, Matthieu (SPP-IRFU CEA/Saclay)
Session Classification: Top and Electroweak Physics

Track Classification: Top and Electroweak Physics
QCD effects and search for new physics in $t \rightarrow bW$

_Thursday, 21 July 2011 17:15 (15 minutes)_

The most general new physics effective operators in the decay of an unpolarized top quark into a bottom quark and a W gauge boson are considered at next-to-leading order in QCD. We find that the dipole operator $O_{\{LR\}}$ contribution to the transverse-plus W helicity fraction $F_+$ is significantly enhanced compared to the leading order result at non-vanishing bottom quark mass. Nonetheless, presently the most sensitive observable to direct $O_{\{LR\}}$ contributions is the longitudinal W helicity fraction $F_L$. In particular, the most recent CDF measurement of $F_L$ already provides the most stringent upper bound on $O_{\{LR\}}$ contributions, even when compared with indirect bounds from the rare decay $B \rightarrow X_s \gamma$.

**Primary author:** Prof. FAJFER, Svjetlana (Institute Jozef Stefan and Ljubljana University)

**Co-authors:** Dr FESEL KAMENIK, Jernej (Institute Jozef Stefan and Ljubljana University); Mr DROBNAK, Jure (Institute Jozef Stefan)

**Presenter:** Prof. FAJFER, Svjetlana (Institute Jozef Stefan and Ljubljana University)

**Session Classification:** QCD

**Track Classification:** QCD
Overview of CMS results from heavy-ion collisions

Thursday, 21 July 2011 09:30 (30 minutes)

We will present results of the CMS experiment from PbPb collisions at $\sqrt{s_{NN}} = 2.76$ TeV, probing quark and gluon matter at unprecedented values of energy density. The CMS apparatus provides calorimetry, muon and tracking systems covering a large range in pseudorapidity, complemented by a flexible two-level trigger system. This allows us to study the production of jets, photons, charged hadrons, quarkonia and vector bosons at large transverse momenta as a function of collision centrality. In addition, the large acceptance enables detailed studies of particle correlations in heavy ion collisions.

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)

Presenter: LEE, Yen-Jie (Massachusetts Institute of Technology)

Session Classification: Ultrarelativistic Heavy Ions
Jet measurements by the CMS experiment in pp and PbPb collisions

Thursday, 21 July 2011 16:30 (30 minutes)

The energy loss of fast partons traversing the strongly interacting matter produced in high-energy nuclear collisions is one of the most interesting observables to probe the nature of the produced medium. The multipurpose Compact Muon Solenoid (CMS) detector is well designed to measure these hard scattering processes with its high resolution calorimeters and high precision silicon tracker. Analyzing data from pp and PbPb collisions at a center-of-mass energy of 2.76 TeV parton energy loss is observed as a significant imbalance of dijet transverse momentum. To gain further understanding of the parton energy loss mechanism the redistribution of the quenched jet energy was studied using the transverse momentum balance of charged tracks projected onto the direction of the leading jet. In contrast to pp collisions, a large fraction the momentum balance for asymmetric jets is found to be carried by low momentum particles at large angular distance to the jet axis. Further the fragmentation functions for leading and subleading jets were reconstructed and are compared to model calculations and measurements in pp collisions. The results confirm and complement earlier CMS results based on calorimeter jets and yield a detailed picture of parton propagation in the hot QCD medium.

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)
Presenter: MA, Frank
Session Classification: Ultrarelativistic Heavy Ions
Track Classification: Ultrarelativistic Heavy Ions
Quarkonia measurements by the CMS experiment in PbPb collisions

Thursday, 21 July 2011 18:00 (15 minutes)

CMS is fully equipped to measure hard probes in the di-muon decay channel in the high multiplicity environment of nucleus-nucleus collisions. Such probes are especially relevant for studying the quark gluon plasma since they are produced at early times and propagate through the medium, mapping its evolution. Quarkonia and bottomonia are sensitive to the evolution of the medium. In particular, the $J/\psi$ production in heavy ion collisions has been studied at different energies and with different collision systems without yet giving a global picture that is fully understood. Measuring the charmonium production at the LHC energies in PbPb collisions will help constraining predictions, in particular those expecting high recombination of prompt $J/\psi$ or suppression in hot medium. We will review CMS $J/\psi$ measurements in pp collisions at $\sqrt{s_{NN}} = 7$-TeV, which allow precision studies of quarkonia production and serve as a reference for the observation of hot nuclear effects. CMS is able to distinguish non-prompt $J/\psi$ from prompt $J/\psi$ in PbPb collisions, and will present the prompt $J/\psi$ production cross-section in PbPb inclusively and as a function of transverse momentum, rapidity and number of nucleons participating in the collision. Finally, we compare the B fraction measured in PbPb collisions with that measured in pp at various energies. The LHC centre-of-mass energy allows copious $\Upsilon$ production in PbPb collisions. Detailed measurements of bottomonium will help characterize the dense matter produced in heavy-ion collisions beyond what was accessible at RHIC (mostly) with charmonia. The full spectroscopy of quarkonium states has been suggested as a possible thermometer for the QGP. With its excellent dimuon mass resolution, CMS has measured the three $\Upsilon$ states in pp collisions. With the 2010 PbPb data sample, CMS has observed the $\Upsilon(1S)$ as well as excited states. The $\Upsilon(1S)$ cross-section is presented as a function of transverse momentum, rapidity and centrality, and excited state. Suppression of the excited state in PbPb will be discussed.

Primary authors: Mrs SILVESTRE, Catherine (LPSC, UIC, LANL (now LPSC, work done with UIC and LANL)); Dr KRAMMER, Manfred (HEPHY, Vienna)

Presenter: Mrs SILVESTRE, Catherine (LPSC, UIC, LANL (now LPSC, work done with UIC and LANL))

Session Classification: Ultrarelativistic Heavy Ions
Physics with taus at CMS

The importance of decays of new particles to taus led to the development of innovative tau reconstruction programs by the CMS collaboration. The performance of tau reconstruction algorithms, their validation by the measurement of isolated taus from vector boson decays and searches for new physics processes, e.g., MSSM higgs decays to taus, will be discussed.

Primary author:  Dr KRAMMER, Manfred (HEPHY, Vienna)
Presenter:  VERZETTI, Mauro
Track Classification:  Higgs and New Physics
Update on $W+2$jets at CDF

Thursday, 21 July 2011 09:30 (15 minutes)

We present an updated study of the invariant mass and other kinematic distributions of jet pairs produced in association with a $W$ boson using data collected with the CDF detector utilizing an integrated luminosity of $\sim 7$-fb$^{-1}$. The distributions are compared in detail to the Standard Model predictions.

Primary author: Dr CAVALIERE, VIVIANA (CDF Collaboration, University of Illinois at Urbana Champaign)

Presenter: Dr CAVALIERE, VIVIANA (CDF Collaboration, University of Illinois at Urbana Champaign)

Session Classification: Higgs and New Physics
Global SUSY Fits with the MasterCode Framework

We present the latest results of the MasterCode collaboration on global SUSY fits. Currently available experimental data are used to determine the preferred SUSY and Higgs boson mass scales. The data comprise a combination of high-energy SUSY searches, low-energy precision measurements and astrophysical data. We include all relevant LHC searches for SUSY, electroweak precision observables such as the W boson mass and the anomalous magnetic moment of the muon, B physics observables such as BR(b -> s gamma), as well as the cold dark matter density in the Universe.

The preferred masses for SUSY particles as well as for the MSSM Higgs bosons are derived in the context of four GUT-based realizations of the MSSM. We find a preference for relatively light SUSY masses, which the direct searches at the LHC shift to slightly higher mass scales.

The preferred mass values can directly be compared to the reach of the LHC and future e+e- colliders as well as to current and future direct detection searches for dark matter.

MasterCode Collaboration:
The GRANIT project: status and perspectives

*Friday, 22 July 2011 12:30 (15 minutes)*

The GRANIT project is the follow-up of the pioneering experiments that first observed the quantum states of neutrons trapped in the earth’s gravitational field at the Institute Laue Langevin (ILL) [1]. Due to the weakness of the gravitational force, these quantum states exhibit most unusual properties: peV energies and spatial extensions of order 10 μm. Whereas the first series of observations aimed at measuring the properties of the wave functions, the GRANIT experiment will induce resonant transitions between various states and measure their energy differences, thus improving dramatically the sensitivity.

In this talk, I will present the status of the experiment presently under commissioning at the ILL. I will then discuss the potential of GRANIT to searches for new physics and in particular to a modified Newton law in the micrometer range.


**Primary author:** Dr REBREYEND, Dominique (LPSC/CNRS-IN2P3/UJF)

**Presenter:** Dr REBREYEND, Dominique (LPSC/CNRS-IN2P3/UJF)

**Session Classification:** Cosmology and Gravity
EVIDENCE - A control system for small experiments

Experiments integrating several hardware and software components require, except for the simplest cases, a control system. Comprehensive control system frameworks exist, for example EPICS, DOOCS or the commercial PVS-II. For a small scale application, these systems are however often too complicated and need professional support for their installation and maintenance. This presentation gives an overview of a control system development for smaller experiments. The development was originally started within the FACT project (First G-APD Cherenkov Telescope) and care was taken to keep it general to become applicable also for other projects.

The system, called EVIDENCE, allows for the integration of software with a minimum of extra coding on part of the specific application. It uses the CERN-developed DIM system (Distributed Information Management) as communication layer and the freely available Qt library for visualization.

EVIDENCE consists of a small C++ class and a few server programs that form the control system backbone. It supports central message logging and the distribution of standard warning and error conditions. Configuration information and data storage are centralized. It imposes only little definite structure on the programmer and is thus easy to integrate into existing programs.

The presentation will demonstrate the main features of the control system by an example of an application which is the FACT voltage feedback system, comprising three individual programs running on different computers.

**Primary author:** Dr GRIMM, Oliver (ETH Zurich)

**Presenter:** Dr GRIMM, Oliver (ETH Zurich)

**Track Classification:** Detector R & D and data handling
Design and R&D of very forward calorimeters for detectors at future e+e- collider

Friday, 22 July 2011 17:30 (15 minutes)

[On behalf of the FCAL Collaboration]

Detectors at future e+e- collider need special calorimeters in the very forward region for a fast estimate and precise measurement of the luminosity, to improve the hermeticity and mask the central tracking detectors from back-scattered particles. Using Monte Carlo simulations, designs optimized for the ILC and CLIC colliders are presented. Sensor prototypes have been produced and dedicated FE ASICs have been developed and tested for the ILC. For the first time, a prototype of sensor planes has been assembled and tested in a particle beam. Results on the performance will be given.

Primary author: Dr BOZOVIC-JELISAVCIC, Ivanka (VINCA Institute of Nuclear Sciences)

Presenter: Dr BOZOVIC-JELISAVCIC, Ivanka (VINCA Institute of Nuclear Sciences)

Session Classification: Detector R & D and Data Handling

Track Classification: Detector R & D and data handling
Hadron production in hot and dense nuclear matter

We study the hadron yield ratios at finite value of baryon density and temperature by means of an effective relativistic mean-field model with the inclusion of the full octet of baryons, the Delta-isobars degrees of freedom and the lightest pseudoscalar and vector mesons. These last particles are considered in the so-called one-body contribution, taking into account of an effective chemical potential and an effective mass depending on the self-consistent interaction between baryons. The analysis is performed by requiring the Gibbs conditions on the global conservation of baryon number, electric charge fraction and zero net strangeness. In this context, we study the influence of the Delta-isobars degrees of freedom in the behavior of different hadron ratios and strangeness production.

Primary author:  LAVAGNO, Andrea (Politecnico di Torino)
Presenter:  LAVAGNO, Andrea (Politecnico di Torino)
Right unitarity triangles and tri-bimaximal mixing from discrete symmetries and unification

We propose new classes of models which predict both tri-bimaximal lepton mixing and a right-angled Cabibbo-Kobayashi-Maskawa (CKM) unitarity triangle, alpha approximately 90 degrees. The ingredients of the models include a supersymmetric (SUSY) unified gauge group such as SU(5), a discrete family symmetry such as A4 or S4, a shaping symmetry including products of Z2 and Z4 groups as well as spontaneous CP violation. We show how the vacuum alignment in such models allows a simple explanation of alpha approximately 90 degrees by a combination of purely real or purely imaginary vacuum expectation values (vevs) of the flavons responsible for family symmetry breaking.

Primary authors: Dr LUHN, Christoph (University of Southampton); Dr SPINRATH, Martin (SISSA); Prof. ANTUSCH, Stefan (University of Basel); Prof. KING, Stephen F. (University of Southampton)

Presenter: Dr SPINRATH, Martin (SISSA)

Track Classification: Flavour Physics and Fundamental Symmetries
Design of the front-end digitization electronics for a G-APD-based Cherenkov telescope camera

A camera for ground-based based Cherenkov astronomy using Geiger-mode Avalanche Photodiodes (GAPD) was developed within the FACT project (First G-APD Cherenkov Telescope). Its essential design components are solid light concentrators to make full use of the large angular acceptance of G-APDs and camera-integrated digitization and trigger electronics. Data transfer from the camera to the counting house uses Ethernet fibres.

The digitization employs custom-developed boards, with 36 channels each, integrating four DRS4 analog pipeline chips. The sampling frequency will be 2 GHz, digitization at 30 MHz. Custom-developed preamplifier boards are connected to the digitizers via a mid-plane connector board. In total, FACT will use 40 digitizer and 40 preamplifier boards, arranged in four crates. In total, the camera has 1440 channels.

This presentation will cover the detailed design of the preamplifier and digitizer boards, and the data read-out procedure over Ethernet. The calibration method of the DRS4 chips will be discussed, as well as performance results from the serial board production.

Primary author: Dr GRIMM, Oliver (ETH Zurich)

Presenter: Dr GRIMM, Oliver (ETH Zurich)

Track Classification: Detector R & D and data handling
The SuperB Detector

The SuperB experiment is a next generation Super Flavour Factory expected to accumulate 75ab^-1 of data at the Y(4S) in five years of nominal running. In addition to running data at the Y(4S), SuperB will be able to accumulate data from the psi(3770) up to the Y(6S). A polarized electron beam enables unique physics opportunities at SuperB. We discuss the detector design for this new facility.

Primary author:  Dr BEVAN, Adrian (Queen Mary University of London)

Presenter:  Dr ARNAUD, Nicolas (LAL)

Track Classification:  Detector R & D and data handling
MET Performance with CMS

Friday, 22 July 2011 10:15 (15 minutes)

In this talk we report comprehensive results of studies of missing transverse energy (MET) measured by the CMS detector in pp collisions at a centre-of-mass energy of 7 TeV. Three MET reconstruction algorithms are deployed for various physics analyses. The scale and resolution for MET are validated using vector boson and dijet events, and severe mismeasurements due to the detector are studied. We also parametrize the effects of multiple pp interactions within the same bunch crossings on the scale and resolution. A tool, called MET significance, based on particle resolutions in each event is also presented.

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)
Presenter: Mr LACROIX, FLORENT (UIC/FERMILAB)
Session Classification: Detector R & D and Data Handling
Track Classification: Detector R & D and data handling
Jet Energy Calibration and Transverse Momentum Resolution in CMS

Friday, 22 July 2011 09:15 (15 minutes)

We present results on the jet energy calibration and jet transverse momentum resolution at CMS. In-situ measurements are performed using couple of 100/pb of proton-proton collisions at 7 TeV center of mass energy. The transverse momentum balancing in dijet and photon/Z+jet events is used to measure the jet energy response in the CMS detector, as well as the transverse momentum resolution. The results are presented for three different approaches to reconstruct jets in the CMS: calorimeter-based jet reconstruction; the Jet-Plus-Track algorithm, which improves the measurement of calorimeter jets by exploiting the associated tracks; the Particle Flow method, which attempts to reconstruct individually each particle in the event, prior to the jet clustering, based on information from all relevant sub-detectors.

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)

Presenters: IASHVILI, Ia (SUNY Buffalo); Dr KRAMMER, Manfred (HEPHY, Vienna)

Session Classification: Detector R & D and Data Handling

Track Classification: Detector R & D and data handling
Phenomenology of irreversible processes from gravity

Saturday, 23 July 2011 09:45 (15 minutes)

We argue, using inputs from both field theory and gravity, that all non-equilibrium phenomena holographically dual to solutions of pure gravity, are determined completely by a closed set of equations of motion of the energy-momentum tensor. These phenomenological equations include energy-momentum conservation, but additional equations for evolution of the shear-stress tensor also. A class of solutions is purely hydrodynamic. These equations should capture all asymptotically AdS solutions of pure gravity with regular future horizons for the right values of phenomenological coefficients, like the shear viscosity. We prove this for homogeneous relaxation explicitly. This also provides us new analytical means of systematically studying the transition to the hydrodynamic regime in boost invariant flows.

Primary author: Dr MUKHOPADHYAY, Ayan (LPTHE, University of Paris VI, France)

Co-author: IYER, Ramakrishnan (Department of Physics and Astronomy, University of Southern California, USA)

Presenter: Dr MUKHOPADHYAY, Ayan (LPTHE, University of Paris VI, France)

Session Classification: Non-Perturbative QFT and String Theory
Flavor Physics in an SO(10) Grand Unified Model

Friday, 22 July 2011 17:35 (15 minutes)

In a supersymmetric grand-unified model proposed by Chang, Masiero and Murayama the atmospheric neutrino mixing angle induces large new $b \rightarrow s$ transitions. Relating the supersymmetric low-energy parameters to seven new parameters $a_0$, $m_0^2$, $m_{\tilde{g}}$, $D$, $\xi$, $\tan(\beta)$ and $\arg(\mu)$ of this SO(10) GUT model, we perform a correlated study of several FCNC processes. The LEP limit on the lightest Higgs boson mass implies an important lower bound on $\tan(\beta)$, which in turn limits the size of the new FCNC transitions. Remarkably, the combined analysis does not rule out large effects in $B_s - \bar{B_s}$ mixing and we can easily accommodate the large CP phase in the $B_s - \bar{B_s}$ system which has recently been inferred from a global analysis of CDF and D0 data. The model predicts a particle spectrum which is different from the popular CMSSM. BR($\tau \rightarrow \mu$ gamma) enforces heavy masses, typically above 1 TeV, for the sfermions of the degenerate first two generations. However, the ratio of the third-generation and first-generation sfermion masses is smaller than in the CMSSM and a (dominantly right-handed) stop with mass below 500 GeV is possible.

Primary author: Dr GIRRBACH, Jennifer (TU Munich)
Co-author: Prof. NIERSTE, Ulrich (KIT)
Presenter: Dr GIRRBACH, Jennifer (TU Munich)
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
Searches for point sources of high energy cosmic neutrino with the ANTARES telescope

Thursday, 21 July 2011 09:30 (15 minutes)

The ANTARES observatory is currently the largest neutrino telescope in the Northern Hemisphere. It is well suited to detect high energy neutrinos produced in astrophysical sources as it can observe a full hemisphere of the sky at all the times with a duty cycle close to unity and an angular resolution about 0.3 degrees. Due to its location in the South of France, ANTARES is sensitive to up-going neutrinos from many potential galactic sources in the TeV to PeV energy regime. Results from a time-integrated unbinned method as well as the sensitivity of the detector using 2007-2008 data are presented. Moreover, using a time-dependant search for the transient sources, the background rejection and point-source sensitivity can be drastically improved by selecting a narrow time window around the assumed neutrino production period. The gamma-ray light curves of blazars measured by the LAT instrument on-board the Fermi satellite reveal important time variability information. A strong correlation between the gamma-ray and the neutrino fluxes is expected in a hadronic scenario. First results on the search for nine bright and variable Fermi sources are also presented.

Primary author: DORNIC, damien (IFIC)
Presenter: DORNIC, damien (IFIC)
Session Classification: Astroparticle Physics
Track Classification: Astroparticle Physics
Non-perturbative transitions among intersecting-brane vacua

Saturday, 23 July 2011 12:45 (15 minutes)

We investigate the transmutation of D-branes into Abelian magnetic backgrounds on the world-volume of higher-dimensional branes, within the framework of global models with compact internal space. The phenomenon, T-dual to brane recombination in the intersecting-brane picture, shares some similarities to small-instanton transitions in non-compact space, though in this case the Abelian magnetic background is a consequence of the compactness of the internal manifold, and is not ascribed to a zero-size non-Abelian instanton growing to maximal size. We study the similarities and differences between the two cases in the supersymmetric case. We provide details of the transition in various supersymmetric and non-supersymmetric tachyon-free orientifold with Brane Supersymmetry Breaking, both from brane recombination and from field theory Higgsing viewpoints. The Higgs mechanism is ignited by non-vanishing vev’s for D7-D7’ scalars, as in the small instanton transitions.

Primary authors: ANGELANTONJ, Carlo (Universita di Torino); Dr CONDEESCU, Cezar (CPHT - Ecole Polytechnique); DUDAS, Emilian (CPHT - Ecole Polytechnique); PRADISI, Gianfranco (Universita di Roma "Tor Vergata")

Presenter: Dr CONDEESCU, Cezar (CPHT - Ecole Polytechnique)

Session Classification: Non-Perturbative QFT and String Theory
Higgs bosons of R-symmetric supersymmetric theories

Saturday, 23 July 2011 10:00 (15 minutes)

The Higgs sector of the $R$-symmetric supersymmetric model includes two iso-doublets $R_{d,u}$ in addition to the standard iso-doublets $H_{d,u}$. Masses and interactions of these novel states are analysed and their decay modes and production channels at the LHC and $e^+e^-$ colliders are calculated.

Primary author: Prof. KALINOWSKI, Jan (University of Warsaw)
Presenter: Prof. KALINOWSKI, Jan (University of Warsaw)
Session Classification: Higgs and New Physics
In this talk I will discuss possible stringy signatures at hadron colliders. I will concentrate on D-brane models with a low string scale in the TeV region. The production of string resonances in di-jet events as well as leptophobic Z'-gauge bosons will be discussed. Also some more formal aspects of low string scale compactifications in connection with black holes will be mentioned at the end.

**Primary author:** LUEST, Dieter (Max-Planck-Institut fuer Physik, Ludwig-Maximilians-Universitaet)

**Presenter:** LUEST, Dieter (Max-Planck-Institut fuer Physik, Ludwig-Maximilians-Universitaet)

**Session Classification:** Non-Perturbative QFT and String Theory
POWHEG: status and perspectives

Thursday, 21 July 2011 11:15 (15 minutes)

I will review recent developments and applications of the POWHEG method, to merge NLO calculations with Shower Monte Carlo programs, in the POWHEG-BOX framework. Particular emphasis will be given to comparisons with LHC data and on the implementation of new processes.

Primary author: Dr ALIOLI, Simone (DESY)
Presenter: Dr ALIOLI, Simone (DESY)
Session Classification: QCD
Track Classification: QCD
Improved Holographic QCD

Saturday, 23 July 2011 09:00 (30 minutes)

We propose holographic models based on Einstein-dilaton gravity with a potential in 5 dimensions. Such theories, for a judicious choice of potential are very close to the physics of large-N YM theory both at zero and finite temperature. The zero temperature glueball spectra as well as their finite temperature thermodynamic functions compare well with lattice data. The model can be used to calculate transport coefficients, like bulk viscosity, the drag force and jet quenching parameters, relevant for the physics of the Quark-Gluon Plasma.

Primary author: KIRITSIS, Elias (UoC and APC)
Co-authors: Dr NITTI, Fransesco (APC); Dr MAZZANTI, Liuba (Santiago de Compostella); Dr GURSOY, Umut (CERN)
Presenter: KIRITSIS, Elias (UoC and APC)
Session Classification: Non-Perturbative QFT and String Theory
Observation of the Moon shadow with the ANTARES neutrino telescope

ANTARES is currently the largest neutrino detector on the Northern Hemisphere. Operating since May 2008 in its full configuration, it aims to detect high-energy cosmic neutrinos. In the absence of an astrophysical standard candle, a possible way to measure the angular resolution and the pointing accuracy for a neutrino telescope is to look at “Moon shadow” in the atmospheric muon flux. The analysis method and the present results of the observation of the Moon shadow with ANTARES will be presented and discussed.

Primary author: Dr DISTEFANO, Carla (LNS-INFN)

Presenter: Dr DISTEFANO, Carla (LNS-INFN)

Track Classification: Astroparticle Physics
Hadron physics at COMPASS

Friday, 22 July 2011 09:30 (15 minutes)

The COMPASS experiment at CERN SPS is dedicated to the study of hadron structure and spectroscopy. One goal of the physics programme using hadron beams is the search for new states, in particular the search for $J^{PC}$ spin-exotic states and glueballs. Apart from a short pilot run in 2004 (190 GeV/c negative pion beam, lead target), we started our hadron spectroscopy programme in 2008 by collecting unprecedented statistics with a negative hadron beam (190 GeV/c) on a liquid hydrogen target. A similar amount of data with positive hadron beam (190 GeV/c) has been taken in 2009, as well as some data (negative beam) on nuclear targets.

Our spectrometer features good coverage by electromagnetic calorimetry, crucial for the detection of final states involving $\pi^0$ or $\eta$. For scattering of negatively charged pions off nuclear targets, photon exchange dominates (Primakoff). By detection of exclusive $\pi^-\gamma$ final states, COMPASS further aims to study the $\pi^-\eta$ final state, allowing a precise determination of the chiral anomaly. We will present a selective overview of the status of various ongoing analyses and first results on the 2008/09 data.

Primary author: Dr NERLING, Frank (University of Freiburg)

Presenter: Dr NERLING, Frank (University of Freiburg)

Session Classification: QCD

Track Classification: QCD
The Muon ATLAS MicroMegas Activity

Friday, 22 July 2011 17:45 (15 minutes)

The luminosity upgrade of the Large Hadron Collider at CERN (sLHC) foresees a luminosity increase by a factor five compared to the LHC. To cope with the corresponding increase in background rates, the Muon System of the ATLAS experiment at CERN will likely need major changes in the very forward/backward regions. The Muon ATLAS MicroMegas Activity (MAMMA) is focused on the development and testing of large-area muon detectors based on the bulk-Micromegas technology as candidates for such an upgrade. In order to overcome the spark problem a novel protection scheme using resistive strips above the readout electrode has been developed. This technology has undergone extensive tests with hadron beams at the CERN-SPS, X-rays in the lab, as well as tests in a neutron beam at the TANDEM accelerator of the N.C.S.R. "Demokritos". In addition a set of prototype chambers have been installed in the ATLAS cavern and are taking data in real LHC conditions. Results on the performance of these chambers will be presented.

Primary author: TSIPOLITIS, Georgios (National Technical University of Athens)

Presenter: TSIPOLITIS, Georgios (National Technical University of Athens)

Session Classification: Detector R & D and Data Handling

Track Classification: Detector R & D and data handling
The Dark Energy Survey

Friday, 22 July 2011 17:50 (15 minutes)

The Dark Energy Survey will employ a powerful instrument, the Dark Energy Camera, and a state-of-the-art data management system on the improved Blanco 4-meter telescope at CTIO to probe the nature of dark energy and the cause of cosmic acceleration. The instrument includes a 520-Megapixel optical imager with red-sensitive CCDs covering a 3 square degree field of view and an active alignment system. Starting in 2012, using 525 nights over 5 years, the survey will image 300 million galaxies over 5000 square degrees to 24th magnitude and several thousand supernovae over a smaller area, using the grizY passbands. The 120-member international collaboration will use these data to probe dark energy using the galaxy cluster abundance, weak gravitational lensing, baryon acoustic oscillations, and supernovae and carry out studies of strong lensing, galaxy evolution, the structure of the Milky Way, and QSOs, among other topics. We will discuss the status of the project, the survey strategy and prospects for cosmological tests.

Primary author: Prof. HONSCHEID, Klaus (Ohio State University)

Presenter: SEVILLA, Ignacio (CIEMAT, Madrid)

Session Classification: Cosmology and Gravity
Revisiting No-Scale Supergravity Inspired Scenarios: Updated Theoretical and Phenomenological Constraints

Saturday, 23 July 2011 10:15 (15 minutes)

We consider no-scale supergravity inspired scenarios, with emphasize on the possible dynamical determination of the gravitino mass and connected soft supersymmetry-breaking parameters, through radiative corrections to an essentially flat tree-level potential in the hidden sector. We (re)emphasize the important role played by the scale-dependent vacuum energy contribution to the (renormalization group improved) effective potential, for the occurrence of phenomenologically interesting no-scale minima. As a consequence, a new set of input parameters is introduced, more relevant to the model: $B_0$ (soft breaking mixing Higgs parameter) and $\eta_0$ (the cosmological constant value at high energy) instead of $m_{\text{half}}$ and $\tan \beta$, the latter being determined consistently through EWSB conditions at low energy. We examine, for rather representative high scale boundary conditions, the theoretical and phenomenological viability of such a mechanism, when confronted with up-to-date calculations of the low energy sparticle spectrum.

The outcome of our analysis is a more constrained mSUGRA parameter space, with particular consequences on high scale values of the supersymmetric, soft and vacuum energy parameters, and related phenomenological consequences at the LHC. Concerning the dark matter relic density constraints, considerably enlarged allowed parameter space emerges provided that a gravitino LSP is allowed.

**Primary authors:** Dr BENHENNI, Amine (LCC Montpellier); Dr MOULTAKA, Gilbert (LCC Montpellier); Dr KNEUR, Jean-Loïc (LCC Montpellier); Dr BAILLY, Sean (LAPTH Annecy le Vieyux)

**Presenter:** Dr BENHENNI, Amine (LCC Montpellier)

**Session Classification:** Higgs and New Physics
Flavor structure of the octet baryons and quark sea

The chiral constituent quark model (CQM) is known to provide a satisfactory explanation of the proton spin and related issues in the nonperturbative regime. It has been extended to understand the effects of nonperturbatively generated “quark sea” to determine the flavor structure of the octet baryons. In particular, we have calculated the sea quark distribution functions, quark sea asymmetries, meson-nucleon sigma terms which have large contributions from the quark sea and are greatly affected by SU(3) symmetry breaking. Our results show that chiral symmetry breaking and SU(3) symmetry breaking play an important role in understanding the flavor structure of the octet baryons.

Primary author: Dr DAHIYA, Harleen (Dr. B.R. Ambedkar National Institute of Technology)

Co-author: Ms SHARMA, Neetika (Dr. B.R. Ambedkar National Institute of Technology)

Presenter: Dr DAHIYA, Harleen (Dr. B.R. Ambedkar National Institute of Technology)

Track Classification: QCD
Two-Loop Mixed QCD-EW Virtual Corrections to the Drell-Yan Production of Z and W bosons

Friday, 22 July 2011 14:30 (20 minutes)

Drell-Yan production of Z and W bosons is a very important process for physics studies at hadron colliders. At the moment, the theoretical prediction includes the NNLO calculation in QCD, together with the resummation of logarithmic terms coming from soft gluon emission up to the next-to-next-to-leading logarithmic accuracy. In the talk, I will present the analytic calculation of the mixed alpha alpha_S two-loop virtual corrections.

Primary author: BONCIANI, Roberto (LPSC)
Presenter: BONCIANI, Roberto (LPSC)
Session Classification: Top and Electroweak Physics
Track Classification: Top and Electroweak Physics
Current experimental data on the neutrino parameters is in good agreement with tribimaximal mixing and may indicate the presence of an underlying family symmetry. For 76 flavor groups, we perform a systematic scan for models: The particle content is that of the Standard Model plus up to three flavon fields, and the effective Lagrangian contains all terms of mass dimension <=6. We find that 44 groups can accommodate models that are consistent with experiment at 3sigma, and 38 groups can have models that are tribimaximal. For A4xZ3, T7 and T13 we look at correlations between the mixing angles and make a prediction for theta13 that will be testable in the near future. We present the details of a model with theta12=33.9, theta23=40.9, theta13=5.1 to show that the recent tentative hints of a non-zero theta13 can easily be accommodated. The smallest group for which we find tribimaximal mixing is T7. We argue that T7 and T13 are as suited to produce tribimaximal mixing as A4 and should therefore be considered on equal footing.

**Primary author:** Dr WINGERTER, Akin (LPSC)

**Presenter:** Dr WINGERTER, Akin (LPSC)

**Session Classification:** Neutrino Physics

**Track Classification:** Neutrino Physics
Three-dimensional Kaon Source Imaging from STAR Experiment at RHIC

Thursday, 21 July 2011 15:30 (15 minutes)

Three-dimensional source imaging techniques in conjunction with detailed model comparisons have shown the viability of disentangling the spatio-temporal information contained in two-pion interferometric measurements from ultra-relativistic heavy ion collisions. This has led to the observation of non-Gaussian tails in the 3D pion source function and the extraction of finite pion emission duration at RHIC energies. The STAR Collaboration has recently also extracted the 3D kaon source function from a high statistics two-kaon interferometric measurement from Au+Au collisions at \( \sqrt{s_{\text{NN}}} = 200 \text{ GeV} \). Such measurement offers a window into the fireball freeze-out dynamics with a much cleaner probe with smaller resonance decay contributions than for the pion case. The extracted space-time characteristics are compared with those obtained from pion analysis. The implications with respect to the validity of the Buda-Lund hydrodynamic expansion scenario are discussed.

**Primary author:** Dr SUMBERA, Michal (Nuclear Physics Institute ASCR)

**Presenter:** Dr SUMBERA, Michal (Nuclear Physics Institute ASCR)

**Session Classification:** Ultrarelativistic Heavy Ions
Dark Matter and 2-Steps Leptogenesis in a UV completion of the Inverse Seesaw

Saturday, 23 July 2011 11:55 (15 minutes)

We present a UV-completion of the Inverse-Seesaw model for the Neutrino masses, where 3 right-handed Neutrinos and one extra Higgs doublet are added to the Standard Model. Through the addition of two extra scalar fields, the model provides a natural mechanism for the generation at of the Baryon Asymmetry of the Universe and for thermal Dark Matter. A Global U(1) spontaneously broken explains the smallness of Neutrino masses and strongly constraints the model.

**Primary authors:** Dr MOLINARO, Emiliano (CFTP,IST); Dr JOSSE-MICHAUX, Francois-Xavier (CFTP,IST)

**Presenter:** Dr JOSSE-MICHAUX, Francois-Xavier (CFTP,IST)

**Session Classification:** Neutrino Physics

**Track Classification:** Neutrino Physics
Prospects for the LHC heavy-ion programme in the coming decade

Saturday, 23 July 2011 11:00 (20 minutes)

The first heavy-ion run of the LHC in 2010 opened up a new energy frontier in nucleus-nucleus collisions. An immediate harvest of physics results demonstrated the potential of the collider and its three heavy-ion experiments, ALICE, ATLAS and CMS. The plan for the coming decade foresees not only increasing energy and luminosity of the primary Pb-Pb collisions but also hybrid p-Pb and Ar-Ar collisions. The programme is defined by the physics requirements, the limits from beam physics and accelerator technology in the LHC and its heavy-ion injector chain, compatibility with the p-p programme and the planning of upgrades and modifications to the CERN accelerator complex.

Primary author: Dr JOWETT, John (CERN)
Presenter: Dr JOWETT, John (CERN)
Session Classification: Accelerators
Track Classification: Accelerators
Indirect searches for Dark Matter with the ANTARES neutrino telescope

Thursday, 21 July 2011 17:30 (15 minutes)

Using the ANTARES neutrino telescope, the largest neutrino telescope in the Northern hemisphere, with its first configuration with 5 lines of photodetectors to the actual nominal one corresponding to a total of 12 lines, we have studied our ability to search indirectly for an evidence of Dark Matter annihilations in heavy astrophysical objects as the Sun and the Galactic centre. First results have been obtained using the data recorded by ANTARES in 2007 and 2008, and compared with neutrino fluxes predicted within a minimal supersymmetric extension of the Standard Model with supersymmetry-breaking scalar and gaugino masses constrained to be universal at the GUT scale, the CMSSM, as well as a minimal Universal Extra-Dimensions scenario with one extra compact dimension where all the Standard Model fields propagate into the bulk, the UED.

The current limits over the neutrino/muon fluxes coming from Dark Matter annihilations, and the spin-dependent cross-section with protons, as well as the expected sensitivities predicted after several years of data taking with ANTARES will be presented for each source.

Primary author:  Dr LAMBARD, Guillaume (IFIC)
Presenter:  Dr LAMBARD, Guillaume (IFIC)
Session Classification:  Astroparticle Physics
Track Classification:  Astroparticle Physics
New results from the T2K experiment

Friday, 22 July 2011 16:50 (30 minutes)

The T2K (Tokai to Kamioka) experiment is a long baseline neutrino oscillation experiment designed to probe the $\theta_{13}$ neutrino mixing parameter by looking for the appearance of $\nu_e$ in an almost pure $\nu_\mu$ beam. The concurrent measurement of $\nu_\mu$ disappearance allows refined measurements of the atmospheric $\Delta m^2$ and of the $\theta_{23}$ mixing parameters. A neutrino beam is produced at the Japan Proton Accelerator Research Complex (J-PARC) in Tokai, Japan, and aimed at 2.5° off the direction of the Super-Kamiokande (Super-K) detector, 295 km away. The resulting narrow energy band neutrino beam at the Super-K location, peaked at about 600 MeV, is optimized to maximize the probability of oscillation at the atmospheric $\Delta m^2$ scale, minimizing at the same time the background for $\nu_e$ searches. The neutrino beam is monitored by an on-axis non-magnetic detector, INGRID, and an off-axis magnetic near detector, ND280, both located at J-PARC at 280 m from the target. In addition, the primary proton beam and the muons from the secondary pion decays in the neutrino beam-line are monitored on a spill by spill basis to provide further constraints on the determination of the neutrino beam. T2K has successfully operated since January 2010, and it has been presently paused due to the recent earthquake in Japan. Preliminary results on the search for $\nu_e$ appearance and measurements of $\nu_\mu$ disappearance will be presented in this talk.

Primary author: MARCHIONNI, Alberto (ETH Zurich)
Presenter: Dr GIGANTI, Claudio (IFAE Barcelona)
Session Classification: Neutrino Physics
Track Classification: Neutrino Physics
Singlet Contribution to the Vector Correlator

Friday, 22 July 2011 15:45 (15 minutes)

We compute, for the first time, the order $\alpha_s^4$ contribution to the singlet Adler function for the case of a generic colour gauge group. Giving access to the terms proportional to the squared sum of the quark charges, this result completes the $\alpha_s^4$ corrections to the familiar $R$-ratio as measured in electron-positron annihilation. Adopting the colour factors to the U(1) group, the full five-loop QED beta-function is completed. An independent calculation leads to the singlet contribution of order $\alpha_s^4$ to the Gross-Llewellyn Smith sum rule. Relating Adler function and sum rule through the generalized Crewther relation leads to two non-trivial constrains which are indeed fulfilled. This cross check gives additional confidence in the correctness of this highly complicated calculation.

Primary author: KUEHN, Johann (KIT)

Co-authors: RITTINGER, Joerg (KIT); CHETYRKIN, Konstantin (KIT); BAIKOV, Pavel (Moscow University)

Presenter: KUEHN, Johann (KIT)

Session Classification: QCD

Track Classification: QCD
Higgs search in the Higgs to gammagamma channel

Friday, 22 July 2011 11:45 (15 minutes)

The search for the Standard Model-like Higgs boson decaying to two photons is one of the best ways to identify a low mass Higgs boson at LHC. The results of the search in this channel are presented, based on the ATLAS data collected in 2011 and giving sensitivity exceeding any currently reported. The detailed analysis of the background contributions is included.

Primary author: Dr BARONCELLI, Antonio (INFN / Roma TRE)
Presenter: KADO, Marumi
Session Classification: Higgs and New Physics
Higgs search in the Higgs to $bb$ channel

Friday, 22 July 2011 11:30 (15 minutes)

The decay of the Standard Model-like Higgs boson into $bb$ is the dominant decay process in the region of low Higgs boson masses. The Higgs search in this channel requires an associated heavy object, allowing for strong discrimination from the dominant multi-jet background processes. We present the status of the Higgs searches in the $H\rightarrow bb$ channel based on the ATLAS data collected so far in 2011.

Primary author: Dr BARONCELLI, Antonio (INFN / Roma TRE)
Presenter: GONCALO, Ricardo
Session Classification: Higgs and New Physics
Search for Higgs to WW (lnulnu,lnuqq)

Friday, 22 July 2011 14:30 (15 minutes)

The search for the Standard Model-like Higgs boson via its decays into two W bosons is presented, based on the ATLAS data collected in 2011. The search in the dilepton final state is more powerful than any public result for intermediate mass Higgs bosons and has the highest sensitivity of any of the LHC Higgs searches. It is complemented by semi-leptonic WW decays which give good performance in the region of high Higgs boson masses.

Primary author: Dr BARONCELLI, Antonio (INFN / Roma TRE)
Presenter: STRANDBERG, Jonas
Session Classification: Higgs and New Physics
The search for the Standard Model-like Higgs boson via its decays into two Z bosons is presented, based on the ATLAS data collected in 2011. The results obtained in the fully leptonic ‘golden’ decay channel cover a wide range of Higgs boson masses. Above 200 GeV, the sensitivity is highly improved using channels in which one of the Z bosons decays into neutrinos or hadrons. The good signal to background ratio makes these channels ideal for a discovery.

**Primary author:** Dr BARONCELLI, Antonio (INFN / Roma TRE)
**Presenter:** NIKOLOPOULOS, Konstantinos
**Session Classification:** Higgs and New Physics
Combined SM Higgs search

Friday, 22 July 2011 15:00 (20 minutes)

Combined ATLAS results on the Standard Model-like Higgs boson search are presented, based on the ATLAS data collected in 2010 and 2011. Several Higgs boson decay channels are combined: $H \rightarrow \gamma\gamma$, $H \rightarrow ZZ \rightarrow 4l$, $H \rightarrow ZZ \rightarrow ll\nu\nu$, $H \rightarrow ZZ \rightarrow llqq$, $H \rightarrow WW \rightarrow ll\nu\nu$ and $H \rightarrow WW \rightarrow llqq$ in a mass range from 110 GeV to 600 GeV. Models with a fourth generation of heavy leptons and quarks with Standard Model-like couplings to the Higgs boson are also investigated.

**Primary author:** Dr BARONCELLI, Antonio (INFN / Roma TRE)

**Presenter:** Dr CRANMER, Kyle Cranmer (New York University)

**Session Classification:** Higgs and New Physics
New Results and Conjectures on Theory Space

Using scalar field theory as a template, I will discuss new insights into the structure of theory space emerging from the Exact Renormalization Group. I will outline how conformal symmetry is realized in this framework and then discuss the spectrum of fixed-points and how this is tied up with the renormalization of composite operators. Finally, I will mention possible constraints on asymptotic safety scenarios deriving from unitarity.

Primary author: Dr ROSTEN, Oliver (University of Sussex)
Presenter: Dr ROSTEN, Oliver (University of Sussex)
Scaled Momentum Spectra in deep inelastic Scattering at HERA

Charged particle production has been studied in neutral current deep inelastic ep scattering with the ZEUS detector at HERA using an integrated luminosity of 0.44 fb\(^{-1}\). Distributions of scaled momenta in the Breit frame are presented for particles in the current fragmentation region. The evolution of these spectra with the photon virtuality, \(Q^2\), is described in the kinematic region \(10 < Q^2 < 41000 \text{ GeV}^2\). Next-to-leading-order and modified leading-log-approximation QCD calculations as well as predictions from Monte Carlo models are compared to the data. The results are also compared to \(e^+e^-\) annihilation data. The dependences of the pseudorapidity distribution of the particles on \(Q^2\) and on the energy in the p system, \(W\), are presented and interpreted in the context of the hypothesis of limiting fragmentation.

**Primary author:** Mr LEVY, Aharon

**Presenter:** Mr LEVY, Aharon

**Track Classification:** QCD
Measurement of the Energy Dependence of the Total Photon-Proton Cross Section at HERA

The energy dependence of the photon-proton total cross section, $\sigma_{\text{tot}}$, was determined from $e+p$ scattering data collected with the ZEUS detector at HERA at three values of the center-of-mass energy, $W$, of the gamma-p system in the range $194 < W < 296$ GeV. This is the first determination of the $W$ dependence of $\sigma_{\text{tot}}$ from a single experiment at high $W$. Parameterizing $\sigma_{\text{tot}} \sim W^{2\epsilon}$, $\epsilon = 0.111 \pm 0.009\text{(stat.)} \pm 0.036\text{(syst.)}$ was obtained.

**Primary author:** Mr LEVY, Aharon

**Presenter:** Mr LEVY, Aharon

**Track Classification:** QCD
Exclusive Electroproduction of two pions at HERA

Two pion exclusive electroproduction at HERA has been studied with the ZEUS detector using 82 pb-1 of integrated luminosity collected during 1998-2000. The analysis was carried out in the kinematic range of photon virtuality $2 < Q^2 < 80$ GeV$^2$, gamma*p center-of-mass energy $40 < W < 180$ GeV and two-pion invariant mass $0.4 < M(pipi) < 2.5$ GeV. The $pimipi$-invariant-mass distribution was analysed in terms of the pion electro-magnetic form factor, $|F(M pi pi)|$ based on the contributions from three Vector Mesons, rho, rho’, and rho”. The masses and widths of the resonances were obtained. The $Q^2$ dependence of the cross-section ratios $\sigma(\text{rho})/\sigma(\text{rho‘})$ and $\sigma(\text{rho”})/\sigma(\text{rho})$ was studied.

Primary author: Prof. ZEUS, Collaboration (Tel Aviv University)
Presenter: Mrs ABRAMOWICZ, Halina

Track Classification: QCD
Exotics Searches in Jet Final States with the ATLAS detector

Thursday, 21 July 2011 11:20 (20 minutes)

We summarize the analysis of events with jets in the final state in pp collision data recorded with the ATLAS detector. The data are compared to Standard Model predictions with the goal of searching for new phenomena: heavy resonances, contact interactions and gravitationally-mediated effects in large extra dimensions, including gravitational scattering and quantum micro-black holes.

Primary author: Dr BARONCELLI, Antonio (INFN / Roma TRE)
Presenter: GIBSON, Adam
Session Classification: Higgs and New Physics
DC-DC conversion powering schemes for the upgrade of the CMS tracker

The CMS experiment foresees upgrades of its silicon pixel and strip detectors for the luminosity upgrade of the LHC. Due to an increase in the number of readout channels and higher complexity, larger currents will have to be provided to the detector. Since cable channels are hardly accessible and space for cables is limited, this would lead to excessively large resistive power losses in the supply cables, which increase with the current squared. CMS has therefore chosen a novel powering scheme based on DC-DC converters, which allows to deliver the power at a higher voltage and consequently lower current.

Based on radiation-tolerant DC-DC buck converter ASICs from the CERN electronics group, we develop low-mass, low-noise DC-DC converters for the application in CMS. The talk will cover studies of switching noise, magnetic emissions and power efficiency as well as system tests with silicon strip and pixel modules. A scheme for the integration of DC-DC converters in the silicon pixel detector, currently foreseen to be exchanged around 2016, will be presented.

Primary author: Dr KRAMMER, Manfred (HEPHY, Vienna)

Presenter: Ms KLEIN, Katja (RWTH Aachen University)

Track Classification: Detector R & D and data handling
Measurement of beauty production in deep inelastic scattering at HERA using decays into electrons

The production of beauty quarks in ep interactions has been studied with the ZEUS detector at HERA for exchanged four-momentum squared $Q^2 > 10 \text{ GeV}^2$, using an integrated luminosity of 363 pb$^{-1}$. The beauty events were identified using electrons from semileptonic $b$ decays with a transverse momentum $0.9 < p_T^e < 8 \text{ GeV}$ and pseudorapidity $|\eta^e| < 1.5$. Cross sections for beauty production were measured and compared with next-to-leading-order QCD calculations. The beauty contribution to the proton structure function $F_2$ was extracted from the double-differential cross section as a function of Bjorken-$x$ and $Q^2$.

Primary author:  Prof. ZEUS, Collaboration (Tel Aviv University)

Presenter:  Mrs SHEHZADI, Ramoona

Track Classification:  QCD
Measurement of the top-quark pair production cross section in ATLAS

Thursday, 21 July 2011 14:30 (30 minutes)

We present measurements of the top-quark pair-production in proton-proton collisions at sqrt(s)= 7 TeV with the ATLAS detector at the Large Hadron Collider. The cross section is measured in several channels, including the single lepton, dilepton and all hadronic channel, some using information from b-tagging.

Primary author: Dr BARONCELLI, Antonio (INFN / Roma TRE)
Presenter: COSTA, Maria Jose
Session Classification: Top and Electroweak Physics
Track Classification: Top and Electroweak Physics
Properties of the top quark decays in ATLAS

*Thursday, 21 July 2011 18:00 (30 minutes)*

We present results on top quark decay properties using data collected in 7 TeV LHC proton-proton collisions with the ATLAS detector, including W boson polarisation in top quark decays and the search for FCNC in decays of top quarks.

**Primary author:** Dr BARONCELLI, Antonio (INFN / Roma TRE)

**Presenter:** FERRARI, Pamela

**Session Classification:** Top and Electroweak Physics

**Track Classification:** Top and Electroweak Physics
We present the result of searches for single top-quark production in the t- and Wt-channels in 7 TeV proton-proton collisions with the ATLAS detector. The t-channel search is based on the selection of events with a single lepton (muon or electron), jets and missing transverse energy. The Wt-channel analysis is based on the selection of events with one or two leptons, jets and missing transverse energy.

**Primary author:** Dr BARONCELLI, Antonio (INFN / Roma TRE)

**Presenter:** HIRSCHBUEHL, Dominic

**Session Classification:** Top and Electroweak Physics

**Track Classification:** Top and Electroweak Physics
The production of the excited charm mesons D1(2420)0 and D2(2460)0 in ep collisions was measured with the ZEUS detector at HERA using an integrated luminosity of 373 pb⁻¹. The masses, widths and helicity parameters of these resonances were determined and compared with previous measurements, with theoretical expectations and with published ZEUS results of an independent sample with an integrated luminosity of 126 pb⁻¹. The measured D01 width is found to be above the world average value in both cases. The measured D01 helicity parameter allows for some mixing of S- and D-waves in its decay to Dπ; however the result is also consistent with the prediction for a pure D-wave decay.

**Primary author:** Prof. ZEUS, Collaboration (Tel Aviv University)

**Presenter:** ONISHCHUK, Yuriy

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
Top quark mass measurement in ATLAS

Thursday, 21 July 2011 15:45 (15 minutes)

We present a measurement of the top-quark mass in proton-proton collisions at $7 \text{ TeV}$ with the ATLAS detector at the Large Hadron Collider. The top mass is extracted directly in the single lepton channel with template methods and indirectly from the measurement of the production cross-section.

Primary author: Dr BARONCELLI, Antonio (INFN / Roma TRE)

Presenter: Dr ETIENVRE, Anne-Isabelle (CEA-DAPNIA)

Session Classification: Top and Electroweak Physics

Track Classification: Top and Electroweak Physics
Search for supersymmetry in jet(s) plus missing transverse momentum final states with the ATLAS detector

Saturday, 23 July 2011 11:00 (20 minutes)

The most sensitive channels to Supersymmetry in proton-proton collisions are composed of jet(s) and missing transverse momentum final states (with and without b-jets). The most recent results on these channels will be given based on data recorded in 2011

**Primary author:** Dr BARONCELLI, Antonio (INFN / Roma TRE)

**Presenter:** VIVARELLI, Iacopo

**Session Classification:** Higgs and New Physics
Search for supersymmetry in lepton/photon(s), jets and missing transverse momentum final states with the ATLAS detector

Saturday, 23 July 2011 11:55 (20 minutes)

Channels with one or several leptons or photons and high missing transverse momentum (and potentially high pT jets or b-jets) are a natural place to search for supersymmetry at the LHC. The most recent results on these channels will be given based on data recorded in 2011

Primary author: Dr BARONCELLI, Antonio (INFN / Roma TRE)
Presenter: HAYWARD, Helen
Session Classification: Higgs and New Physics
Search for R-parity violating supersymmetry with the ATLAS detector

Saturday, 23 July 2011 09:45 (15 minutes)

R-parity violation in supersymmetry gives rise to many unique experimental signatures. We describe searches with the ATLAS detector for supersymmetry with R-parity violation. Examples include searches for sneutrino decay to electron plus muon, and displaced vertices from the late decays of heavy objects. The most recent results on these channels will be given based on data recorded in 2010 and 2011.

Primary author:  Dr BARONCELLI, Antonio (INFN / Roma TRE)
Presenter:  JACKSON, Paul
Session Classification:  Higgs and New Physics
Measurement of heavy quark jet photoproduction at HERA

Photoproduction of beauty and charm quarks in events with at least two jets has been measured with the ZEUS detector at HERA using an integrated luminosity of 133 pb⁻¹. The fractions of jets containing b and c quarks were extracted using the invariant mass of charged tracks associated to secondary vertices and the decay-length significance of these vertices. Differential cross sections as a function of jet transverse momentum, pT(Jet), and pseudorapidity, eta(Jet), were measured. The data are compared with previous measurements and are well described by next-to-leading order QCD predictions.

Primary author: Prof. ZEUS, Collaboration (Tel Aviv University)

Presenter: Mrs SHEHZADI, Ramoona

Track Classification: QCD
Measurement of high-Q2 charged current deep inelastic scattering cross sections with a longitudinally polarised positron beam at HERA

Friday, 22 July 2011 14:50 (15 minutes)

Measurements of the cross sections for charged current deep inelastic scattering in e+p collisions with a longitudinally polarised positron beam are presented. The measurements are based on a data sample with an integrated luminosity of 132 pb⁻¹ collected with the ZEUS detector at HERA in 2006 and 2007 at a centre-of-mass energy of 318 GeV. The total cross section is presented at positive and negative values of the longitudinal polarisation of the positron beams. The single-differential cross sections \( \frac{d\sigma}{dQ^2} \), \( \frac{d\sigma}{dx} \) and \( \frac{d\sigma}{dy} \) are presented for \( Q^2 > 200 \text{ GeV}^2 \). The reduced double-differential cross section \( \sigma_r \) is presented in the kinematic range \( 280 < Q^2 < 30 \text{ 000 GeV}^2 \) and \( 0.0078 < x < 0.42 \). The cross section measurements agree well with the predictions of the Standard Model. The results are used to determine a lower limit on the mass of a hypothetical right-handed W boson.

**Primary author:** Prof. ZEUS, Collaboration (Tel Aviv University)

**Presenter:** STEWART, Trevor (DESY)

**Session Classification:** Top and Electroweak Physics

**Track Classification:** Top and Electroweak Physics
Exclusive B-Decays in ATLAS

Thursday, 21 July 2011 17:15 (15 minutes)

The ATLAS B physics program relies on exclusive decays, in particular involving a J/ψ. ATLAS capabilities to reconstruct the properties of D-mesons and B-hadrons in exclusive decay modes will be demonstrated and prospects for future measurements highlighted.

Primary author: Dr BARONCELLI, Antonio (INFN / Roma TRE)
Presenter: CERRI, Alessandro
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
The cross sections for neutral current deep inelastic scattering in e^+p collisions with a longitudinally polarised positron beam have been measured using the ZEUS detector at HERA. The single-differential cross-sections $d\sigma/dQ^2$, $d\sigma/dx$ and $d\sigma/dy$ and the double-differential cross sections in $Q^2$ and $x$ are measured in the kinematic region $Q^2 > 185$ GeV$^2$ for both positively and negatively polarised electron beams and for each polarisation state separately. The measurements are based on an integrated luminosity of 136 pb$^{-1}$ taken in 2006 and 2007 at a centre-of-mass energy of 318 GeV. The structure functions $x F_3$ and $x F_3^{\gamma Z}$ are determined by combining the e+p results presented in this analysis with previously measured e-p neutral current data. The measured cross sections are compared to the predictions.

**Primary author:**  Prof. ZEUS, Collaboration (Tel Aviv University)

**Presenter:**  STEWART, Trevor (DESY)

**Session Classification:**  Top and Electroweak Physics

**Track Classification:**  Top and Electroweak Physics
The Modified Bargmann-Wigner Formalism: Quantum Gravity from Relativistic Quantum Mechanics, and Beyond

The Bargmann-Wigner procedure for constructions spin-1 and spin-3/2 fields are well described in the textbooks. We modify this procedure based mainly on the motivations of the ideas of dual electrodynamics and the possibility of the QFT construct with the bosons of opposite parities, and the necessity to have the causal behaviour of the corresponding particles (even in the presence of external fields). Next, we proceed to derive equations for the symmetric tensor of the second rank on the basis of the Bargmann-Wigner formalism in a straightforward way. The symmetric multispinor of the fourth rank is used. It is constructed out of the Dirac 4-spinors. Due to serious problems with the interpretation of the results obtained on using the standard procedure we generalize it and obtain the spin-2 relativistic equations, which are consistent with those given before. The importance of the 4-vector field (and its gauge part) is pointed out.

Primary author: Dr DVOEGLAZOV, Valeriy (Universidad de Zacatecas)
Presenter: Dr DVOEGLAZOV, Valeriy (Universidad de Zacatecas)
First Data from the TOTEM experiment at LHC

Saturday, 23 July 2011 11:30 (15 minutes)

The TOTEM experiment at the LHC, placed symmetrically with respect to the CMS Interaction Point IP5, is optimized to measure in dedicated special-optics runs, luminosity independently, the total pp cross-section and to study elastic pp scattering over a wide range in momentum transfer from $-t \sim 10^{-3}$ to 10 GeV$^2$. Furthermore, diffractive dissociation, including single, double and central diffractive topologies will be studied using the forward detectors in combination with Roman pot detectors close to the beams. Very forward event topologies and particle multiplicities are also studied in view of interpretations for Cosmic Rays.

Two tracking telescopes T1 and T2, at distances between 7.5 and 14m to the IP, will measure charged particles in the forward region covering an adequate acceptance over a rapidity interval of $3.1 < y < 6.5$. Leading protons, scattered elastically or quasi elastically, will be detected by silicon detectors placed in Roman Pot stations at distances of 147 and 220 m from IP5. During 2010, TOTEM commissioned the RP detectors at 220 m and the T2 telescopes and was able to take data at $\sqrt{s} = 7$ TeV. For the first time after the ISR measurements, the $t$-distribution ($t > 0.4$ GeV$^2$) of elastic pp scattering (at ~ 100 times larger energy than at the ISR) is presented, exhibiting the diffractive minimum and a similar slope at target-values as at the ISR. Also the analysis of charged particle distributions in the very forward regions is in progress.

During the LHC technical stop of 2010/11, the T1 telescopes and the Roman Pot detectors at 147 m were installed and commissioned, completing the TOTEM apparatus. With the successful preparation of the $\beta^* = 90$ m optics, TOTEM will now be able to carry out a major part of its physics program during 2011.

Primary author: Dr CATANESI, mariagabriella (INFN, Sezione di Bari)

Presenter: Prof. MARCO, Bozzo (INFN Genova)

Session Classification: QCD

Track Classification: QCD
Combined Electroweak and QCD Fit of Inclusive Neutral and Charged Current Data with Polarized Lepton Beams at HERA

Friday, 22 July 2011 15:20 (30 minutes)

Using the deep inelastic $e+p$ and $e-p$ neutral and charged current scattering cross sections, including data with polarised electron beams, a combined electroweak and QCD analysis is performed to determine vector and axial-vector couplings $v_q$ and $a_q$ of light quarks $u$ and $d$ to the $Z^0$ boson accounting for their correlation with parton distributions. The precision has been improved in particular for vector couplings with respect to the published results based on the unpolarized HERA data only. The determinations from HERA are compared with those from LEP and Tevatron.

Primary author: KRUEGER, Katja (KIP, Heidelberg University, H1 Collaboration)
Presenter: RIZVI, Eram
Session Classification: Top and Electroweak Physics
Track Classification: Top and Electroweak Physics
Light neutralinos in the NMSSM

Next-to-Minimal Supersymmetric Standard Model neutralino dark matter candidates in the 1-15 GeV range are found with a Markov Chain Monte Carlo scanning code. A very light, singlet-like Higgs and/or CP-odd Higgs are needed to achieve such masses. Implications for direct detection (spin independent and spin dependent interactions) and indirect detection (gamma-rays, radio and antimatter) will be discussed as well as LHC predictions.

Primary author: Mr ALBORNOZ VASQUEZ, Daniel (LAPTH)
Presenter: Mr ALBORNOZ VASQUEZ, Daniel (LAPTH)

Track Classification: Astroparticle Physics
Chisholm-Caianiello-Fubini Identities for S=1

Trace theorems for the S=1 Barut-Muzinich-Williams matrices are considered. The formulas of the relativistic scalar product $\gamma_{\mu\alpha} \ldots \gamma_{\beta\mu}$, etc., are found. They are analogs of the well-known Chisholm-Caianiello-Fubini identities. The obtained results could be useful in the higher-order calculations of the high-energy processes with S=1 and S=0 particles in the framework of the 2(2S+1) Weinberg formalism which recently obtained new development. We discuss some applications to the case of boson-boson scattering, and to the case of gluonium spectrum as well.

**Primary author:** Dr DVOEGLAZOV, Valeriy (Universidad de Zacatecas)

**Co-author:** Mrs CALDERA CABRAL, Maria de Guadalupe (Universidad de Zacatecas)

**Presenter:** Dr DVOEGLAZOV, Valeriy (Universidad de Zacatecas)

**Track Classification:** QCD
Soft gluon resummation for Slepton pair-production

We use a recent approach to threshold soft gluon resummation, based on effective field theory, to quantify the dynamical enhancement of the partonic threshold region for Drell-Yan and slepton pair production in supersymmetry. We evaluate the resummed invariant mass distribution and total cross section at the NNLL order, and match the result onto NLO fixed order calculation.

Primary authors: BROGGIO, Alessandro (Johannes Gutenberg Universität); DR. VERNAZZA, Leonardo (Johannes Gutenberg Universität); Prof. NEUBERT, Matthias (Johannes Gutenberg Universität)

Presenter: BROGGIO, Alessandro (Johannes Gutenberg Universität)

Session Classification: Higgs and New Physics
Analysis of the anomalous-dimension matrix of n-jet operators in SCET to 4 loops

Thursday, 21 July 2011 12:15 (15 minutes)

Extending previous results obtained in arXiv:0903.1126, we perform a diagrammatic analysis of the anomalous-dimension matrix of n-jet operators in SCET, investigating for possible new structures arising at 4 loop.

Primary authors: Dr VERNAZZA, Leonardo (Johannes-Gutenberg-Universität); Prof. NEUBERT, Matthias (Johannes-Gutenberg-Universität); Mr AHRENS, Valentin (Johannes-Gutenberg-Universität)

Presenter: Dr VERNAZZA, Leonardo (Johannes-Gutenberg-Universität)

Session Classification: QCD

Track Classification: QCD
Global fit to CKM data

Friday, 22 July 2011 17:50 (15 minutes)

We present updated results for the CKM matrix elements from a global fit to Flavour Physics data within the Standard Model theoretical context. We describe some current discrepancies, established or advocated, between the available observables. These discrepancies are further examined in the light of New Physics scenarios.

Primary author: Mr NIESS, Valentin (LPC, Clermont)
Presenter: Mr NIESS, Valentin (LPC, Clermont)
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
Measurements of particle production in pp--collisions in the forward region at the LHC

Saturday, 23 July 2011 11:45 (15 minutes)

The phase space coverage of the LHCb detector allows a unique insight into the particle production in the forward region at the LHC. Due to its unique pseudorapidity coverage and the possibility of extending the measurements to low transverse momenta, the LHCb data provide important input to the understanding of particle production in a kinematical range where QCD models have large uncertainties.

Measurements of the production of charged particles, K^0_S and phi mesons are presented. In addition the ratio of pbar/p and Lambdabar/Lambda are presented as a function of rapidity and transverse momentum for centre-of-mass energies sqrt(s) = 0.9 TeV and 7.0 TeV, probing baryon number transport from the beam. Baryon strangeness suppression is studied through the measurement of Abar/K^0_S. The measurements are compared with lower energy measurements, phenomenological models and Monte Carlo event generators.

Primary author: Dr LANFRANCHI, Gaia (Laboratori Nazionali di Frascati - INFN)
Presenter: RUF, Thomas
Session Classification: QCD
Electroweak boson production in the forward region with LHCb

Friday, 22 July 2011 10:00 (30 minutes)

We report on measurements of $W$ and $Z$ boson production, using muon final state topologies, with the LHCb experiment and using data taken at centre of mass energy of 7 TeV. Measurements of the inclusive $W$ and $Z$ production cross-sections, $Z(W)$ differential cross-sections as a function of boson rapidity (muon pseudorapidity), their ratios, and the $W$ charge asymmetry are presented and compared to theoretical predictions. We discuss the potential sensitivity such measurements display to the underlying parton density functions.

Primary author: Dr LANFRANCHI, Gaia (Laboratori Nazionali di Frascati - INFN)

Presenter: SHEARS, Tara

Session Classification: Top and Electroweak Physics

Track Classification: Top and Electroweak Physics
The KLOE-2 detector upgrade at DAFNE

The KLOE experiment at the DAFNE e+e- collider of the Frascati Laboratories of INFN is about to start a second data-taking campaign (KLOE-2). The interaction region of DAFNE has been modified using a crabbed waist scheme.

The KLOE-2 scientific program aims to further improve the precision studies on kaon and low energy hadron physics, e.g. CKM unitarity and lepton universality, CPT symmetry and quantum mechanics tests, low energy QCD and the contribution of hadron vacuum polarization to muon anomalous moment.

The detector has been upgraded with small angle electron taggers to extend the physics program to gamma-gamma physics: two stations of LYSO crystal calorimeters read-out by SiPM for the detection of low energy e+/e-(LET), and two scintillator hodoscopes to detect high energy e+/e-(HET). The LET have been assembled, installed and integrated in the KLOE DAQ system for data taking. The Roman pots for the insertion of the HET stations have been realized, equipped with step-motors for the positioning inside the beam pipe, and used for housing test scintillators to measure the background levels.

Further detector upgrades include the insertion near the interaction point of an inner tracker (IT) to improve the reconstruction performance for low momentum tracks. The adopted solution is a low-mass, fully cylindrical and dead-zone free GEM based detector. After three years of R&D the construction of the first layer has started, with the aim of completing the detector by middle of 2012. The front-end electronics is based on the GASTONE ASIC, specifically developed for this detector, a charge amplifier with digital output integrating 64 channels in one single chip.

To increase acceptance for photons emitted at very small angles and to improve the reconstruction of photons hitting the DAFNE quadrupoles, small crystal calorimeters (CCALT) and tile calorimeters (QCALT) will be installed inside the KLOE-2 detector.

Primary author: KLOE-2, Collaboration (LNF-INFN)

Presenters: KLOE-2, Collaboration (LNF-INFN); Dr MORICCIANI, Dario (INFN - Sez. Roma "Tor Vergata")

Session Classification: Detector R & D and Data Handling

Track Classification: Detector R & D and data handling
Kaon Physics at KLOE and KLOE-2 prospects

Friday, 22 July 2011 17:20 (15 minutes)

A phi-factory offers the possibility to select pure kaon beams: neutral kaons from phi → KSKL are in fact produced in pairs and the detection of a KS (KL) tags the presence of a KL (KS), the same holds for charged kaons. This allows to perform precise measurement of kaon properties.

The KLOE experiment has measured most decay branching ratios of K$_S$, K$_L$ and K$^+$+$^-$ mesons providing the basis for the determination of the CKM parameter $V_{us}$ and the most precise test of the unitary of the quark flavor mixing matrix.

We are presently finalizing new determinations of BR(K$^+$ -> 3 charged pions), to complete the KLOE program of precise and fully inclusive measurements of the kaon dominant BR’s, and finalizing the update of the upper limit on the branching ratio measurement of the CP-violating transition K$_s$ -> 3pi$^0$ (Phys. Lett. B619, 61,2005), using the complete data set.

The neutral kaon system also offers unique possibilities to perform fundamental tests of CPT invariance, as well as of the basic principles of quantum mechanics. In particular a new analysis of the KLOE data is aiming at the measurement of the parameters describing the CPT and Lorentz symmetries breaking in the framework of the Standard-Model Extension (SME), and exploiting the EPR correlations in the neutral kaon pairs produced at DAPHNE.

Prospects on further improvements at the KLOE-2 experiment, aiming at an integrated luminosity of about 20 fb$^{-1}$ with an upgraded detector, will be also discussed.

Primary author:  KLOE-2, Collaboration (LNF-INFN)

Presenters:  Mrs BLOISE, Caterina;  KLOE-2, Collaboration (LNF-INFN)

Session Classification:  Flavour Physics and Fundamental Symmetries

Track Classification:  Flavour Physics and Fundamental Symmetries
Hadron Physics at KLOE and KLOE-2

Friday, 22 July 2011 10:15 (15 minutes)

The KLOE experiment has collected 2.5 fb⁻¹ at the peak of the phi resonance at the e⁺e⁻ collider DAPHNE in Frascati. The whole data set includes 100 million eta’s produced through the radiative decay

\[ \phi \rightarrow \eta \gamma \]

tagged by means of the monochromatic recoil photon. Measurements of eta decay channels, such as \( \pi^+ \pi^- \gamma \), are in progress. We have also measured the branching ratio of the \( \eta \rightarrow e^+ e^- e^+ e^- \) decay channel, never observed before, with a sample of about 360 events.

Pseudoscalar production at the phi-factory associated to internal conversion of the photon into a lepton pair allows the measurement of the form factor \( F(q_1^2=M(\phi)^2,q_2^2>0) \) of pseudoscalar mesons in the kinematical region of interest for the VMD model. The only existing data on \( \phi \rightarrow \eta e^+ e^- \) are based on 213 events. At KLOE, a preliminary study of this decay has been performed on 739 pb⁻¹ using the \( \eta \rightarrow \pi^+\pi^-\pi^0 \) final state. Simple analysis cuts provide about 7000 signal events with very small residual background contamination.

From a sample of 240 pb⁻¹ taken off the phi resonance, a preliminary analysis of the \( e^+ e^- \rightarrow e^+ e^- \eta \) process, without tagging \( e^+e^- \) in the final state is presented. Using two different decay channels, \( \eta \rightarrow \pi^+\pi^-\pi^0 \) and \( \eta \rightarrow \pi^0\pi^0\pi^0 \), the cross section of the process \( e^+ e^- \rightarrow e^+ e^- \eta \) is extracted. The same data set has been used to search for the \( f_0(600) \) that can be produced in gamma-gamma interactions and observed in the reaction \( e^+ e^- \rightarrow e^+ e^- \pi^0\pi^0 \). The preliminary \( \pi^0\pi^0 \) mass spectrum show an excess of events with respect to the expected background in the \( f_0(600) \) mass region.

A new beam crossing scheme allowing for a reduced beam size and increased luminosity is operating at DAPHNE. The KLOE-2 detector is successfully rolled in this new interaction region and is ready to acquire collision data. At the moment, the detector is being upgraded with small angle tagging devices, to detect both high and low \( e^+e^- \) energy in \( e^+ e^- \rightarrow e^+ e^- X \) events. The inner tracker and small angle calorimeters are scheduled to be installed in a subsequent step, providing wider acceptance for both charged particles and photons. The main goal of KLOE-2 is to collect an integrated luminosity of about 20 fb⁻¹ in 2-3 years in order to refine and extend the KLOE physics programme.

**Primary author:** Dr NGUYEN, Federico (INFN Roma TRE)

**Presenters:** Dr NGUYEN, Federico (INFN Roma TRE); GAUZZI, Paolo (Università’ degli Studi “La Sapienza” and Sezione INFN “Roma”)

**Session Classification:** QCD

**Track Classification:** QCD
Open charm hadron production and spectroscopy at LHCb

Friday, 22 July 2011 09:15 (15 minutes)

Measurements for open charm hadron production and spectroscopy at LHCb, and future prospects are presented. The LHCb detector is designed for the observation of heavy flavour decays with a fully instrumented forward coverage that is unique among the LHC experiments. These features, with the prolific charm production in $\sqrt{s}=7$ TeV proton-proton collisions, make LHCb ideally suited to perform precise measurements of charm production and spectroscopy that test QCD in this new energy regime.

**Primary author:** Dr LANFRANCHI, Gaia (Laboratori Nazionali di Frascati - INFN)

**Presenter:** PAPPAGALLO, Marco

**Session Classification:** QCD

**Track Classification:** QCD
Exclusive dimuon measurements with LHCb

We report on studies of exclusive dimuon production using LHCb experimental data. Exclusively produced muon pairs can be produced by two photon fusion (a QED process ideally suited to obtaining a precise integrated luminosity measure), or through resonances produced by pomeron-photon fusion or double pomeron exchange. We present cross-section measurements for exclusive dimuon production, and the first observations at a proton-proton collider of exclusive J/ψ, ψ′ and χ_c states, obtained with 37 pb−1 of data at centre of mass energy of 7 TeV. The resolution of the LHCb detectors allow the chic0, chic1 and chic2 states to be separated. We compare our results to theoretical predictions.

Primary author: Dr LANFRANCHI, Gaia (Laboratori Nazionali di Frascati - INFN)

Presenter: SHEARS, Tara

Track Classification: QCD
Standard Model updates and new physics analysis with the Unitarity Triangle fit,

*Friday, 22 July 2011 18:05 (15 minutes)*

We present the summer 2011 update of the Unitarity Triangle (UT) analysis performed by the UTfit Collaboration within the Standard Model (SM) and beyond. Within the SM, combining the direct measurements on sides and angles, the UT is over-constrained allowing for the most accurate SM predictions and for investigation on the tensions due to the most recent updates from experiments and theory.

Generalizing the UT analysis to investigate NP effects, constraints on $b \rightarrow s$ transitions are also included and both CKM and NP parameters are fitted simultaneously. The inputs to this analysis include the updated Tevatron analyses on $B_s$-$\bar{B}_s$ mixing that are significantly improving the NP constraints on the previously unexplored $B_s$ sector.

Finally, based on the NP analysis, we derive upper bounds on the coefficients of the most general Delta $F=2$ effective Hamiltonian. These upper bounds can be translated into lower bounds on the scale of new physics that contributes to these low-energy effective interactions.

**Primary author:** Dr BONA, Marcella (Queen Mary, University of London)

**Presenter:** Dr BONA, Marcella (Queen Mary, University of London)

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
The current run of the LHC experiment shall be able to probe gluino and squark masses up to values of about 1 TeV. Assuming that hints for SUSY are found by the end of this run, we explore the flavour constraints on the parameter space of the CMSSM, with and without massive neutrinos. In particular, we focus on decays that might have been measured by the time the run is concluded, such as $B_s \rightarrow \mu\mu$ and $\mu \rightarrow e\gamma$.

**Primary authors:** Prof. MASIERO, Antonio (INFN - Padova); Dr JONES-PEREZ, Joel (INFN - LNF); Dr CALIBBI, Lorenzo (Max-Planck-Institut fuer Physik); Prof. VIVES, Oscar (Universitat de Valencia); Dr HODGKINSON, Robert (Universitat de Valencia)

**Presenter:** Dr JONES-PEREZ, Joel (INFN - LNF)

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
A light-front coupled-cluster method for the nonperturbative solution of quantum field theories

We propose a new nonperturbative method that is based on a light-front Hamiltonian approach and the exponential-operator techniques of the many-body, coupled-cluster method. The mass eigenstates of the field theory are written as infinite expansions in Fock space but approximated by the exponentiation of an operator acting on a projection onto the lowest Fock sector. The full eigenvalue problem is then reduced to an eigenvalue problem in the lowest sector, combined with nonlinear equations that determine the operator. This replaces the usual coupled system of equations for the Fock-state wave functions and, instead of truncating this system by truncating Fock space, the possible contributions to the exponential operator are truncated. As an illustration, we apply the method to a calculation in QED of the dressed-electron state and its anomalous magnetic moment. This shows that, unlike the Fock-space truncation, the self-energy and vertex corrections are spectator-independent and physical masses appear naturally in the kinetic-energy terms. Also, the uncanceled divergences that are characteristic of Fock-space truncations do not occur.

Primary author: Prof. HILLER, John (University of Minnesota Duluth)
Co-author: Dr CHABYSHEVA, Sophia (University of Minnesota Duluth)
Presenter: Prof. HILLER, John (University of Minnesota Duluth)
A search for charged massive long-lived particles at D0

Thursday, 21 July 2011 14:30 (15 minutes)

We report on a search for charged massive long-lived particles (CMLLPs), based on 5.2 fb\(^{-1}\) of data collected with the D0 detector at the Fermilab Tevatron \(p\bar{p}\) collider. CMLLPs are predicted in many theories of physics beyond the Standard Model. We look for events in which one or more particles are reconstructed as muons but have speed and ionization energy loss \(dE/dx\) inconsistent with muons produced in beam collisions. We present 95\% C.L. upper limits on the production cross section for \(\tilde{t}\) and exclusion mass ranges for \(\tilde{\chi}^{\pm}\) in two SUSY scenarios and for long-lived \(\tilde{t}\) squarks.

**Primary author:** Dr VERZOCCHI, Marco (Fermilab - PPD Division)

**Presenter:** Prof. BANERJEE, Sudeshna (Tata Institute of Fundamental Research)

**Session Classification:** Higgs and New Physics
The Quest for Light Scalar Quarkonia from an Nf=3 Linear Sigma Model with Vectors and Axial-Vectors

Current experimental data provide us with five scalar isoscalar meson states in the low-energy region, i.e. the region up to 1.8 GeV: \( f_0(600) \), \( f_0(980) \), \( f_0(1370) \), \( f_0(1500) \) and \( f_0(1710) \). The issue of the structure of these states (quark-antiquark, tetraquark, meson-meson molecules...) has been extensively, but not conclusively, debated in the last decades. We use a U(3)xU(3) Linear Sigma Model with vector and axial-vector Mesons to address the nature of the scalar mesons above 1 GeV. A global fit including the masses of scalar, pseudoscalar, vector and axial-vector states is performed and its results favour the scalar mesons in the region above 1 GeV to be quarkonia (quark-antiquark states). We also discuss a possibility to identify the scalar glueball which also turns out to be in the region above 1 GeV, in accordance with the lattice predictions.

**Primary author:** PARGANLIJA, Denis (Frankfurt University - Institute for Theoretical Physics)

**Co-authors:** RISCHKE, Dirk H. (Frankfurt University - Institute for Theoretical Physics); Dr GIACOSA, Francesco (Frankfurt University - Institute for Theoretical Physics); WOLF, György (RMKI Budapest); Dr KOVACS, Peter (RMKI Budapest)

**Presenter:** PARGANLIJA, Denis (Frankfurt University - Institute for Theoretical Physics)

**Track Classification:** QCD
Measurement of the forward-backward charge asymmetry in top quark production in 
\[ p p \text{ collisions at } \sqrt{s} = 1.96 \text{-TeV} \]

Saturday, 23 July 2011 11:50 (20 minutes)

We present measurements of the integrated forward-backward charge asymmetry in \( t\bar{t} \) production in \( pp \) collisions using data collected with the D0 detector at the Fermilab Tevatron collider, using both the lepton+jets and dilepton final states. We present the raw measurement as well as results obtained after correcting for acceptance and detector effects and present also measurements as a function of invariant mass of the \( t\bar{t} \) pair. We also investigate the dependence of the asymmetry on the total transverse momentum of the \( t\bar{t} \) pair.

**Primary author:** Dr VERZOCCHI, Marco (Fermilab - PPD Division)

**Presenter:** DEMINA, Regina

**Session Classification:** Top and Electroweak Physics

**Track Classification:** Top and Electroweak Physics
First measurements of jet substructure in ATLAS

We present new results on the commissioning of the tools in ATLAS data for mapping the substructure of hadronic jets and for distinguishing the signatures of new boosted massive particles from the QCD background. Techniques to utilize jets as more than simply surrogates for individual short distance partons allow for detailed comparisons of QCD predictions for jet mass and parton shower properties, but also for recovering regions of phase space otherwise hidden by the QCD background in which highly boosted objects decay to hadrons. Two “fat” jet algorithms are used, along with the filtering jet grooming technique pioneered by ATLAS. Measurements of the jet invariant mass for each jet algorithm are compared to multiple Monte Carlo event generators and to NLO predictions. The substructure of these jets is directly probed by first measurements of the splitting scales within these jets. Finally, candidate boosted top quark events collected in the 2010 data are analyzed in detail for the substructure properties of hadronic “top-jets” in the final state.

Primary author:  Dr MILLER, David W. (SLAC and Stanford University)
Co-author:  Prof. SCHWARTZMAN, Ariel (SLAC and Stanford University)
Presenter:  LIVERMORE, Sarah

Track Classification:  QCD
Performance of Tau Identification and Associated Systematic Uncertainties in ATLAS

Identification and reconstruction of hadronically decaying tau leptons is essential for many physics studies at the LHC, e.g. searches for new physics like the Higgs boson. In about 35% of the cases tau leptons decay leptonically into electrons or muons and in about 65% of the cases they decay hadronically.

Since it is impossible to distinguish the leptonically decaying tau leptons from prompt electrons or muons, tau identification is only concerned with hadronically decaying tau leptons. Due to the overwhelming background of QCD jet production at the LHC, a strong rejection of misidentified QCD jets is needed.

In ATLAS, three algorithms are used for tau identification: rectangular cuts, a projective likelihood method and a boosted decision tree. They provide jet rejection factors between 10 and 1000 for signal efficiencies from 30% to 70%. This poster presents the performance of the different algorithms, and the systematic uncertainties on the tau identification efficiency are discussed.

Primary author: SEIFERT, Frank (TU Dresden)

Presenter: SEIFERT, Frank (TU Dresden)

Track Classification: Top and Electroweak Physics
Jet performance and inclusive jet cross section measurement in ATLAS

Proton-proton collisions at the LHC have provided data to probe quantum chromodynamics (QCD) at distances never reached before with the 7 TeV center-of-mass data taken by the ATLAS detector. While precision tests of strong interactions are interesting in their own right, QCD also provides one of the main backgrounds to many New Physics measurements; furthermore, it is also through tests of QCD that New Physics may be discovered.

Hadronic jets are a fundamental ingredient for precision tests of QCD: understanding and measuring their performance is crucial in the LHC environment. A correct estimate of the energy of jets (jet energy scale) is input to many physics analyses, and the uncertainty on this estimate is the dominant experimental systematic for many QCD measurements. This poster presents the measurement of the inclusive jet cross section using data collected by the ATLAS detector, with a particular focus on the reconstruction and calibration techniques used for jets in this measurement and on the estimate of the systematic uncertainties on their energy scale.

**Primary author:** DOGLIONI, Caterina (University of Oxford)

**Presenter:** GILLBERG, Dag (Carleton)

**Track Classification:** QCD
Angular distributions and Afb of Drell-Yan process at Tevatron

We report on the measurement of angular coefficients and the forward and backward asymmetry (Afb) of Drell-Yan dilepton pairs from $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ TeV. The data sample is collected by the CDF II detector. The angular distributions are studied as a function of the transverse momentum of dilepton pair and Afb is measured using the event weighting technique. The Lam-Tung ($A_0-A_2=0$) relation which is only valid for a spin-1 description of the gluon is also tested.

Primary author: Ms HAN, Jiyeon (University of Rochester)
Presenter: Ms HAN, Jiyeon (University of Rochester)

Track Classification: Top and Electroweak Physics
Electron efficiency measurement at low energies with J/psi in ATLAS

The understanding of the reconstruction of electrons in the ATLAS experiment at LHC is one of the key issues for the run at a center of mass energy of 7 TeV and is of particular importance in any analysis with isolated electrons in final state. We describe the measurements performed using tag-and-probe techniques to establish reference electron efficiencies at low transverse energies based on J/psi->ee events, over the full pseudorapidity range of |eta|<2.5. The bulk of the poster is devoted to the electron identification efficiencies but also describes the selection of the J/psi->ee events. The results are presented as efficiencies and also as scale factors to be applied to correct the expected efficiencies from simulation.

Primary author: Mr THEVENEAUX-PELZER, Timothée (LPNHE/IN2P3/CNRS)

Presenter: Mr THEVENEAUX-PELZER, Timothée (LPNHE/IN2P3/CNRS)

Track Classification: Top and Electroweak Physics
Search for heavy top-like fourth generation quarks in the dilepton channel with a collinear approximation at ATLAS

We present a search for pair production of heavy quarks Q4 decaying via Q4 -> qW -> q l nu. We perform approximate mass reconstruction by assuming that the boosted W decays to a charged lepton and neutrino which are nearly collinear. We use 37 inverse picobarns of integrated luminosity from pp collisions at sqrt(s) = 7 TeV collected by the ATLAS detector. The data are in agreement with standard model expectations; we exclude at 95% confidence level a heavy quark with mass less than 270 GeV.

Primary author: WERTH, Michael (UC Irvine ATLAS)
Co-author: WHITESON, Daniel (UC Irvine ATLAS)
Presenter: WERTH, Michael (UC Irvine ATLAS)
Observation of exclusive diphoton production in Hadron-Hadron collisions

Saturday, 23 July 2011 10:15 (15 minutes)

We present the first observation and cross section measurement of exclusive photon pair production in proton-antiproton collisions at center-of-mass energy of 1.96 TeV using data taken by the Run II Collider Detector at Fermilab.

We select events with two electromagnetic showers, each with transverse energy ET greater than 2.5 GeV and pseudorapidity, $|\eta| < 1.0$, with no other particles detected in the event.

The events are explained as the double pomeron exchange process.

The measured cross section is in agreement with a perturbative QCD calculation.

This process is closely related to exclusive Higgs boson production that could be observed at the LHC.

Primary author: Dr MESROPIAN, Christina (The Rockefeller University)

Presenter: BRUCKEN, Erik

Session Classification: QCD

Track Classification: QCD
Measurement of the Cross Section for Prompt Isolated Dihadron Production in $p\bar{p}$ Collisions at $\sqrt{s} = 1.96$ TeV.

Saturday, 23 July 2011 09:45 (15 minutes)

We report a measurement of the cross section of prompt isolated photon pair production in $p\bar{p}$ collisions at a total CM energy of 1.96 TeV using data of 5.4/fb integrated luminosity collected with the CDF II detector at the Fermilab Tevatron. The measured differential cross section is compared with three perturbative QCD predictions, a Leading Order (LO) parton shower Monte Carlo and two Next-to-Leading Order (NLO) calculations. The NLO calculations reproduce most aspects of the data. By including photon radiation from quarks before and after hard scattering, the parton shower Monte Carlo becomes competitive with the NLO predictions.

**Primary author:** Dr MESROPIAN, Christina (The Rockefeller University)

**Presenter:** Dr VELLIDIS, Costas (Fermilab)

**Session Classification:** QCD

**Track Classification:** QCD
Study of Substructure of High Transverse Momentum Jets Produced in Proton-Antiproton Collisions at $\sqrt{s} = 1.96$ TeV

Thursday, 21 July 2011 11:30 (15 minutes)

We present a study of the substructure of jets with transverse momentum greater than 400 GeV/c produced in proton-antiproton collisions at a center-of-mass energy of 1.96 TeV at the Fermilab Tevatron Collider and recorded by the CDF II detector. We measure for the first time the distributions of the jet mass, angularity and planar flow in a 5.95/fb data sample. The observed substructure for high mass jets are found to be consistent with predictions from perturbative quantum chromodynamics.

**Primary author:** Dr MESROPIAN, Christina (The Rockefeller University)

**Presenter:** Mr ALON, Raz (Weizmann Institute of Science)

**Session Classification:** QCD

**Track Classification:** QCD
Chiral Dynamics with strange quarks in the light of recent lattice Nf=2+1 simulations

Due to the intermediate position of the strange quark in the hierarchy of quark masses, a numerical competition may arise in chiral series between leading (LO) and next-to-leading order (NLO) in three-flavour Chiral Perturbation Theory (ChPT), as it was suggested by several studies performing a chiral extrapolation of Nf=2+1 lattice data. A way to study this question is to use a modified version of ChPT called Resummed Chiral Perturbation Theory, which does not assume the smallness of NLO terms compared to LO in the series expansion.

Working within this framework, we fit recent lattice results on masses of pseudoscalar mesons, decay constants and Kl3 form factors from several simulations using 2+1 dynamical quarks. We extract numerical values for the order parameters of chiral symmetry breaking, along with other quantities like the quark masses and decay constants ratio. We also deduce from those values a numerical estimate of some NLO low energy constants as well as other quantities of phenomenological interest like $f+(0)$. We observe the previously discussed numerical competition between LO and NLO thus favoring the use of the resummed theory in three flavour calculations.

We then investigate within the same framework the topological susceptibility of QCD, another quantity of interest since the size of its LO term is directly linked to the size of the quark condensate in the chiral limit. Different sets of Nf=2+1 lattice data are used to perform the fits.

**Primary author:** TOUCAS, Guillaume (Laboratoire de Physique Théorique d’Orsay)

**Presenter:** TOUCAS, Guillaume (Laboratoire de Physique Théorique d’Orsay)

**Track Classification:** Flavour Physics and Fundamental Symmetries
Top mass measurement in the semileptonic channel with the ATLAS detector

The top quark has been discovered in 1995 at Fermilab. Being the heaviest known elementary particle, it plays a special role in the Standard Model. The LHC produced first pp collisions at 7 TeV centre-of-mass energies in fall 2009. The top quark was observed in both experiments ATLAS and CMS during 2010.

First top mass measurement by ATLAS have been made using 35 pb⁻¹ of data recorded in 2010. Three separate direct measurements were performed in the semileptonic decay channel. All three compare data to templates from simulation at different mass points. The default method uses a stabilized top mass and the R32 variable which is the ratio between reconstructed top mass and reconstructed W mass. The top mass measurement obtained for 2010 data is m_{top} = (169.3 ± 4.0 ± 4.9) GeV/c². The most important systematic uncertainty came from Jet Energy Scale the top mass being the invariant mass of three reconstructed jets.

The luminosity increase will allow to record more that 1 fb⁻¹ by the end of the year 2011. By July, close to 500 pb⁻¹ of data will be used to obtain a more precise measurement of the top mass.

**Primary author:** CINCA, Diane (Laboratoire de Physique Corpusculaire Clermont-Ferrand (LPC)-In)

**Presenter:** CINCA, Diane (Laboratoire de Physique Corpusculaire Clermont-Ferrand (LPC)-In)

**Track Classification:** Top and Electroweak Physics
Preliminary Results From the MINERvA Experiment

Saturday, 23 July 2011 11:00 (15 minutes)

The MINERvA detector, operating since 2009 in the NuMI beam line at Fermilab, has collected neutrino and antineutrino scattering data on a variety of nuclear targets. The detector is designed to identify events originating in plastic scintillator, lead, carbon, iron, water, and liquid helium. The goals of the experiment are to measure precisely inclusive and exclusive cross sections for neutrino and antineutrino interactions for these targets. We present preliminary kinematic distributions for charged current quasi-elastic scattering and other processes.

**Primary author:** Prof. PAOLONE, Vittorio (University of Pittsburgh)

**Presenter:** HARRIS, Deborah (Fermilab)

**Session Classification:** Neutrino Physics

**Track Classification:** Neutrino Physics
Search for multilepton final states of supersymmetry at the ATLAS Detector

The results of a search for supersymmetry in multilepton final states using the ATLAS detector is presented. Such signals require three or more leptons, jets, and missing transverse energy. This channel provides the advantage that the contribution due to standard model backgrounds is expected to be very low. Results from the 2011 data-taking will be reported.

Primary author: Mr GOODSON, Jeremiah Jet (Stony Brook University)

Presenter: Mr GOODSON, Jeremiah Jet (Stony Brook University)
The ATLAS b-jet Trigger

The online event selection is crucial to reject most of the events containing uninteresting background collisions while preserving as much as possible the interesting physical signals. The b-jet selection is part of the trigger strategy of the ATLAS experiment and a set of dedicated triggers is presently contributing to the event selection for the 2011 running.

The b-jets acceptance is increased and the background reduced by lowering jet transverse energy thresholds at the first trigger level and applying b-tagging techniques at the subsequent levels. Different physics channels, especially topologies containing more than one b-jet where higher rejection factors are achieved, benefit from requesting this trigger to be fired.

An overview of the status-of-art of the b-jet trigger menu and performance on real data is presented in this contribution.

Primary authors: Dr COCCARO, Andrea (Universita’ di Genova/INFN); ENOQUE FERREIRA DE LIMA, Danilo (University of Glasgow)

Presenter: ENOQUE FERREIRA DE LIMA, Danilo (University of Glasgow)

Track Classification: Detector R & D and data handling
Spectrum of quarks in QCD2

Friday, 22 July 2011 15:15 (15 minutes)

Using an exact integrodifferential equation, the spectral properties of the gauge invariant quark two-point Green’s function are analyzed in two-dimensional QCD in the large \( N_c \) limit. The singularities of the Green’s function arise from contributions of the colored sector of quarks (here in the fundamental representation) and give information about their spectrum. The problem is solved analytically. The Green’s function is found to be infrared finite. The singularities are located on the positive real axis of the momentum squared and are represented by a denumerable infinite number of threshold type branch points with power \(-3/2\) starting at positive mass values, which lie from a minimal value up to infinity. The emergence of strong threshold singularities is an indication that quarks could not be observed as free asymptotic states.


Primary author: Dr SAZDJIAN, Hagop (IPN, Universite Paris-Sud 11, Orsay)

Presenter: Dr SAZDJIAN, Hagop (IPN, Universite Paris-Sud 11, Orsay)

Session Classification: QCD

Track Classification: QCD
Search for high mass dielectron resonances at ATLAS

We present a search for high mass dielectron resonances using 7 TeV pp collisions recorded by the ATLAS detector in 2011. The reconstructed invariant mass spectrum is compared to standard model expectations. Possible signals include heavy neutral gauge bosons and the Randall-Sundrum graviton. In the absence of a signal we set exclusion limits for various models using a Bayesian approach.

Primary author: Mrs HEIM, Sarah (Michigan State University)
Presenter: Mrs HEIM, Sarah (Michigan State University)
Strong Field Ionization from a P-wave state.

The electronic states of an atom in a uniform electric field are modified by the Stark effect. If the field is strong enough, ionization of the atom eventually occurs due to the tunnel effect. In the case where the electron is initially in a state of orbital angular momentum $<L>$ perpendicular to the field $F$, it was expected that the transverse velocity of the extracted electron is in average in the direction of $F \times <L>$: This azimuthal asymmetry, is analogous to the Collins effect in quark fragmentation.

**Primary author:** REDOUANE-SALAH, Essma (Physics)  
**Presenter:** REDOUANE-SALAH, Essma (Physics)  
**Track Classification:** Detector R & D and data handling
Radiation damage at LHCb, results and expectations

The LHCb calorimeter comprises the scintillator pad detector, preshower, electromagnetic Shashlyk type (ECAL) and hadronic Tile calorimeters, arranged in pseudo-projective geometry. All the four detectors follow the general principle of reading the light from scintillator tiles with wavelength shifting fibers, and transporting the light towards photomultipliers, all following the 25 ns readout. The calorimeter has been installed in the LHCb experiment, cabled and equipped with the front end electronics. The calorimeter has been pre-calibrated before installing in the pit, and the calibration techniques have been tested with the data taken in 2010.

The mission of the LHCb calorimeter system aims at selecting high $E_T$ hadron, electron, photon and $\pi_0$ candidates for the first level trigger, providing electron identification essential for the flavor tagging, and giving access to studies of B-meson decays with $\pi_0$ or prompt photons. Maximum expected annual dose acquired at the shower maximum position of the innermost ECAL cell amounts to 250 krad. The actual ECAL design assumes the possibility to replace the detector modules most subjected to the irradiation, so that the induced constant term of the energy resolution does not exceed 1.5%. Radiation resistance of the modules for the LHCb electromagnetic calorimeter was studied in order to optimize its design. The results of scintillating materials irradiation and the expected dose distribution map have been translated into the LHCb calorimeter performance degradation. Additional tests have been performed in highly radiative area. Actual dose map at the LHCb calorimeter location for all the four calorimeter detectors and electronics will be monitored using sets of passive dosimeters, each comprising alanine, TLD and pin diode, and read out once per year.

The presentation addresses the LHCb calorimeter commissioning, expected performance, summary of the irradiation tests, expected radiation induced performance degradation and actual dose monitoring. This will be discussed in the context of the LHCb upgrade, taking place after 4-5 years of data taking. Foreseen operations and electronic for the LHCb upgrade will be discussed.

**Primary author:** Dr LANFRANCHI, Gaia (Laboratori Nazionali di Frascati - INFN)

**Presenter:** FAERBER, Christian

**Track Classification:** Detector R & D and data handling
Performance studies of b-tagging algorithms using top quark pairs processes in pp collisions at the center of mass energy 7 TeV with the ATLAS Experiment

Many physics analyses with the ATLAS detector expect to have jets originating from b-quarks. Algorithms that allow to identify those jets are thus of great importance and it is crucial to understand their performance, namely the b-tagging efficiencies, misidentification efficiencies and calibration.

The final state of single lepton top pair decays is characterized by at least four jets among which at least two are b-jets. This b-enriched sample provides a perfect environment for calibration of b-tagging algorithms for analyses with large multiplicity of high transverse momentum jets, for example Higgs and SUSY searches. On the other hand, the dilepton channel guarantees a high purity of selected ttbar events and ensures a high reliability of the real b-tagging efficiency estimation. This approach takes advantage of the large cross-section of the top quark pair production at the LHC and a good understanding of this process after the initial phase of data taking with the ATLAS detector.

To measure the b-tagging efficiency in the single lepton channel a slightly modified tag and probe method is applied to ttbar events selected from data. Alternatively, in both single lepton and dilepton channels, b-tagged jets in an event can be counted. This method provides as well a ttbar production cross-section estimation. Thanks to the large amount of data collected by ATLAS in 2011 those studies are not much affected by statistical uncertainty and an accurate measurement of the efficiencies in many jet transverse momentum bins is possible.

Primary author: LEYKO, Agnieszka Leyko (University of Bonn)
Presenter: Dr UCHIDA, Kirika (Universität Bonn)

Track Classification: Top and Electroweak Physics
New physics in the third generation quark sector: LHC predictions from LEP and Tevatron anomalies

Thursday, 21 July 2011 10:00 (15 minutes)

The last decade of particle physics beyond the Standard Model has seen extensive developments on an alternative to supersymmetry: the scenarios with warped extra dimensions. Those constitute a new paradigm in the sense that they are dual, through the AdS/CFT correspondence, to composite Higgs models. These scenarios predict strong deviations from the Standard Model mainly in the bottom and top quark sector. In that sense, the LEP anomaly on forward-backward bottom asymmetry ($A^b_{FB}$) and the recent Tevatron anomalies on the top asymmetry ($A^t_{FB}$) could be interpreted as early signatures of such warped models. We will discuss warped model realizations allowing to address both $A^b_{FB}$ and $A^t_{FB}$, taking also into account the new constraints issued from top pair and dijet production rates at the LHC. Then, I will describe what are the predictions of these warped models at LHC, pointing out the complementarity between Tevatron and LHC on top physics. There are typically two types of predicted signatures at LHC: a resonance peak in the top pair invariant mass distribution (due to the exchange of a Kaluza-Klein excitation of the gluon) or the production of exotic colored fermions (custodians) around a few hundred’s of GeV.

Primary author:  Dr MOREAU, Grégory (LPT/Orsay)
Presenter:  Dr MOREAU, Grégory (LPT/Orsay)
Session Classification:  Higgs and New Physics
Probing Flavor Transition Mechanisms of Astrophysical Neutrinos

Thursday, 21 July 2011 10:00 (15 minutes)

The determination of neutrino flavor transition mechanism by neutrino telescopes is presented. We first propose a model-independent parameterization for flavor transitions (such as standard three-flavor oscillations, neutrino decays or others) of astrophysical neutrinos propagating from their sources to the Earth. We demonstrate how one can constrain parameters of the above parameterization by performing flavor identifications in neutrino telescopes. Given the anticipated flavor discrimination capability in IceCube, we work out the allowed regions for the flavor transition parameters. The possibility of distinguishing neutrino decay models from the standard neutrino oscillation by IceCube detector is discussed.

Primary author: Prof. LIN, Guey-Lin (Institute of Physics, National Chiao-Tung University)

Co-authors: Prof. LAI, Kwang-Chang (Physics Group, General Education Center, Chang-Gung University); Dr LIU, Tsung Che (Leung Center for Cosmology and Particle Astrophysics, National Taiwan University)

Presenter: Prof. LIN, Guey-Lin (Institute of Physics, National Chiao-Tung University)

Session Classification: Astroparticle Physics

Track Classification: Astroparticle Physics
Diamond for high energy radiation and particle detection

Friday, 22 July 2011 15:45 (15 minutes)

Progress in experimental particle physics in the coming decade depends crucially upon the ability to carry out experiments at high energies and high luminosities. These two conditions imply that future experiments will take place in very high radiation areas. In order to perform these complex and perhaps expensive experiments new radiation hard technologies will have to be developed. Chemical Vapor Deposition (CVD) diamond is being developed as a radiation tolerant material for use very close to the interaction region where detectors may have to operate in extreme radiation conditions. During the past few years many CVD diamond devices have been manufactured and tested. As a detector for high radiation environments CVD diamond benefits substantially from its radiation hardness, very low leakage current, low dielectric constant, fast signal collection and ability to operate at room temperature. As a result CVD diamond now has been used extensively in beam conditions monitors as the innermost detectors in the highest radiation areas of e+e- colliders (BaBar and Belle experiments) and hadron colliders (CDF and every experiment at the recently commissioned CERN Large Hadron Collider). In addition, CVD diamond is now being considered as a sensor material for the particle tracking detectors closest to the interaction region where the most extreme radiation conditions exist. We will present the present state-of-the-art of polycrystalline CVD diamond and the latest results obtained from detectors constructed with this material. Recently single crystal CVD diamond material has been developed which resolves many of the issues associated with polycrystalline material. We will also present recent results obtained from devices constructed from this new diamond material. Finally, we will discuss the use of diamond detectors in present and future experiments and their survivability in the highest radiation environments.

**Primary authors:** KAGAN, Harris (The Ohio State University); TRISCHUK, William (University of Toronto)

**Presenters:** KAGAN, Harris (The Ohio State University); TRISCHUK, William (University of Toronto)

**Session Classification:** Detector R & D and Data Handling

**Track Classification:** Detector R & D and data handling
Reactor Neutrino Experiments in the light of the Reactor Antineutrino Anomaly

Saturday, 23 July 2011 11:15 (25 minutes)

Recently new reactor antineutrino spectra have been provided for 235U, 239Pu, 241Pu and 238U, increasing the mean flux by about 3 percent. We will review the synthesis of published experiments at reactor-detector distances <100 m leading to a ratio of observed event rate to predicted rate of 0.943(0.023), deviating from unity at the 98.6% C.L.. The compatibility of this new result with the existence of a fourth non-standard neutrino state driving new neutrino oscillations will be discussed. Test of the anomaly with short baseline reactor experiments will be presented. We will then review the forthcoming reactor neutrino program towards the determination of the theta13 mixing angle at Daya Bay, Double Chooz, and Reno. We will finally discuss the implication of the reactor antineutrino anomaly on the sensitivity of the neutrino oscillation searches at reactors in both solar and atmospheric sectors.

Primary author: Dr LASSERRE, Thierry (Saclay)
Presenter: Dr LASSERRE, Thierry (Saclay)
Session Classification: Neutrino Physics
Track Classification: Neutrino Physics
Center-symmetric effective theory for two-color QCD with massive quarks at nonzero chemical potential

Friday, 22 July 2011 14:45 (15 minutes)

We revisit the center-symmetric dimensionally reduced effective theory for two-color Yang-Mills theory at high temperature. This effective theory includes an order parameter for center symmetry breaking/restoration and thus allows to broaden the range of validity of the conventional three-dimensional effective theory (EQCD) to lower temperatures, towards the confining phase transition. We extend the previous results by including in the effective theory the effects of massive quarks with nonzero baryon chemical potential. The parameter space of the theory is constrained by leading-order matching to the Polyakov loop effective potential of two-color QCD. Two-color QCD has attracted considerable interest due to the absence of the sign problem, and hence the possibility to probe its phase diagram at nonzero baryon density using standard Monte Carlo simulations. Our effective theory can provide model-independent predictions for the physics above the deconfinement transition, thus bridging the gap between large-scale numerical simulations and semi-analytical calculations within phenomenological models.

Primary author: Dr BRAUNER, Tomas (Bielefeld University)
Co-authors: Dr VUORINEN, Aleksi (Bielefeld University); Mr ZHANG, Tian (Frankfurt University)
Presenter: Dr BRAUNER, Tomas (Bielefeld University)
Session Classification: QCD
Alignment of the ATLAS Inner Detector tracking system

ATLAS is a multipurpose experiment that records the products of the LHC collisions. In order to reconstruct trajectories of charged particle produced in these collisions, ATLAS is equipped with a tracking system built using two different technologies, silicon planar sensors (pixel and microstrips) and drift-tube based detectors. Together they constitute the ATLAS Inner Detector, which is embedded in a 2 T solenoidal field.

Efficiently reconstructing tracks from charged particles traversing the detector, and precisely measure their momenta, is of crucial importance for physics analyses. In order to achieve its scientific goals, the alignment of the ATLAS tracking system requires the determine accurately its almost 700,000 degrees of freedom. Thus the demanded precision for the alignment of the silicon sensors is below 10 micrometers. This implies to use a large sample of high momentum and isolated charge particle tracks. The high level trigger selects those tracks online. Then the raw data with the hits information of the triggered tracks is stored in a calibration stream. Tracks from cosmic trigger during empty LHC bunches are also used as input for the alignment.

The implementation of the track based alignment within the ATLAS software framework unifies different alignment approaches and allows the alignment of all tracking subsystems together. Primary vertexing and beam spot constraints have also been implemented, as well as constraints from on the particle momentum as measured by the Muon System. Finally the assembly survey data can be used as constraint to the alignment corrections. As alignment algorithms are based on minimization of the track-hit residuals, one needs to solve a linear system with large number of DoF. The solving involves the inversion or diagonalization of a large matrix that may be dense. The alignment jobs are executed at the CERN Analysis Facility. The event processing is run in parallel in many jobs. The output matrices from all jobs are added before solving.

We will present the results of the alignment of the ATLAS detector using real data recorded during 2010 and 2011 using the the LHC proton-proton collision runs at 7 TeV. Validation of the alignment was performed by measuring the alignment observables as well as many other physics observables, notably resonance invariant masses in a wide mass range (Kbs,J/ψ and Z decays into μ+μ-) and the effect of detector systematic distortions on their invariant mass and μ momentum. Also the E/p for electrons has been studied. The results of the alignment with real data reveal that the precision of the alignment constants is approximately 5 microns.

Primary author: KANAYA, Naoko (ICEPP, University of Tokyo)

Presenter: Ms SKINNARI, Louise (UC Berkeley / LBNL)

Track Classification: Detector R & D and data handling
Perfromance of the ATLAS Trigger and DAQ system

Friday, 22 July 2011 11:15 (15 minutes)

The ATLAS Trigger and Data Acquisition (TDAQ) system is responsible for reducing the event rate from the design bunch-crossing rate of 40 MHz to an average recording rate of 200 Hz.

The ATLAS trigger is designed to select signal-like events from a large background in three levels: a first-level (L1) implemented in custom-built electronics, as well as the two levels of the high level trigger (HLT) software triggers executed on large computing farms. The first-level trigger is comprised of calorimeter, muon and forward triggers to identify event features such as missing transverse energy, as well as candidate electrons, photons, jets and muons. Input signals from these objects are processed by the L1 Central Trigger to form a L1 Accept (L1A) decision. L1A and timing information is consequently sent to all sub-detectors, which push their data to DAQ buffers. The first part of the HLT system (called Level 2) pulls the data from the buffers on demand, while the second part (called Event Filter) works with the whole event at hand.

We will demonstrate that the ATLAS trigger performed smoothly throughout 2010 and 2011, evolving with increasing LHC luminosity in order to maintain a high selection efficiency whilst operating at an overall data acquisition efficiency of 96%. The ATLAS first-level trigger rate has already reached 40 kHz, roughly half of the design rate. Concurrently, the Level 2 and Event Filter rates reached and consequently exceeded the design performance. We will also discuss the achievements and problems encountered during the 2010 and 2011 data taking periods, with an overview of challenges and plans for adapting to the upcoming upgrade of LHC running.

Primary author: KANAYA, Naoko (ICEPP, University of Tokyo)
Presenter: Mrs DOBSON, Eleanor (CERN)
Session Classification: Detector R & D and Data Handling
Track Classification: Detector R & D and data handling
Tracker and Calorimeter Performance for the Identification for Hadronic Tau Lepton Decays in ATLAS

Friday, 22 July 2011 09:45 (15 minutes)

Tau leptons will play an important role in the physics program at the LHC. They will be used not only in searches for new phenomena like the Higgs boson or Supersymmetry and electroweak measurements but also in detector related studies like the determination of the missing transverse energy scale.

Identifying hadronically decaying tau leptons requires good understanding of the detector performance, combining the calorimeter and tracking detectors. We present the current status of the tau reconstruction and identification at the LHC with the ATLAS detector.

The identification efficiencies are measured by W→taunu and Z→tautau events, and compared with the prediction of the Monte Carlo simulation. The performance of the fake tau rejection is also estimated in jet-enriched data samples from dijets, multi-jets, gamma+jets and Z+jets events.

**Primary author:**  KANAYA, Naoko (ICEPP, University of Tokyo)

**Presenter:**  LAI, Stanley

**Session Classification:**  Detector R & D and Data Handling

**Track Classification:**  Detector R & D and data handling
Probing annihilations and decays of low-mass galactic dark matter by track and cascade events in IceCube DeepCore

Thursday, 21 July 2011 17:45 (15 minutes)

The deployment of DeepCore array significantly lowers IceCube's energy threshold to about 10 GeV and enhances the sensitivity of detecting neutrinos from annihilations and decays of light dark matter. To match this experimental development, we provide a complete analysis of track and cascade event rates in DeepCore array due to neutrino flux produced by annihilations and decays of galactic dark matter. We also calculate the background event rates due to atmospheric neutrino flux for evaluating the sensitivity of DeepCore array to galactic dark matter signatures. Unlike previous approaches, which set the energy threshold for track and cascade events at around 50 GeV (this choice makes the estimation of atmospheric background event rate much simpler, i.e., the oscillation effect in atmospheric neutrino flux can be neglected), we have set the energy threshold at 10 GeV to take the full advantage of DeepCore array. We compare our calculated sensitivity with those obtained by setting a 50 GeV threshold energy. We conclude that our choice of threshold energy significantly improves the sensitivity to dark matter signature for WIMP mass below 100 GeV.

Primary author: Dr LEE, Fei-Fan (National Chiao Tung University)
Co-author: Prof. LIN, Guey-Lin (National Chiao Tung University)
Presenter: Dr LEE, Fei-Fan (National Chiao Tung University)
Session Classification: Astroparticle Physics
Track Classification: Astroparticle Physics
Searches for first and second generation leptoquarks using the ATLAS detector

Searches for the pair production of first and second generation scalar leptoquarks have been performed using 35 pb−1 of proton-proton collision data recorded by the ATLAS detector at $\sqrt{s} = 7$ TeV, delivered by the LHC during 2010. We search for leptoquarks in events with two oppositely charged muons or electrons and at least two jets, and in events with one muon or electron, missing transverse momentum and at least two jets. The results on the dilepton and the single lepton channels are combined in each generation, and presented as limits on the leptoquark mass as a function of the branching fraction of a leptoquark to a charged lepton. The modeling of the Standard Model backgrounds is validated in dedicated control regions that enhance the major background contributions and that are orthogonal to the signal region. The signal region is defined using an a priori optimization procedure based on simulated signal and background yields. After full event selection, the observed number of events are consistent with the expected yields. Leptoquark production is excluded at the 95% CL for masses $M_{LQ} < 376$ (319) GeV and $M_{LQ} < 422$ (362) GeV for first and second generation scalar leptoquarks, respectively, when assuming the branching fraction of a leptoquark to a charged lepton is equal to 1.0 (0.5).

**Primary author:** DELUCA, Carolina (Stony Brook University)

**Presenter:** DELUCA, Carolina (Stony Brook University)
The MICE beamline instrumentation (trackers and PID) for a precise emittance measurement

Friday, 22 July 2011 12:15 (15 minutes)

The International Muon Ionization Cooling Experiment (MICE) will carry out a systematic investigation of ionization cooling of a muon beam, for the future Neutrino Factory and the Muon Collider. As the emittance measurement will be done on a particle-by-particle basis, a sophisticated beam instrumentation is needed to measure both particle coordinates and timing vs RF in a harsh environment due to high particle rates, fringe magnetic fields and RF backgrounds. A PID system, based on three time-of-flight stations (with resolutions up to 50-60 ps), two Aerogel Cerenkov counters and a KLOE-like calorimeter (KL) has been constructed and has allowed the commissioning of the MICE muon beamline in 2010. It will be soon followed by an Electron Muon Ranger to determine the muon range at the apparatus downstream end and later by two tracker detectors to trace incoming particles inside two high-field superconducting solenoids.

Detector performances will be shown and their use for the beamline characterization fully illustrated.

Primary author: Dr BONESINI, Maurizio (INFN Milano Bicocca)

Presenter: Dr BONESINI, Maurizio (INFN Milano Bicocca)

Session Classification: Detector R & D and Data Handling

Track Classification: Detector R & D and data handling
Loop Quantum Cosmology

Friday, 22 July 2011 17:10 (15 minutes)

Loop Quantum Gravity is a very attractive attempt to perform a non-perturbative and background-independant quantization of general relativity. Applied to the Universe as a whole, the resulting framework, Loop Quantum Cosmology (LQC) has led to several important results beginning by the fact that the Big Bang singularity is resolved and replaced by a Big Bounce. In this talk, I will focus on showing that LQC naturally leads to inflation and could leave observational features that might be detected by the next generation CMB experiments.

Primary author: BARRAU, Aurélien (LPSC)
Presenter: BARRAU, Aurélien (LPSC)
Session Classification: Cosmology and Gravity
Hadronic matrix elements for exclusive rare $B$ decays

Thursday, 21 July 2011 16:30 (15 minutes)

I will report on the QCD calculation of the hadronic matrix elements relevant for the exclusive rare $B$ decays, such as $B \rightarrow K^{(*)} \ell^+ \ell^-$ and $B \rightarrow K^* \gamma$.

The hadronic input for the decay observables, in addition to the heavy-light form factors, contains specific contributions, generated by the four-quark and penguin operators, such as the charm-loop effects. The corresponding hadronic matrix elements are calculated by the same method as the form factors, applying OPE and light-cone sum rules in QCD. This technique allows one to take into account the nonfactorizable soft-gluon contributions. The results are expressed in terms of (process-dependent) corrections to the short-distance coefficients of the effective Hamiltonian. The impact of these corrections on the most important observables, e.g., on the forward-backward asymmetry in $B \rightarrow K^* \ell^+ \ell^-$, is estimated.

**Primary author:** Mr KHODJAMIRIAN, Alexander (Siegen University)

**Presenter:** Mr KHODJAMIRIAN, Alexander (Siegen University)

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
Measurement of the cosmic ray energy spectrum above 1 EeV at the Pierre Auger Observatory

Thursday, 21 July 2011 11:30 (15 minutes)

Authorship: The Pierre Auger Collaboration
The Pierre Auger Observatory is measuring the ultra-high energy cosmic ray extended air showers from simultaneous observation of fluorescence and surface detectors with unprecedented precision. The high statistics of the surface detector allows a good determination of the cosmic ray flux above an energy of 3 EeV. This bound is extended down to 1 EeV using a unique technique that exploits the hybrid detection power. The spectrum is presented displaying two clear features in the energy range between 1 and 100 EeV.

Primary author:  Dr BERAT, Corinne (LPSC, Université Joseph Fourier Grenoble 1, CNRS/IN2P3, Institut Polytechnique de Grenoble)

Presenter:  Dr BERAT, Corinne (LPSC, Université Joseph Fourier Grenoble 1, CNRS/IN2P3, Institut Polytechnique de Grenoble)

Session Classification:  Astroparticle Physics

Track Classification:  Astroparticle Physics
A new design for the CERN to Fréjus neutrino beam

In the framework of the EUROnu design study, we have developed a new design for the CERN to Fréjus neutrino beam based on the proposed linear accelerator SPL. The aim of this beam is to study CP violation in the neutrino sector, with a proton beam of 4.5 GeV/c, a baseline of 130 km and the water Cherenkov MEMPHYS (440 kton fiducial mass) as the far detector.

The main challenge of this project lies with the design of a multi-MW target for the proton beam. We have fully investigated the design of the target, the target station and the decay tunnel.

We will present the new technical baseline which provides a feasible solution without compromising the physical performance. We will also present the feature of the neutrino beam, the event rates and the sensitivity to $\sin^2(2\theta_{13})$ and to the CP-violating phase $\delta$.

Primary authors: Dr ZITO, Marco (IRFU-Saclay); Dr DRACOS, Marcos (IPHC Strasbourg)

Presenter: Dr DRACOS, Marcos (IPHC Strasbourg)

Track Classification: Accelerators
Performance and Calibration of the ATLAS Jet Trigger

ATLAS has been successfully collecting 7 TeV pp collision data from the LHC since 2010, at a rate that will ultimately reach 40 MHz for nominal LHC conditions. The ATLAS trigger system handles this enormous data flow, providing efficient rejection and maintaining an unbiased efficiency for rare signals.

It is organized in three levels that reduce the rate to approximately 200 Hz, by reconstructing and selecting high transverse momentum objects such as jets, taus, electrons, photons or missing transverse energy. The first level (L1) is implemented in custom made electronic modules, while the High Level Trigger (HLT), which comprises the second (L2) and third (Event Filter, EF) trigger levels, is based on software running in commercial computers.

High performance of the jet trigger is essential to achieve the physics goals of ATLAS and the ATLAS jet trigger is prepared to cover a wide variety of physics topics, ranging from QCD studies to SUSY searches. At the LHC, where jets are produced at a high rate and have jets as the main background, fast jet reconstruction and accurate calibration becomes the main challenge for the ATLAS jet trigger. It must accurately measure the jet energy to distinguish high pT jets from low pT ones. This is a particularly complex issue, especially with non-compensating hadronic calorimeters, such as the one used in ATLAS.

Here, we will present the challenges of the ATLAS jet trigger and describe its implementation and performance with 7 TeV data. We will also discuss possible improvements to this system.

Primary author: MACHADO MIGUÉNS, Joana (LIP (Lisbon))
Presenter: MACHADO MIGUÉNS, Joana (LIP (Lisbon))
Track Classification: Detector R & D and data handling
Evolution of the Universe in the Inert Doublet Model

Inert Doublet Model is a minimal extension of the Standard Model with the second scalar doublet that may provide a Dark Matter candidate. We consider possible evolutions of the Universe to this state during cooling down of the Universe after inflation, taking into account first order of the temperature corrections to the potential. We argue that in the past Universe could pass through phase states having no DM candidate. In the evolution via such states in addition to a possible EWSB phase transition (2-nd order) the Universe sustained one 1-st order phase transition or two phase transitions of the 2-nd order. We consider the evolution of physical parameters, taking into account the existing accelerator and astrophysical constraints. Talk is based on following works: arXiv:1009.4593 [hep-ph], arXiv:1104.3326 [hep-ph].

**Primary author:** SOKOLOWSKA, Dorota (University of Warsaw)

**Presenter:** SOKOLOWSKA, Dorota (University of Warsaw)
Analysis Of The New Generalized Actions Of The Einstein-Cartan Theory

Inspiring by the Holst case, the Palatini (Palatini-Holst) action was generalized by adding term of real function depending on the Torsion which has no effects on the obtained evolution equations which are the classical vacuum Einstein equations (M. Dubois-Violette and M. Lagraa Lett. Math. Phys, 91 83, 2010). Through this poster, we shall expose an analysis of these new actions which shows the possibility to obtain the classical vacuum Einstein equations on space-time manifold allowing arbitrary no dynamical torsion when this additional function takes particular values (M. H. Lagraa and M. Lagraa, Classical and Quantum Gravity, Chapter 8, Nova Science Publisher 2011.

The second result presenting in this poster shows that we can construct the standard effective Einstein-Cartan action coupled to fermionic matter without the usual current-current term resulting from the nonvanishing torsion and depending on the real dimensionless Barbero-Immirzi Parameter. Hence, the establishment of equivalence between the Theory of General Relativity and the Einstein-Cartan theory minimally coupled to fermionic matter. (M. H. Lagraa and M. Lagraa, Class. Quant. Grav. 27, 095012, 2010).

Primary author: LAGRAA, Meriem Hadjer (Laboratoire de Physique Théorique d’Oran (LPTO), Université d’Oran Es-Sénia.)

Presenter: LAGRAA, Meriem Hadjer (Laboratoire de Physique Théorique d’Oran (LPTO), Université d’Oran Es-Sénia.)
SM background estimation in the 1-lepton channel in SUSY searches (ATLAS)

One of the promising channels in the searches for Supersymmetry is the 1-lepton channel which requires one isolated electron or muon, multiple jets and a high Missing Transverse Energy. Some SM processes like top, W and QCD can show similar experimental signatures. The magnitude of these backgrounds must be understood well. Various methods to estimate these backgrounds are presented.

**Primary author:** Mrs LORENZ, Jeanette (Fakultaet fuer Physik, LMU Muenchen)

**Presenter:** Mrs LORENZ, Jeanette (Fakultaet fuer Physik, LMU Muenchen)
Measurement of W and Z boson production cross sections in pp collisions at 7 TeV with the ATLAS detector

Friday, 22 July 2011 11:00 (20 minutes)

Differential and inclusive cross sections for electroweak boson production are presented, in the electron, muon and tau decay channels. The data are compared to the predictions of next-to-leading-order and, where available, next-to-next-leading order QCD.

Primary author: Dr BARONCELLI, Antonio (INFN / Roma TRE)
Presenter: REECE, Ryan (University of Pennsylvania)
Session Classification: Top and Electroweak Physics
Track Classification: Top and Electroweak Physics
Measurement of W and Z boson production in association with jets and heavy flavours in pp collisions at 7 TeV with the ATLAS detector

Friday, 22 July 2011 11:45 (20 minutes)

Differential and inclusive cross sections for electroweak boson production in association with jets are presented, in the electron and muon decay channels. Inclusive jet distributions, multiplicities and ratios are presented, as well as measurements of jets containing B-hadrons. The data are compared to the predictions of next-to-leading-order.

Primary author: Dr BARONCELLI, Antonio (INFN / Roma TRE)
Presenter: MESSINA, Andrea
Session Classification: Top and Electroweak Physics
Track Classification: Top and Electroweak Physics
Measurement of W gamma and Z gamma production at the LHC

Friday, 22 July 2011 17:30 (15 minutes)

Measurements are presented of high energy photons produced in association with W and Z bosons in pp collisions at √s = 7 TeV using the ATLAS detector. The analysis uses W and Z bosons selected with leptonic (e/µ) decays. Subsets of these events are identified by demanding an electromagnetic object passing isolated photon selection criteria. We isolate signals of p + p → l + ν + γ + X and p + p → l + l + γ + X production with photon ET > 15 GeV and delatR(l -γ ) > 0.7. The production cross sections and the kinematic distributions of the leptons and photons are compared to Standard Model predictions. The measurements are sensitive to the electroweak triple gauge couplings of the Standard Model, and constraints are set on anomalous TGCs.

Primary author: Dr BARONCELLI, Antonio (INFN / Roma TRE)
Presenter: WANG, Song-Ming
Session Classification: Top and Electroweak Physics
Track Classification: Top and Electroweak Physics
Measurement of charged kaons and pions production in proton-carbon interaction at 31 GeV/c from NA61/SHINE

Friday, 22 July 2011 15:50 (15 minutes)

An overview of the recent NA61/SHINE results on determination of charged kaon and pion yields in proton-carbon reactions is presented. The results aim to improve predictions of the neutrino flux in the T2K experiment. The data were recorded during the first physics run of NA61 in 2007 where a proton beam of 31 GeV/c momentum scattered off a graphite target. Thin target, 4% of a nuclear interaction length, was used to determine interaction cross section. Inclusive production cross sections for negatively and positively charged pions and kaons are presented as a function of laboratory momentum and polar angle. The spectra are compared to predictions of hadron production models. In addition preliminary results obtained with a long graphite target (the so called T2K replica target) are presented. The precision required by T2K is discussed.

Primary author: Dr KORZENEV, Alexander (Universite de Geneve, Section de physique, DPNC)

Presenter: Dr KORZENEV, Alexander (Universite de Geneve, Section de physique, DPNC)

Session Classification: Neutrino Physics

Track Classification: Neutrino Physics
Phenomenology of helicity amplitudes of high energy exclusive leptoproduction of the rho meson

Exclusive leptoproduction of vector mesons has been the subject of recent significant progress, both theoretically and experimentally. In particular, the hard regime with a highly virtual photon exchange allows to separate a short distance dominated amplitude of hard subprocess from suitably defined hadronic objects. However, a consistent picture is still missing, in particular for contributions to the scattering amplitude beyond the leading power in the photon virtuality.

We recently described the hard production of transversally polarized rho-meson, up to twist 3 accuracy, including 2- and 3- particles Fock-states, in the HERA kinematics of high center-of-mass energy. We compare our results with high energy experimental data for the ratios of helicity amplitudes $T(\rho_T \gamma_T)/T(\rho_L \gamma_L)$ and $T(\rho_L \gamma_T)/T(\rho_L \gamma_L)$ and get a good description of the data.

Primary author: BESSE, Adrien (LPT Orsay / Soltan Institute for Nuclear Physics)

Presenter: BESSE, Adrien (LPT Orsay / Soltan Institute for Nuclear Physics)

Track Classification: QCD
Studies of the internal properties of jets with the ATLAS detector

Thursday, 21 July 2011 12:00 (15 minutes)

The internal properties of jets are sensitive to fragmentation and QCD radiation. Jet substructure may be used to indentify the decays of boosted hadronically decaying particles. Measurements of jets shapes, of single-jet mass, of charged particle multiplicites, and of some key substructure variables are presented and compared to QCD calculations.

Primary author: Dr BARONCELLI, Antonio (INFN / Roma TRE)
Presenter: MILLER, David
Session Classification: QCD
Measurement of the $Z$-$\tau\tau$ and $W$-$\tau\nu$ cross sections with the ATLAS detector

The $Z$-$\tau\tau$ cross-section has been measured with the ATLAS experiment at the LHC in four different channels, depending on the decays of the two tau leptons: electron-hadrons, muon-hadrons, electron-muon and muon-muon. The analysis is based on the data sample collected in 2010, corresponding to an integrated luminosity of 36 pb$^{-1}$, at a proton-proton centre-of-mass energy of 7 TeV. The cross section for $W$-$\tau\nu$ is also measured.

Primary author: Dr BARONCELLI, Antonio (INFN / Roma TRE)

Presenter: GRIFFITHS, Justin

Track Classification: QCD
Gamma-ray astronomy and cosmic-ray physics with ARGO-YBJ

Thursday, 21 July 2011 12:15 (15 minutes)

The ARGO-YBJ detector, located 4300 m a.s.l. on the Tibet plateau, is a ground-based, full-coverage array of Resistive Plate Chambers (RPCs) covering a surface of 78 x 74 m^2, surrounded by a guard ring of RPCs enclosing a total surface of about 11000 m^2. ARGOYBJ was designed to detect extensive air showers generated by cosmic rays and gamma rays with primary energy greater than few hundred GeV, in order to study the region of the cosmic-ray spectrum out of the reach of both satellite-based experiments and traditional ground-based arrays. The experiment has been running with its complete layout since November 2007, collecting over 2.5 x 10^11 events. The main results obtained by ARGO-YBJ will be presented here, and specifically:
- the monitoring of astronomical gamma-ray sources, such as the Crab nebula and the MRK 421 AGN;
- the moon shadow;
- the intermediate-scale and large-scale anisotropy map;
- the proton-proton inelastic cross section at center-of-mass energy between 70 and 500 GeV where no accelerator data are available.

Primary author: Dr CAMARRI, Paolo (University of Roma "Tor Vergata" and INFN Roma Tor Vergata)

Presenter: Dr CAMARRI, Paolo (University of Roma "Tor Vergata" and INFN Roma Tor Vergata)

Session Classification: Astroparticle Physics

Track Classification: Astroparticle Physics
The characteristics of thermalization of boost-invariant plasma from holography

Saturday, 23 July 2011 09:30 (15 minutes)

We report on the evolution of boost-invariant N=4 super Yang-Mills plasma covering a large range of proper times starting from various nonequilibrium states at $\tau=0$, through a transition to a hydrodynamic regime and following subsequent hydrodynamic expansion. The results are obtained through numerical solution of Einstein’s equations for the dual geometries. Despite the very rich far from equilibrium evolution, we find surprising regularities in the form of simple phenomenological relations between initial entropy and total produced entropy, as well as between initial entropy and the temperature at thermalization. For 20 different initial conditions that we consider, hydrodynamics turns out to be applicable for proper times larger than at most 0.67 in units of inverse temperature at thermalization.

Based on arXiv:1103.3452 [hep-th]

Primary authors: Dr HELLER, Michal (Universiteit van Amsterdam / Institute for Nuclear Studies); Mr WITASZCZYK, Przemyslaw (Jagiellonian University); Prof. JANIK, Romuald (Jagiellonian University)

Presenter: Dr HELLER, Michal (Universiteit van Amsterdam / Institute for Nuclear Studies)

Session Classification: Non-Perturbative QFT and String Theory
Overview of Searches for Supersymmetry with the ATLAS detector

Thursday, 21 July 2011 15:45 (15 minutes)

ATLAS searches for supersymmetry in data from the 2010 and 2011 running of the LHC will be reviewed. These searches were performed in various channels containing different lepton and jet multiplicities in the final state. Although ATLAS searches for supersymmetry in channels both with and without missing transverse momentum, this talk will concentrate on the missing transverse momentum channels, in order to make the connection with dark matter.

Primary author: Dr BARONCELLI, Antonio (INFN / Roma TRE)
Presenter: TAFFARD, Anyes
Session Classification: Astroparticle Physics
Track Classification: Astroparticle Physics
F-theory was developed in the mid-nineties as a tool to study IIB string theory beyond its perturbative regime. Although conceptually less understood than its “spouse”, M-theory, F-theory is a more practical tool for model building mainly because it is anchored to algebraic geometry. This well-studied field of mathematics facilitates spectacularly detailed calculations and provides for endless supplies of explicit examples. Since the year 2008, we have seen a revival of F-theory model building.

In this talk, I will review the basic picture of F-theory and its relation to M-theory. Then, I will summarize the recent developments that triggered the renewed interest in this branch, and sketch the current state of affairs.

In the past few years, myriad works have been produced that focus on embedding particular aspects of GUT-like models into F-theory, such as breaking the gauge group in a certain way, getting the right spectrum, or suppressing proton decay. I will place the spotlight on the fundamental issues that have been addressed and for which understanding is still lacking.

**Primary author:** Dr COLLINUCCI, Andres (LMU, Munich)

**Presenter:** Dr COLLINUCCI, Andres (LMU, Munich)

**Session Classification:** Non-Perturbative QFT and String Theory
Measurement of the top quark cross-section in the single-lepton channel in pp collisions at $\sqrt{s} = 7$ TeV using kinematic fits and b-tagging information

The measurement of the top-quark pair production cross-section is a powerful tool to test the Standard Model (SM) at a new energy. With the recent advances in theoretical calculations that led to predictions at a precision level of 10%, this measurement particularly provides a precision test of the theory of Quantum Chromodynamics. At the same time, the decays of top-quark pairs are phenomenologically similar to processes predicted by beyond-SM theories, thus representing an irreducible background that has to be studied thoroughly. In this first phase of data taking of the ATLAS detector, a copious process like $tt$ production can be also exploited to test the performance of the detector itself. The single-lepton channel, in which the W boson produced in the decay of one top quark decays leptonically and the W boson from the other top quark decays hadronically, currently provides the best trade-off between experimental accessibility, production rate and background contamination.

The measurement of the $tt$ production cross-section in the single-lepton channel in pp collisions at a centre-of-mass energy $\sqrt{s} = 7$ TeV is presented. The analysis is based on a multivariate discriminant distribution in 3, 4 and $\geq 5$ jet bins using three kinematic variables and b-tagging information. With a data sample of about 35 pb$^{-1}$ recorded by ATLAS in 2010 the inclusive top quark production cross-section is measured to be $\sigma_{tt} = 186 \pm 10 \text{ (stat.)}^{+21}_{-20} \text{ (syst.)} \pm 6 \text{ (lumi.)} \text{ pb}$. This measurement is in agreement with the theory prediction.

**Primary author**: LANGE, Clemens (DESY)

**Presenter**: LANGE, Clemens (DESY)

**Track Classification**: Top and Electroweak Physics
Search for New Physics in Dijet Mass and Angular Distributions in pp Collisions at $\sqrt{s} = 7$ TeV Measured with the ATLAS Detector

We present a search for physics beyond the Standard Model in proton-proton collisions at a centre-of-mass energy of $\sqrt{s} = 7$ TeV, performed with the ATLAS Detector at the Large Hadron Collider (LHC). In 2010, no sign of new physics was observed in dijet mass and angular distributions and the world’s best limits were set on a variety of models of new physics, including excited quarks, quark contact interactions, axigluons, and quantum black holes. For example, an exited quark was excluded with mass between 0.60 and 2.64 TeV and quark contact interactions were excluded with a compositeness scale below 9.5 TeV. Pending approval and LHC performance, we anticipate presenting new results from a significantly larger dataset.

**Primary author:** DIETZSCH, Thorsten (University of Heidelberg)

**Presenter:** DIETZSCH, Thorsten (University of Heidelberg)
Mass composition of Ultra High Energy Cosmic Rays at the Pierre Auger Observatory

Thursday, 21 July 2011 12:00 (15 minutes)

Authorship: The Pierre Auger Collaboration
The mass composition of ultra-high energy cosmic rays is a critical issue to understand their origin and nature. The Pierre Auger Observatory is a hybrid instrument which provides a powerful environment for the determination of the primary mass, being able to discriminate between photons, neutrinos and hadrons. Results on limits of photon and neutrino fluxes together with hadronic identification are presented. The dependence of average primary mass with energy by comparison with current predictions from models is finally discussed.

Primary author: Dr WAHLBERG, Hernan (IFLP - Universidad Nacional de La Plata)
Co-author: FOR THE PIERRE AUGER COLLABORATION, Full author list: [www.auger.org](http://www.auger.org) 2011 05.html (Observatorio Pierre Auger, Av. San Martin Norte 304, 5613 Malargue, Argentina)
Presenter: Dr WAHLBERG, Hernan (IFLP - Universidad Nacional de La Plata)
Session Classification: Astroparticle Physics
Track Classification: Astroparticle Physics
I want to discuss the next-to-leading order QCD
corrections to the production of a top-quark pair in association
with a hard photon. This process allows a direct measurement
of the top quark electromagnetic couplings.
For a realistic description of this process we incorporated top quark and W-boson decays using
the narrow width approximation. Photon radiation off top quark decay products
is included and yields a significant contribution to the cross section. I will present our findings
for ttbar+gamma production at the Tevatron using the selection criteria of a recent CDF analysis.
For the LHC I will discuss the impact of the QCD corrections to the ttbar+gamma process on the
measurement of the top quark electric charge.

Primary authors: Dr SCHARF, Andreas (SUNY Buffalo); Prof. MELNIKOV, Kirill (Johns Hopkins
University); Dr SCHULZE, Markus (Johns Hopkins University)

Presenter: Dr SCHARF, Andreas (SUNY Buffalo)

Session Classification: Top and Electroweak Physics

Track Classification: Top and Electroweak Physics
Quantifying the impact of collider isolated photon data on global PDF fits

Thursday, 21 July 2011 15:30 (15 minutes)

Isolated prompt photon production in proton-(anti)proton collisions proceeds mostly through quark-gluon Compton scattering [1] and has been proposed since long to directly constrain the gluon distribution in the proton. There exist 25 pT-differential measurements of isolated photon production at collider energies in the range sqrt(s)=0.2-7 TeV which are well reproduced by next-to-leading-order (NLO) perturbative QCD predictions, yet the photon data have not been included in global parton distribution functions (PDF) fits since more than 10 years. We present a quantitative study of the impact of including these data sets into global PDF fits based on the JETPHOX NLO code [2] supplemented with the NNPDF2.1 parton densities [3]. By running over hundreds of PDF replicas and using the NNPDF reweighting technique [4] we quantify the additional constraints that all these data (and coming LHC measurements) will impose on the gluon distribution of the proton.


Primary author: Prof. D’ENTERRIA, David (CERN)
Presenter: Prof. D’ENTERRIA, David (CERN)
Session Classification: QCD
Track Classification: QCD
Search for a CP-odd light Higgs in $\Upsilon(1S)$ radiative decays at Belle

Friday, 22 July 2011 17:00 (15 minutes)

We search for a CP-odd light Higgs among 102 $M\Upsilon(1S)$ events recorded with the Belle detector at KEKB. Our signal mode is $\Upsilon(1S) \rightarrow \gamma A_0; A_0 \rightarrow \tau^+\tau^-$, where the $\tau$ is detected via its leptonic decay modes. We determine the upper limits on the production rates for a CP-odd light Higgs with a mass between the $\tau^+\tau^-$ threshold and 9.4 GeV$/c^2$. This result puts stringent constraints on theoretical models of low mass NMSSM Higgs bosons.

Primary author: Dr TRABELSI, Karim (KEK)

Presenter: RORIE, Jamal

Session Classification: Higgs and New Physics
Status and schedule of SuperKEKB

Saturday, 23 July 2011 10:00 (30 minutes)

SuperKEKB, which is an upgrade of KEKB B-factory (KEKB), is a next-generation high luminosity electron-positron collider with asymmetric energies of 7 GeV (e-) and 4 GeV (e+). Its predecessor, KEKB, was operated from 1998 to 2010 and had been a leader in the race to provide the world’s highest luminosity since 2001. It delivered a total integrated luminosity more than 1 /ab to Belle detector and made a great contribution to confirm CP violation in the neutral B meson system. To pursue research on flavor physics, however, much more luminosity is required and the SuperKEKB project started last year. At the SuperKEKB project, a 50-fold increase in integrated luminosity is expected just ten-plus years after inauguration. The design luminosity is 8.0E35 /cm2/s, which is about 40 times higher than the KEKB’s record.

To achieve this challenging goal, “nano-beam scheme” and “doubling the beam currents” are adopted. In the nano-beam scheme, the bunches of both beams are extremely squeezed to nano-meter scale (0.3 mm across and 100 nm high) and intersected only at the highly focused region of each bunch at a large crossing angle (4.8 degree). To that end, the design of the interaction region is changed drastically and new superconducting magnets for final focusing are installed deeper in the interaction region. To have low emittance beams, which are essential to realize nano-size beams, construction of a damping ring for positrons, replacement of magnets (mainly in the positron ring) and precise alignment of the magnets are also required. These should produce 20 times more luminosity than KEKB.

Meanwhile, the luminosity is also pushed up twice by increasing the beam current 2.6 A (e-) and 3.6 A (e+), which are twice as much as KEKB. To achieve this, the beam pipes of the positron ring are replaced to new one with antechambers, which can deal with the unfortunate side effects of high beam current in the positron ring (electron-cloud effect), as well as excessive heating in the beam pipe due to the strong radiation. Additionally, there are other modifications, such as upgrades of a positron source and RF systems.

Dismantle of KEKB and construction of SuperKEKB started on July 2010. They are now underway and commissioning will start in the second half of Japanese FY2014. The status and an updated schedule of SuperKEKB will be reported at the conference.

Primary author: Dr SHIBATA, Kyo (High Energy Accelerator Research Organization (KEK))
Presenter: Dr SHIBATA, Kyo (High Energy Accelerator Research Organization (KEK))
Session Classification: Accelerators
Track Classification: Accelerators
First results from the CMD-3 detector at the VEPP-2000 e+e- collider

Saturday, 23 July 2011 09:15 (15 minutes)

The CMD-3 detector at the VEPP-2000 electron-positron collider in the Budker Institute in Novosibirsk collected about 20/pb in the center-of-mass energy range from 1 to 2 GeV during the first year of operation. First results on the hadronic cross sections are reported important for improving the precision of the theoretical predictions for the muon anomalous magnetic moment.

Primary author: Dr EIDELMAN, Simon (Budker Institute)
Presenter: Dr EIDELMAN, Simon (Budker Institute)
Session Classification: Top and Electroweak Physics
Track Classification: Top and Electroweak Physics
Recent results from the KEDR detector at the VEPP-4M e+e- collider

Friday, 22 July 2011 14:45 (15 minutes)

We report results from the KEDR detector operating at the VEPP-4M electron-positron collider in the Budker Institute in Novosibirsk. They include: high-precision measurements of J/psi, psi’ and tau lepton masses as well as determination of the main parameters of the psi(3770) resonance.

Primary author: Dr BALDIN, Evgeny (Budker Institute)
Presenter: Dr BALDIN, Evgeny (Budker Institute)
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
We present results on the nucleon electromagnetic/axial form factors, as well as the lower moments of the nucleon generalized parton distributions, within lattice QCD using two dynamical flavors of degenerate twisted mass fermions. Our simulations are performed on lattices with three different values of the lattice spacings, namely $a=0.089$ fm, $a=0.070$ fm and $a=0.056$ fm, allowing the investigation of cut-off effects. The volume dependence is examined using simulations on two lattices of spatial length $L=2.1$ fm and $L=2.8$ fm. The simulations span pion masses in the range of 260-470 MeV. Our results are renormalized non-perturbatively and the values are given in the MS-scheme at a scale $\mu=2$ GeV.

The nucleon axial charge, magnetic moment, Dirac and Pauli radii are obtained in the continuum limit and chirally extrapolated to the physical pion mass allowing for a comparison with experiment. The consequences of our results on the spin carried by the quarks in the nucleon are also investigated.

**Primary author:** Dr CONSTANTINOU, Martha (University of Cyprus)

**Co-authors:** Prof. ALEXANDROU, Constantia (University of Cyprus); Prof. CARBONELL, Jaume (Laboratoire de Physique Subatomique et Cosmologie, UJF/CNRS/IN2P3); Prof. JANSEN, Karl (NIC, DESY); Dr BRINET, Mariane (Laboratoire de Physique Subatomique et Cosmologie, UJF/CNRS/IN2P3); Dr PAPINUTTO, Mauro (Laboratoire de Physique Subatomique et Cosmologie, UJF/CNRS/IN2P3); Dr HAR-RAUD, Pierre Antoine (Laboratoire de Physique Subatomique et Cosmologie, UJF/CNRS/IN2P3); Dr GUICHON, Pierre (CEA-Saclay, IRFU/Service de Physique Nucléaire); Dr KORZEC, Tomasz (Institut für Physik Humboldt Universität zu Berlin)

**Presenter:** Dr CONSTANTINOU, Martha (University of Cyprus)

**Session Classification:** QCD

**Track Classification:** QCD
Optical follow-up of high energy neutrinos detected by the ANTARES telescope

The ANTARES Collaboration has developed a Target of Opportunity strategy to enhance the detection prospects to transient sources of high energy neutrinos, searching for an optical counterpart associated either to a single neutrino of high energy, either to a doublet of events in space and time coincidence.

The ANTARES alert system can trigger the observation with a network of optical telescopes within a few minutes, making the system suitable for the observation of transient phenomena, such as Gamma Ray Bursts or Core Collapse SuperNovae.

The system is operational since 2009, and since then more than 30 alerts have been sent to the TAROT and ROTSE telescopes: preliminary results on the analysis of optical images will be presented as well as the system performance.

Primary author:  VECCHI ON BEHALF OF THE ANTARES COLLABORATION, Manuela (CPPM)

Presenter:  VECCHI ON BEHALF OF THE ANTARES COLLABORATION, Manuela (CPPM)

Track Classification:  Astroparticle Physics
Neutron EDM in Four Generation Standard Model

Thursday, 21 July 2011 09:00 (15 minutes)

New experiments under construction aim to push neutron electric dipole moment down by one to two orders of magnitude, to an eventual sensitivity of $10^{−28}$ e cm. The Standard Model would still be out of reach. However, there is renewed interest in the direct search for a possible fourth generation of quarks, which may carry sufficient CP violation for the baryon asymmetry of the Universe. We estimate the neutron EDM in the presence of a fourth generation, and find it would be dominated by the strange quark chromoelectric dipole moment, assuming it does not get wiped out by a Peccei-Quinn symmetry. The three electroweak loop contribution is comparable in strength to the two-loop electroweak/one-loop gluonic contribution. With $m_{b'}$, $m_{t'}$ at 500 GeV or so, and with a Jarlskog CPV factor that is consistent with hints of New Physics in $b \rightarrow s$ transitions, the neutron EDM is still far below $10^{−28}$ e cm.

**Primary authors:** Dr XU, Fanrong (National Taiwan University); Prof. HISANO, Junji (Nagoya University and University of Tokyo); Prof. HOU, Wei-Shu (National Taiwan University)

**Presenter:** Dr XU, Fanrong (National Taiwan University)

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
Searches for anisotropies of cosmic rays at the Pierre Auger Observatory

Thursday, 21 July 2011 11:45 (15 minutes)

We report on the analysis of the distribution of the arrival directions of ultra high energy cosmic rays detected at the Pierre Auger Observatory. From $2 \times 10^{17}$ eV to $3 \times 10^{19}$ eV, we present the results of searches for first harmonic modulations in the right-ascension distribution of cosmic rays and discuss the obtained upper limits which constitute the most stringent bounds at present above $2 \times 10^{17}$ eV. At the highest energies, the observation of the flux steepening is consistent with the shortening of the horizon of ultra high energy cosmic rays and leads to the possibility of "cosmic ray astronomy". Thus, we present the analyses searching for correlation of cosmic rays with nearby extragalactic astrophysical objects.

Primary author: LYBERIS, Haris, for the Pierre Auger Collaboration (Institut de Physique Nucléaire d'Orsay, Università degli Studi di Torino, Université Paris VII Denis Diderot)

Presenter: LYBERIS, Haris, for the Pierre Auger Collaboration (Institut de Physique Nucléaire d'Orsay, Università degli Studi di Torino, Université Paris VII Denis Diderot)

Session Classification: Astroparticle Physics

Track Classification: Astroparticle Physics
New Results from the MINOS Experiment

Friday, 22 July 2011 16:30 (20 minutes)

MINOS is a long baseline neutrino oscillation experiment which utilises the NuMI muon neutrino beam from Fermilab. MINOS has two detectors, a Near Detector 1km from the beam source, and a Far Detector 735km away in the Soudan mine in Minnesota. New results from MINOS will be presented and discussed.

Primary author: Dr HOLIN, Anna M (University College London)
Presenter: Dr HOLIN, Anna M (University College London)
Session Classification: Neutrino Physics
Track Classification: Neutrino Physics
Exploring New Physics in the C7-C7' plane

Friday, 22 July 2011 12:15 (15 minutes)

The Wilson coefficient $C_7$ governing the radiative electromagnetic decays of $B$ meson has been calculated to a very high accuracy in the Standard Model, but till date there is no convincing model-independent experimental bound on either the magnitude or the sign of $C_7$. In the present paper, we attempt at constraining both the magnitude and sign of $C_7$ using a systematic approach. We consider already measured observables like the branching ratios of $B \rightarrow X_s \mu^+ \mu^-$ and $B \rightarrow X_s \gamma$, the isospin and CP asymmetries in $B \rightarrow K \gamma$, as well as $A_{FB}$ and $F_L$ in $B \rightarrow K \ell^+ \ell^-$. We also discuss the transverse observable $A_T^\text{(2)}$ which, once measured, may help to disentangle some of the scenarios considered. We explore the constraints on $C_7$, $C_9$, $C_{10}$ as well as their chirality-flipped counterparts. Within our framework, we find that we need to extend the constraints up to 1.6 sigma to allow for the “flipped-sign solution” of $C_7$. The SM solution for $C_7$ exhibits a very mild tension if New Physics is allowed in dipole operators only.

Primary author: Dr DESCOTES-GENON, Sébastien (LPT Orsay)
Co-authors: Dr GHOSH, Diptimoy (Tata Institute of Fundamental Research of Mumbai); Dr MATIAS, Joaquim (Universitat Autonoma de Barcelona); RAMON, Marc (Universitat Autonoma de Barcelona)

Presenter: Dr DESCOTES-GENON, Sébastien (LPT Orsay)
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
Search for new physics in events with monojet and large MET with ATLAS detector

We present results by the ATLAS experiment on a search for new physics in pp collision events at the LHC with mono-jets plus large missing transverse energy in the final state. The data are compared to the SM predictions, dominated by the irreducible background from W/Z+jets production with neutrinos and mis-identified electrons and muons in the final state. The results are interpreted in the context of different theoretical models including ADD models with extra dimensions, supersymmetry, and generic dark matter WIMP production.

**Primary author:** ROSSETTI, Valerio (IFAE - Barcelona)

**Presenter:** ROSSETTI, Valerio (IFAE - Barcelona)
Consistency of a Lorentz-violating extension of the photon sector

Lorentz symmetry is one of the fundamental cornerstones on which the Standard Model of elementary particle physics is based. However, toy models of physics at the Planck scale, such as space time foams, lead to Lorentz symmetry breaking. In the low energy limit such a violation of Lorentz invariance can be described in the framework of an effective quantum field theory. Background fields are introduced that manifestly break Lorentz symmetry and lead to a deformation of the Standard Model.

A modified quantum electrodynamics (QED), which describes a violation of Lorentz invariance in the photon sector, is on the focus. The Lorentz-violating part of the theory is characterized by 19 free parameters. Some sectors of this modified QED are especially interesting from a physics point of view. Theses have been examined with respect to consistency concerning properties such as microcausality and unitarity. The results of that analysis will be presented and conclusions made.

Primary author: Mr SCHRECK, Marco (Institut für Theoretische Physik, Karlsruhe Institute of Technology (KIT))

Presenter: Mr SCHRECK, Marco (Institut für Theoretische Physik, Karlsruhe Institute of Technology (KIT))
NLO event samples for the LHC

*Thursday, 21 July 2011 11:45 (15 minutes)*

We introduce a twiki page with collections of generated event samples at LHC energies including a heavy quark-antiquark pair. These samples are generated with the POWHEG method and can be used to preparedistributions at the NLO accuracy with first radiation treated according to the parton shower approach. The event files are stored according to the Les Houches accord and standard parton shower Monte Carlo programs can be used to shower these events further and simulate events at the hadron level, ready for almost arbitrary experimental analysis. Currently the available final states are the following: (i) $t + T$, (ii) $t + T + H$, (iii) $t + T + b + B$, (iv) $t + T + \text{jet}$, while the generation of four other final states are in progress.

**Primary author:** Mr KARDOS, Adam (University of Debrecen)

**Co-author:** Prof. TROCSANYI, Zoltan (University of Debrecen)

**Presenter:** Prof. TROCSANYI, Zoltan (University of Debrecen)

**Session Classification:** QCD
Z boson forward-backward asymmetry measured with the ATLAS detector

We present a measurement of the Z boson forward-backward asymmetry of the process $pp \rightarrow \gamma^*/Z + X \rightarrow l^+l^- + X$ in collisions at $\sqrt{s} = 7$ TeV, where $l = e$ or muon. The asymmetry is measured in the Collins-Soper frame using the angle $\theta$ between the incoming quark and outgoing lepton. The measurement uses recent data from the ATLAS experiment. At high dilepton invariant mass, the measurement is sensitive to several scenarios of physics beyond the Standard Model.

**Primary author:** Dr BARONCELLI, Antonio (INFN / Roma TRE)

**Presenter:** Dr BARONCELLI, Antonio (INFN / Roma TRE)

**Track Classification:** Top and Electroweak Physics
"Measurements of the inclusive electron cross-section in proton-proton collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector"

This poster presents measurements of the inclusive differential cross-section of electron production in proton-proton collisions at a centre-of-mass energy of $\sqrt{s} = 7$ TeV. From a data sample of 1.4 pb$^{-1}$ collected by the ATLAS detector at the Large Hadron Collider, the electron cross-section measurement is presented as a function of transverse momentum, $p_T$, in the range $7 < p_T < 26$ GeV and within pseudorapidity $|\eta| < 2.0$, correcting for all detector effects. After removal of the Drell-Yan contribution, the measured differential cross-section is found to be in good agreement with theoretical predictions for heavy-flavour production obtained from Fixed Order NLO calculations with Next-to-Leading-Log high-$p_T$ resummation. This poster will describe the electron part of the paper http://cdsweb.cern.ch/record/1341818.

**Primary author:** Mrs BORDONI, Stefania (LPNHE-Universites Paris 6-Paris 7)

**Presenter:** Mrs BORDONI, Stefania (LPNHE-Universites Paris 6-Paris 7)

**Track Classification:** Top and Electroweak Physics
Measurements of isolated prompt photons in pp collisions with the ATLAS detector

We present the latest ATLAS measurement of the cross section for the inclusive production of isolated prompt photons of pp collisions at a centre-of-mass energy $\sqrt{s} = 7$ TeV, as well as the measurement of diphoton production. Photon candidates are identified by combining information from the calorimeters and from the inner tracker. Residual background in the selected sample is estimated from data, based on the observed distribution of the transverse isolation energy in a narrow cone around the photon candidate. The results are compared to predictions from next-to-leading order perturbative QCD calculations.

Primary author: Dr DELMASTRO, Marco (CERN)
Presenter: TRIPIANA, Martin

Track Classification: QCD
Commissioning of advanced b-tagging algorithms in pp collisions at \( \sqrt{s} \)=7 TeV with the Atlas experiment

The ability to identify jets containing b-hadrons is important for the high-pT physics program of a general-purpose experiment at the LHC such as ATLAS. Two robust b-tagging algorithms taking advantage of the impact parameter of tracks or reconstructing secondary vertices have been swiftly commissioned and used for several analyses of the 2010 data: bottom and top quark production cross-section measurements, searches for supersymmetry and new physics, etc.

Building on this success, several more advanced b-tagging algorithms are commissioned with the 2011 data. All these algorithms are based on a likelihood ratio formalism to compare the signal (b-jet) or background (light or in some cases charm jet) hypotheses, using Monte Carlo predicates. The accuracy with which the simulation reproduces the experimental data is therefore critical and is explained in details, as well as the expected improvement in performance brought in by these new algorithms and some first results about the measurement in data of their performance.

Primary author: BOUSSON, Nicolas (Centre de Physique des Particules de Marseille)

Presenter: BOUSSON, Nicolas (Centre de Physique des Particules de Marseille)
Heavy flavour measurements in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$~TeV with the ALICE experiment

**Thursday, 21 July 2011 17:15 (15 minutes)**

The ALICE experiment studies the properties of the QCD matter at the extreme energy densities of the ultra-relativistic heavy-ion collisions at the LHC. Produced on a very short time-scale in the initial hard-scattering processes, the heavy quarks (charm and beauty) experience the whole collision evolution: measuring the open heavy flavour spectra allows to investigate the mechanisms of energy-loss and hadronization in the hot and dense medium formed in the nucleus-nucleus collision. In particular, the ALICE capability to disentangle charm and beauty production is expected to help investigating the predicted quark-mass dependence of the in-medium energy-loss.

The ALICE detector measures heavy-flavours in the semi-electroinc and semi-muonic decay channels at mid- and forward rapidity, respectively, and D mesons at mid-rapidity. The results in lead-lead collisions at $\sqrt{s_{NN}} = 2.76$-TeV and proton-proton collisions at $\sqrt{s} = 7$-TeV will be presented. The nuclear modification factor $R_{AA}$, defined as the ratio between the heavy-flavour production in nucleus-nucleus and proton-proton collisions rescaled to the number of binary collisions of nucleons in nuclei, will be discussed. The central to peripheral nuclear modification factor $R_{CP}$, obtained from the comparison of the measurements in heavy-ion collisions with a small and large impact parameter, respectively, will be presented as well.

**Primary author:**  Dr STOCCHO, Diego (Subatech)

**Presenter:**  Dr STOCCHO, Diego (Subatech)

**Session Classification:**  Ultrarelativistic Heavy Ions
THE MUON ACCELERATOR RESEARCH AND DEVELOPMENT PROGRAM

Saturday, 23 July 2011 12:15 (20 minutes)

A muon accelerator facility that leads to a multi-TeV Muon Collider presents the unique opportunity to explore new physics within a number of distinct programs that can be brought online as the facility evolves. An introduction to the Muon Collider facility and its capabilities will be given. The Muon Accelerator Program, hosted by Fermilab, has recently been approved by the U.S. Department of Energy to carry out the Research and Development necessary to demonstrate the feasibility of the Muon Collider, including the technology development and system tests needed to inform the study, and to contribute to the International Design Study for a Neutrino Factory.

Primary author:  Prof. HANSON, Gail (University of California, Riverside)
Presenter:    Prof. HANSON, Gail (University of California, Riverside)
Session Classification: Accelerators
Track Classification: Accelerators
Heavy flavour production measurements in p-p collisions at the LHC with ALICE

Thursday, 21 July 2011 16:30 (15 minutes)

The measurement of heavy flavour production in proton-proton collisions at the LHC allows to study the production mechanisms and to test perturbative Quantum Chromodynamics at a new energy domain. Furthermore, it will provide important reference for investigations of medium effects in Pb-Pb collisions, where charm and beauty are regarded as a good probe for parton-medium interaction dynamics.

Open heavy flavour production can be measured through hadronic D meson decays at central rapidity and semi-leptonic D and B meson decays at central and forward rapidities by the ALICE experiment. We present preliminary results of these studies in p-p collisions at $\sqrt{s} = 2.76$ and 7 TeV and compare these to pQCD predictions. The cross section measurements of J/psi production in the di-electron channel at central rapidity and in the di-muon channel at forward rapidity will be discussed as well.

Primary author: Dr PACHMAYER, Yvonne (University of Heidelberg)

Presenter: Dr PACHMAYER, Yvonne (University of Heidelberg)

Session Classification: QCD

Track Classification: QCD
The low-energy enhancements of the Pierre Auger Observatory

Authorship: The Pierre Auger Collaboration
The Pierre Auger collaboration uses its observatory in Argentina to study ultra-high energy cosmic rays (E > 1 EeV). The baseline detectors are a surface detector array with 1660 water-Cherenkov detectors distributed over an area of 3000 km² overseen by 24 fluorescence telescopes mounted at the perimeter of this array. Recently, the collaboration has extended its observatory with 3 new detection systems, which will lower the energy threshold of the baseline detectors from 1 EeV to 0.1 EeV. With this threshold we can study the region where we expect the transition from a Galactic to an extra-Galactic origin of cosmic rays and we can study particle-particle interactions in the TeV range. The extensions are AERA (Auger Engineering Radio Array), AMIGA (Auger Muon and Infill for the Ground Array), and HEAT (High Elevation Auger Telescopes), which will work side-by-side, bringing together for the very first time several complementary detection techniques. The information from these systems will be used to determine in detail the flux spectrum and to address their composition of cosmic rays with E > 0.1 EeV. The current status of and initial results from these 3 detection systems will be presented. In addition, I will briefly on the study of new detection techniques based on the emission of GHz molecular Bremsstrahlung from the plasma cloud created by cosmic rays entering the atmosphere of the Earth.

Primary author: Prof. VAN DEN BERG, Ad (KVI/University of Groningen)
Presenter: Prof. VAN DEN BERG, Ad (KVI/University of Groningen)

Track Classification: Astroparticle Physics
From CDMS to SuperCDMS

Thursday, 21 July 2011 15:30 (15 minutes)

The CDMS experiment is a search for dark matter employing subkelvin germanium detectors. A dual phonon-ionization measurement allows to reject the dominant radioactive background. We present results from CDMS and progress towards SuperCDMS. We will also report the result of a joint analysis of CDMS and EDELWEISS data.

Primary author: DI STEFANO (AND THE CDMS COLLABORATION), Philippe (Department of Physics, Queen’s University)

Presenter: DI STEFANO (AND THE CDMS COLLABORATION), Philippe (Department of Physics, Queen’s University)

Session Classification: Astroparticle Physics

Track Classification: Astroparticle Physics
ALICE is the experiment dedicated to heavy-ion studies at the LHC and, in particular, it aims at a comprehensive study of the hot and dense colour-deconfined state of matter called Quark-Gluon Plasma. Quarkonia resonances are considered as powerful probes of the deconfined phase since the heavy quark pairs pairs are produced in the early stages of the collision and their bound states are very sensitive to the coloured medium which they traverse. The reference for heavy-ion studies is given by pp collision measurements, which are also interesting per se for addressing unresolved issues in the description of quarkonia hadroproduction. In particular the study of the pT distribution and of the polarization of quarkonia allow interesting tests of the currently available theoretical models. The ALICE experiment was designed to perform the detection of J/psi resonances, down to pT=0, both in the di-electron (at mid-rapidity: |y| < 0.9) and di-muon (at forward-rapidity: 2.5 < y < 4) decay channels and it has collected J/psi samples with proton beams colliding at sqrt(s) = 7 and 2.76 TeV and with lead beams colliding at 2.76 TeV per nucleon pair. The results on the differential (pT and y) cross-sections for inclusive J/psi production in pp collisions at the two energies will be discussed as well as the current status of the J/psi polarization analysis. For PbPb collisions preliminary results on the nuclear modification factor (R_AA and R_CP) will be shown and compared with results from previous experiments.
ttbar resonance searches in ATLAS

The searches of final states involving top quarks are one of the most promising way to observe deviation from the Standard Model (SM). Some beyond of the SM theories predict the existence of new particles that are strongly coupled to the top quark, because of its high mass.

A particular attention will be devoted to searches for ttbar resonances in the lepton plus jets final states performed with the ATLAS experiment at the LHC. The search will use early 2011 data sample, recorded at a proton-proton centre-of-mass energy of 7 TeV. Using the reconstructed ttbar mass spectrum, we expect to set limits on the mass of the new particle predicted by narrow Z' and Kaluza-Klein (KK) gluon models.

Primary author:  Mrs CAMACHO, Reina (PhD student)
Presenter:  Mrs CAMACHO, Reina (PhD student)
CONTROL AND CONFIGURATION OF THE ATLAS TRIGGER AND DATA ACQUISITION SYSTEM DURING DATA TAKING ACTIVITIES

The ATLAS experiment at the Large Hadron Collider at CERN relies on a complex and highly distributed Trigger and Data Acquisition (TDAQ) system to gather and select particle collision data at unprecedented energy and rates.

The control and configuration (CC) system is responsible for all the software required to configure and control the ATLAS data taking. This ranges from high level applications, such as the graphical user interfaces and the desktops used within the ATLAS control room, to low level packages, such as access, process and resource management.

Currently the CC system is required to supervise more than 15000 processes running on more than 1500 computers. At these scales, issues such as access, process and resource management, distribution of configuration data and access to them, run control, diagnostic and especially error recovery become predominant to guarantee a high availability of the TDAQ system and minimize the dead time of the experiment.

And it is indeed during the data taking activities that the CC system has shown its strength and maturity, featuring a great scalability against the always increasing number of software processes in the TDAQ system (corresponding to the growing of the High Level Trigger farm) and implementing several automatic error recovery procedures in complex and sophisticated scenarios (e.g., disabling a detector busy readout without the need of stopping the full data taking session). As a result several critical actions are performed without the intervention of the operator, greatly enhancing the whole experiment data taking efficiency.

This paper gives an overview of the functionalities of the various CC system components. Particular emphasis will be given to the design choices taken to address the TDAQ system efficiency requirements. We will also highlight some precious lessons learnt in more than one year of data taking leading the CC system to an high level of reliability. Finally we will conclude with an assessment of the present components and with an outlook on possible improvements for the future.

Primary author: BIANCHI, Riccardo Maria (CERN)

Presenter: BIANCHI, Riccardo Maria (CERN)

Track Classification: Detector R & D and data handling
Recent results on dual readout in calorimetry from the DREAM Collaboration.

Friday, 22 July 2011 17:15 (15 minutes)

The energy resolution of the hadronic calorimeters is determined by fluctuations in the development of the shower. In non compensating calorimeters the dominant contribution comes from the fluctuation of the electromagnetic shower fraction. The dual readout technique proposed by DREAM aims to correct event by event for the fluctuations of the e.m. component measuring at the same time scintillation and Cherenkov light.

In the last years the DREAM Collaboration has performed several tests to exploit the dual readout technique in calorimeters.

Many types of crystals (PbWO, BGO, BSO, etc.) have been exposed in test beams to evaluate the Cherenkov yield and how to optimize the light collection (analysis in time of the signal, filtering of the signals, polarization of the Cherenkov component). The extension of the dual readout to crystal is in fact very important when the hadronic calorimeter follows an electromagnetic calorimeter often composed by crystals.

The possibility to use tiles of absorber interleaved with tiles of quartz and scintillator for the dual readout has also been tested.

At present the DREAM Collaboration is testing a new copper calorimeter with scintillator and clear PMMA fibers.

In the presentation a report will be given on this activity of the DREAM Collaboration.

Primary author: Dr LACAVA, Francesco (Dep. Physics University "Sapienza - Roma / INFN - Roma)

Presenter: Dr LACAVA, Francesco (Dep. Physics University "Sapienza - Roma / INFN - Roma)

Session Classification: Detector R & D and Data Handling

Track Classification: Detector R & D and data handling

A High Spectral Resolution Lidar (HSRL) design study, which will lead to a prototype, is being developed for atmospheric monitoring in Ultra High Energy Cosmic Ray Observatories aiming to improve the accuracy of the measurement of the differential scattering coefficients of the aerosol and clouds in near UV region. The specification studies of the candidate Fabry-Perot receivers for the aerosol and molecular channel compatible with a pulsed SLM Nd:YAG laser at 355 nm are presented in this work. The etalon plates have to meet the required performances, by means of parallelism and RMS flatness finesse over their reflective surfaces. Applying our recently developed method, we present the experimental measurements obtained for the aerosol channel in recording fringe patterns by using multi or single isotopic light sources in near UV region. The results can lead us to conclusions concerning the achievement of the required finesse. From preliminary results obtained in prototype etalon plates which have been already coated, by means of the divergence in their parallelism, will lead us to estimate the distortion on both substrates caused by the stresses developed by the deposited thin film layers. Finally, a feasibility study to use the Fizeau type interferometer as an alternative-more accurate performance study method is also described.

Primary author: Mrs GEORGAKOPOULOU, Angelika (NTUA)
Co-authors: Prof. PAPAYANNIS, Alexandros (NTUA); Prof. FOKITIS, Emmanuel (NTUA); Mr MARAGOS, Nikolaos (NTUA); Mr FETFATZIS, Prodromos (NTUA); Prof. MALTEZOS, Stavros (NTUA); Dr GIKI, Violeta (NTUA)
Presenter: Mrs GEORGAKOPOULOU, Angelika (NTUA)
Track Classification: Astroparticle Physics
ICARUS-T600 is the first example of an innovative detection technology, the liquid Argon TPC, which is a sort of "electronic bubble chamber", potentially scalable to huge masses. The excellent topology reconstruction, tracking and particle identification capabilities, together with the calorimetric measurement of deposited energy, make the LAr-TPC an ideal detector for the study of rare events such as neutrino interactions and nucleon decay. With a mass of 600 tons, ICARUS is the largest LAr-TPC ever built. It has been installed at the Gran Sasso underground laboratory and has been taking data since May 2010. ICARUS is performing a broad physics programme, mainly centered on the study of the neutrinos in the CNGS beam from CERN, but also including neutrinos from natural sources. The characteristics and performance of LAr-TPCs will be illustrated, and first results from the physics runs of ICARUS-T600 in 2010 and 2011 will be shown; future projects based on LAr-TPCs, especially concerning the search for sterile neutrinos, will also be discussed.

**Primary author:** Dr VARANINI, Filippo (INFN Padova)

**Presenter:** Dr VARANINI, Filippo (INFN Padova)

**Session Classification:** Neutrino Physics

**Track Classification:** Neutrino Physics
Non-minimal Kaluza-Klein dark matter

Thursday, 21 July 2011 10:15 (15 minutes)

We discuss experimental signatures of non-minimal Kaluza-Klein dark matter. In the minimal Universal Extra Dimensions model, there is a unique possible dark matter candidate, the first Kaluza-Klein excitation of the U(1) gauge boson B. On the other hand, in non-minimal models, allowing for general boundary localized terms, the mass spectrum is different, and such models allow for other dark matter candidates. In this talk, we focus on the first Kaluza-Klein excitations of the Z boson and the neutral Higgs boson. These are the possible non-minimal WIMP type candidates that are not already ruled out by experiments. For these dark matter particles, the phenomenological predictions are changed from the minimal Kaluza-Klein dark matter scenario. We discuss recent results on the relic abundance, the indirect detection signatures from neutrinos and gamma rays, and the prospects of direct detection.

Primary author:  MELBÉUS, Henrik (Royal Institute of Technology (KTH))

Presenter:  MELBÉUS, Henrik (Royal Institute of Technology (KTH))

Session Classification:  Astroparticle Physics

Track Classification:  Astroparticle Physics
Pamela main results after 5 years of data taking

Thursday, 21 July 2011 18:00 (15 minutes)

The PAMELA satellite-borne experiment was launched from the Bajkonur cosmodrome in June 2006. The combination of a permanent magnet silicon strip spectrometer and a silicon-tungsten imaging calorimeter allows precision studies of the charged cosmic rays to be conducted over a wide energy range with high statistics.

After five years of successfully operation in space, the data gathered by the PAMELA experiment are showing very interesting features in cosmic rays spectra, namely in the fluxes of protons, heliums and electrons, that may challenge the current paradigm of cosmic-ray acceleration and propagation in the Galaxy. In addition, PAMELA measurements of cosmic antiproton and positron fluxes are setting strong constraints to the nature of Dark Matter.

This talk illustrates the most recent scientific results obtained by the PAMELA experiment.

Primary author: ADRIANI, Oscar (University of Florence and INFN Sez. di Firenze)

Presenter: ADRIANI, Oscar (University of Florence and INFN Sez. di Firenze)

Session Classification: Astroparticle Physics

Track Classification: Astroparticle Physics
Particle Physics at the high-precision/low-energy frontier with Ultracold Neutrons at the Institut Laue-Langevin in Grenoble

Thursday, 21 July 2011 09:15 (15 minutes)

Due to their outstanding property to be storable and hence observable for long periods of time (several hundreds of seconds) in suitable material or magnetic traps, ultra-cold neutrons (UCN) with energies around 100 neV are an unique tool to study fundamental properties of the free neutron, like its beta-decay lifetime, its electric dipole moment and its wave properties.

The search for the electric dipole moment (EDM) of the neutron plays a prominent role in particle physics because of its direct bearing on CP and T violation: a non-zero value of the neutron EDM would be evidence of CP and T violation.

Precision measurements of the neutron lifetime provide stringent tests of the standard electroweak model as well as crucial inputs for tests of Big-Bang nucleosynthesis. Neutron lifetime can be related to CKM Matrix unitarity. Neutron lifetime also dominates the uncertainty in theoretical calculation of primordial 4He.

In this talk current ILL experiments linked to these fundamental questions are presented and a brief outlook is given.

Primary author: Dr GELTENBORT, Peter (Institut Laue-Langevin)

Presenter: Dr GELTENBORT, Peter (Institut Laue-Langevin)

Session Classification: Flavour Physics and Fundamental Symmetries

Track Classification: Flavour Physics and Fundamental Symmetries
Testing fundamental principles with high-energy cosmic rays

It is not yet clear whether the observed flux suppression for ultra-high energy cosmic rays (UHECR) at energies above 4.10E19 eV (AUGER, HiRes) is a signature of the Greisen-Zatsepin-Kuzmin (GZK) cutoff or corresponds to the maximum energies available at the relevant sources. Both phenomena can be sensitive to violations of standard special relativity modifying cosmic-ray propagation or acceleration at very high energy, and would allow to set bounds of Lorentz symmetry violation (LSV) parameters in models incorporating a privileged local reference frame (the "vacuum rest frame", VRF). These effective parameters are expected to be directly linked to Planck-scale physics, or even to physics beyond Planck scale, as well as to the dynamics relating LSV patterns for nucleons, quarks, leptons and the photon. Other possible violations of fundamental principles and conventional basic hypotheses (quantum mechanics, energy and momentum conservation, vacuum homogeneity and "static" properties, effective space dimensions…) can also be considered and tested in high-energy cosmic-ray phenomena. We present an updated discussion of the theoretical and phenomenological situation, including new ideas and prospects for earth-based and space experiments.

Primary author:  Dr GONZALEZ-MESTRES, Luis (LAPP)

Presenter:  Dr GONZALEZ-MESTRES, Luis (LAPP)

Track Classification:  Astroparticle Physics
Determination of the $m_u$ and $m_d$ quark masses from $\eta\to3\pi$ decay

A natural method for the precise determination of the $m_d - m_u$ mass difference, which is still beyond the reach of direct lattice simulations, is a comparison of a measured value of some quark-mass dependent observable with its chiral perturbation theory prediction. The most promising processes for such study seem to be $\eta\to3\pi$ decays. Unfortunately, achieving this goal is complicated by large chiral corrections to the amplitudes of these processes and by the observed discrepancies between the experimentally measured values of Dalitz parameters describing their energy dependencies and the values predicted from chiral perturbation theory.

We present a method based on our analytic dispersive representation which uses the information we have from the two-loop chiral result together with the one obtained from the KLOE measurement on the charged $\eta\to3\pi$ decay in the consistent way, thereby determining the value of the quark mass ratio $1/R\sim(m_d-m_u)$. Our result is $R=37.7\pm2.2$. Using the recent lattice values for $m_s$ and the isospin averaged value of $(m_u + m_d)/2$, our determination leads to $m_u(2\text{GeV})=(2.2\pm0.6)\text{ MeV}$ and $m_d(2\text{GeV})=(4.6\pm0.6)\text{ MeV}$. Provided there is available a better access to the energy dependence of the (charged) $\eta\to3\pi$ amplitude, this result can be still substantially improved.

**Primary author:** ZDRAHAL, Martin (IPNP, Faculty of Mathematics and Physics, Charles University in Prague)

**Presenter:** ZDRAHAL, Martin (IPNP, Faculty of Mathematics and Physics, Charles University in Prague)

**Track Classification:** Flavour Physics and Fundamental Symmetries
Search for high mass dimuon resonances in the ATLAS experiment at $\sqrt{s} = 7$ TeV at the LHC

This poster describes the search for high mass $\mu^+\mu^-$ resonances in pp collisions at $\sqrt{s} = 7$ TeV at the LHC. A first search was conducted using data recorded by the ATLAS experiment during 2010, corresponding to a total integrated luminosity of 40 pb$^{-1}$. No statistically significant excess above the Standard Model processes was observed in our search region of dimuon invariant mass above 110 GeV, so upper limits at the 95% confidence level were set on the cross-section times branching ratio of $Z'$ resonances decaying to muons as a function of the resonance mass. This poster will present the techniques employed in this search and contain an update using 2011 data. With an expected total integrated luminosity of several hundred pb$^{-1}$, this search will be sensitive to resonance masses of up to ~1.4 TeV for a $Z'$ boson decaying to dimuons in the Sequential Standard Model, that is generally used as a benchmark.

**Primary author:**  VIEL, Simon (University of British Columbia - TRIUMF)

**Presenter:**  VIEL, Simon (University of British Columbia - TRIUMF)
Search for resonances in the diphoton channel at the ATLAS experiment of the Large Hadron Collider.

A variety of new physics models involving extra dimensions predict photons in the final states from pp collisions at energies accessible at the Large Hadron Collider. The search for new particles in the diphoton channel, such as the Kaluza-Klein resonant mode of the graviton in the Randall-Sundrum model, carried out by the ATLAS experiment is presented. Event selection and optimization, as well as data-driven methods for estimating reducible and irreducible backgrounds and efficiencies are discussed. Particular emphasis is given to the statistical treatment for the contrast of the null and alternative hypothesis. The data sample of pp collisions at $\sqrt{s} = 7$ TeV collected by the ATLAS experiment with the integrated luminosity expected by July 2011, allows exploring new parameter regions beyond Tevatron, providing the possibility for evidence of new physics as well as the establishment of the most stringent bounds on the production cross section times branching ratio for the Randall-Sundrum graviton as a function of diphoton mass.

**Primary author:** ANDUAGA, Xabier (Instituto de Fisica La Plata (CONICET -UNLP))

**Presenter:** ANDUAGA, Xabier (Instituto de Fisica La Plata (CONICET -UNLP))
Constraining new physics with a positive or negative signal of neutrinoless double beta decay

*Saturday, 23 July 2011 09:00 (15 minutes)*

We investigate numerically how accurately one could constrain the strengths of different short-range contributions to neutrinoless double beta decay in effective field theory. Depending on the outcome of near-future experiments yielding information on the neutrino masses, the corresponding bounds or estimates can be stronger or weaker. A particularly interesting case, resulting in strong bounds, would be a positive signal of neutrinoless double beta decay that is consistent with complementary information from neutrino oscillation experiments, kinematical determinations of the neutrino mass, and measurements of the sum of light neutrino masses from cosmological observations. The keys to more robust bounds are improvements of the knowledge of the nuclear physics involved and a better experimental accuracy.

**Primary author:** Mr BERGSTRÖM, Johannes (Royal Institute of Technology)

**Co-authors:** Mr MERLE, Alexander (Royal Institute of Technology); Mr OHLSSON, Tommy (Royal Institute of Technology)

**Presenter:** Mr BERGSTRÖM, Johannes (Royal Institute of Technology)

**Session Classification:** Neutrino Physics

**Track Classification:** Neutrino Physics
U(2) and Minimal Flavour Violation in Supersymmetry

Thursday, 21 July 2011 14:45 (15 minutes)

Rather than sticking to the full $U(3)^3$ approximate symmetry normally invoked in Minimal Flavour Violation, we analyze the consequences on the current flavour data of a suitably broken $U(2)^3$ symmetry acting on the first two generations of quarks and squarks. A definite correlation emerges between the mixing amplitudes in the $K$, $B_d$ and $B_s$ systems, which can resolve the current tension in the CKM fit, while predicting the $B_s$ mixing phase. The preferred region for the gluino and the left-handed sbottom masses is below about 1 to 1.5 TeV.

Primary authors: Dr STRAUB, David (Scuola Normale Superiore, Pisa); Prof. ISIDORI, Gino (Laboratori Nazionali di Frascati); Dr JONES-PEREZ, Joel (Laboratori Nazionali di Frascati); LODONE, Paolo (Scuola Normale Superiore, Pisa); Prof. BARBIERI, Riccardo (Scuola Normale Superiore, Pisa)

Presenter: Dr STRAUB, David (Scuola Normale Superiore, Pisa)

Session Classification: Flavour Physics and Fundamental Symmetries

Track Classification: Flavour Physics and Fundamental Symmetries
A recent extension of a variationally optimized perturbation method, combined with renormalization group properties in a straightforward way, can provide a series of approximations to non-perturbative quantities such as the chiral symmetry breaking order parameters. We apply this to evaluate, up to the third order in this modified perturbation, the ratio $F_\pi/\Lambda_{MS}$ where $F_\pi$ is the pion decay constant and $\Lambda_{MS}$ the basic QCD scale in the MS scheme. We also obtain from a similar approach the chiral quark condensate. We compare our estimates of $\Lambda_{MS}$ and the chiral condensate with recent lattice calculation results.

Primary authors: Dr NEVEU, Andre (LCC Montpellier); Dr KNEUR, Jean-Loic (LCC Montpellier)

Presenter: Dr KNEUR, Jean-Loic (LCC Montpellier)

Session Classification: QCD

Track Classification: QCD
Combined Measurement of the Inclusive Diffractive Cross Sections at HERA

A combination is presented of inclusive diffractive cross section measurements made by the H1 and ZEUS collaborations at HERA. Correlations of systematic uncertainties are taken into account by the combination method, resulting in improved precision.

Primary author: BEHNKE, Olaf (DESY)
Presenter: Mrs RUSPA, Marta
Track Classification: QCD
b-quark mass and B decay constant from Nf=2 lattice QCD simulations.

*Thursday, 21 July 2011 16:45 (15 minutes)*

Precision tests of the Standard Model as well as several New Physics scenarios in the beauty flavour physics are possible, due to the large amount of experimental data already available now and to come in the future. While the theoretical uncertainty is limiting the significance of such tests, lattice QCD offers a powerful approach to compute the necessary non-perturbative hadronic contributions.

We report on the status of the ALPHA Collaboration project of lattice Heavy Quark Effective Theory applied to these problems.

In a first step the b quark mass and the B decay constant are computed with the effect of Nf=2 dynamical quarks taken into account. The heavy quark is described by HQET (including all effects of order 1/mb) in order to keep the cut-off effects under control. Coefficients of the effective theory have been determined non-perturbatively. Hadronic matrix elements are obtained by solving a Generalised Eigenvalue Problem on a matrix of 2-point correlators. We have considered several lattice spacings and sea quark masses to deal with cut-off effects and chiral extrapolation.

**Primary author:** BLOSSIER, Benoit (CNRS)

**Presenter:** BLOSSIER, Benoit (CNRS)

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
The Silicon Strip Tracker of the Fermi Large Area Telescope

Friday, 22 July 2011 12:45 (15 minutes)

The Large Area Telescope (LAT) is the main instrument onboard the Fermi Gamma-ray Space Telescope, an orbital observatory launched in low-Earth orbit on June 11 2008 to survey the high-energy gamma-ray sky. The LAT tracker/converter serves the twofold purpose of converting the incoming gamma-ray into an electron-positron pair and tracking the latter in order to measure the original photon direction. With its 73 square meters of single-sided silicon-strip detectors, read out by some 900,000 independent electronics channel, it is the largest solid-state tracker ever built for a space application. The tracker system operates on 160 W of conditioned power while achieving a single-plane hit efficiency in excess of 99% and a noise occupancy at the level of 1 channel per million.

We describe the basic tracker design and the performance throughout the first three years of operation in orbit.

Primary authors:  Dr BREGEDON, Johan (INFN-Pisa); Dr BALDINI, Luca (INFN-Pisa)
Presenter:  Dr BREGEDON, Johan (INFN-Pisa)
Session Classification:  Detector R & D and Data Handling
Track Classification:  Detector R & D and data handling
Pre-Big Bang, vacuum and noncyclic cosmologies

WMAP and Planck open the way to unprecedented Big Bang phenomenology, not only for the standard Big Bang model but also for less conventional approaches including pre-Big Bang patterns. An example is provided by the recent claim (Gurzadyan et al.) that the cosmological sky is a weakly random one with mostly regular signal. If confirmed, this situation would have significant implications not only for cyclic cosmologies following the analyses recently proposed by Gurzadyan and Penrose, but also for noncyclic cosmologies incorporating a new fundamental scale beyond Planck scale and, possibly, new ultimate constituents of matter with unconventional basic properties as compared to conventional particles. More generally and in all cases, new alternatives to standard physics can be considered from a cosmological point of view concerning vacuum structure, the nature of space-time, the origin of our Universe, the validity of quantum field theory, solutions to the cosmological constant problem, inflationary scenarios, dark matter and dark energy, a new approach to string-like theories... Lorentz-like symmetries (standard or superbradyonic) can then be naturally stable space-time configurations produced in general cosmological scenarios including the formation and evolution of the present vacuum. We discuss basic ideas and phenomenological issues for non-cyclic pre-Big Bang cosmologies in the present context.

Primary author: Dr GONZALEZ-MESTRES, Luis (LAPP)
Presenter: Dr GONZALEZ-MESTRES, Luis (LAPP)
Long-Distance Contribution to Delta Gamma_s in the B_s-Bbar_s System

We estimate the long-distance contribution to the width difference Delta Gamma_s in the B_s-Bbar_s system from color-allowed two-body and three-body modes. For two-body modes, in addition to the usual D_s(0) Dbar^+(s) states, modes with excited states, D^+(s)[0,s1], are also included. We find that the contributions from the latter and three-body D^+(s) Dbar^+(s) Kbar^+(s) modes are non-negligible. Our result is compared to short-distance calculation and data.

**Primary author:** Prof. CHUA, Chun-Khiang (Chung Yuan Christian University)

**Co-authors:** Mr SHEN, Chia-Hsien (National Taiwan University); Prof. HOU, Wei-Shu (National Taiwan University)

**Presenter:** Prof. CHUA, Chun-Khiang (Chung Yuan Christian University)

**Track Classification:** Flavour Physics and Fundamental Symmetries
Fourth Generation: From B Factories, to Colliders and to the Cosmos

Friday, 22 July 2011 09:00 (15 minutes)

Adding another generation to the Standard Model is just about the simplest extension available to us; yet it has profound consequences. While there are many motivations for it, it appears now that the data from B-factories is very difficult to reconcile with the CKM-paradigm with just three families. Addition of a new family is just about the simplest way to address these difficulties. That modification then leads very interesting implication for improved experiments at high intensity frontiers such as LHCb and Super-B factories. It also has important repercussions for search strategies at the LHC. The scenario not only has profound consequences for baryogenesis but also in providing a viable dark matter candidate.

Primary author: SONI, amarjit (BNL)

Presenter: SONI, amarjit (BNL)

Session Classification: Flavour Physics and Fundamental Symmetries

Track Classification: Flavour Physics and Fundamental Symmetries
Lattice Flavour Physics

Friday, 22 July 2011 16:30 (20 minutes)

I will review state of the art lattice calculations of hadronic matrix elements that play a role in flavour physics (decay constants, bag parameters, form factors parametrizing semileptonic decays) both for light and heavy flavoured mesons. I will also briefly discuss how the present accuracy on some of these quantities can eventually be improved by considering effects that have been neglected up to now (long distance, isospin breaking, etc.).

Primary author: Dr TANTALO, Nazario (University of Rome "Tor Vergata")
Presenter: Dr TANTALO, Nazario (University of Rome "Tor Vergata")
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
Weak B Decays into Orbitally Excited Charmed Mesons

Accuracy on the measurement of the Cabbibo-Kobayashi-Maskawa matrix elements demands a detailed knowledge of semileptonic decays of $b$-hadrons. In particular, decays involving orbitally excited $c$-mesons provide an important contribution to the total semileptonic width. Therefore, a better understanding of these processes will reduce the uncertainties in the above mentioned matrix elements. Moreover, $B$ and $B_s$ meson weak decays into $D_s(2317)$ and $D_s(2460)$ open charm mesons can provide further information about the nature of these controversial states. Recently, BaBar Collaboration has reported [1] a study of $B$ semileptonic decays into final states containing charged and neutral $D_1(2420)$ and $D_2(2460)$, the two narrow orbitally-excited charmed light mesons. Moreover, the Belle Collaboration has measured [2] the branching fractions of the non leptonic decay $B \rightarrow D S_1(2536) \rightarrow D \bar{K}$. They also calculate different ratios involving $B$ decays into $D_s(2317)$ and $D_s(2460)$ mesons.

From a theoretical point of view these processes involve two steps: a weak decay of the $B$ meson and a strong decay of the charmed meson. The matrix elements for semileptonic decays can be parametrized in terms of form factors which, within the spectator approximation, can be evaluated from the wave functions of the mesons involved in the decay [3]. We evaluate these wave functions using the Constituent Quark Model of Ref. [4] which successfully describes hadron phenomenology and reactions. Strong decay widths are calculated consistently within the same model using a $3P_0$ and a microscopic model, where the strong decay is driven by the same interquark potential which determines the meson spectrum.

In the case of the semileptonic decays, the theoretical results agree reasonably with the experimental values. The prediction obtained with the microscopic model is closer than those obtained with the $3P_0$ model. Comparison of our results with the prediction of heavy quark symmetry is also included.

Motivated by our good previous results about semileptonic $B$ decays into $P$-wave charmed mesons we have extend our work to the exclusive $B$ decays into $P$-wave charmed-strange mesons. Preliminary results suggest a more complicate structure than a simple $q\bar{q}$ pair for some of these mesons.


Primary authors: Dr ALBERTUS-TORRES, Conrado (Departamento de Física Fundamental. Universidad de Salamanca); Dr RODRIGUEZ ENTEM, David (Departamento de Física Fundamental. Universidad de Salamanca); HERNANDEZ GAJATE, Eliecer (Departamento de Física Fundamental. Universidad de Salamanca); FERNANDEZ-GONZALEZ, Francisco (Departamento de Física Fundamental. Universidad de Salamanca); SEGOVIA-GONZALEZ, Jorge (Departamento de Física Fundamental. Universidad de Salamanca); Dr PEREZ GARCIA, M. Angeles (Departamento de Física Fundamental. Universidad de Salamanca)
**Presenter:** Dr ALBERTUS-TORRES, Conrado (Departamento de Física Fundamental. Universidad de Salamanca)

**Track Classification:** Flavour Physics and Fundamental Symmetries
Heavy-quark masses and heavy-meson decay constants from QCD sum rules

*Thursday, 21 July 2011 17:00 (15 minutes)*

We present the sum-rule extraction of the decay constants of the D, Ds, B, and Bs mesons from the two-point correlator of heavy-light pseudoscalar currents. We use the OPE of this correlator in terms of the running heavy-quark mass, for which the perturbative expansion exhibits a reasonable convergence. Our main emphasis is laid on the control over the uncertainties in the decay constants, related both to the input QCD parameters and to the limited accuracy of the method of sum-rules. The latter becomes possible due to the application of our procedure of extracting hadron observables that involves as novel feature dual thresholds depending on the Borel parameter. Our results for the decay constants contain the full analysis of both the statistical and systematic uncertainties.

**Primary authors:** Dr MELIKHOV, Dmitri (HEPHY, Vienna & SINP, Moscow); Dr SIMULA, Silvano (INFN, Roma); Dr LUCHA, Wolfgang (HEPHY, Vienna)

**Presenter:** Dr MELIKHOV, Dmitri (HEPHY, Vienna & SINP, Moscow)

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
Measurement of the Luminosity by the ATLAS Experiment

The luminosity is measured in ATLAS by several detectors and methods, both online and offline. This poster will present briefly the luminosity detectors in ATLAS and explain in some detail how they were used to extract and publish luminosity during the 2010 data taking. One of the challenges in measuring the luminosity at the LHC comes from the fact that many interactions typically occur in every bunch crossing. Comparisons of the number of interactions as measured by different detectors and methods will be presented. The very successful collaboration with the LHC machine has recently lead to a calibration, via beam separation scans, which is now estimated to have a systematic error of 3.4% for 2010 and a similar value for 2011 is expected. Since the error in the luminosity analysis was the limiting factor in the precision of many cross section measurements in ATLAS during 2010, this error analysis will also be discussed in some detail.

Primary author: Prof. HEINEMANN, Beate (UC Berkeley and Lawrence Berkeley National Lab)

Presenter: Mrs GABALDON, Carolina (CERN)

Track Classification: Accelerators
Measurement of the inclusive muon differential cross section with the ATLAS detector at LHC

We present the measurement of the muon inclusive differential cross section d\sigma/dpT in pp collisions at \sqrt{s} = 7 TeV. The analysis is performed in the pseudorapidity interval |\eta| < 2.5 for muon of transverse momentum 4 < pT < 100 GeV. The data have been recorded using different configurations of the level-1 muon trigger for an integrated luminosity of 1.4 pb^{-1}. The result is compared with the Next-To-Leading Order with Next to Leading Log high pT resummation prediction for the heavy flavour production and with MC@NLO prediction for W-Z bosons production. The measurement is sensitive for the first time to the Next to Leading Log contribution to the heavy flavour production in hadronic interactions.

Primary author:  Dr DI MICCO, Biagio Di Micco (CERN)
Presenter:  Dr DI MICCO, Biagio Di Micco (CERN)

Track Classification:  QCD
Updated results of the OPERA long baseline neutrino experiment

Friday, 22 July 2011 15:35 (15 minutes)

The OPERA neutrino detector built in the underground Gran Sasso Laboratory is designed to detect muon-neutrino to tau-neutrino oscillations in direct appearance mode. The hybrid apparatus consists of an emulsion/lead target complemented by electronic detectors. It is placed in the long-baseline CERN to Gran Sasso neutrino beam (CNGS) 730 km away from the source. The experimental set-up and ancillary facilities used to extract data recorded in the emulsion will be described, with the special procedures used to locate the interactions vertices and detect short decay topologies. OPERA is taking data since 2008. A first nu-tau interaction candidate was already published in 2010. An improved analysis scheme associated with a more detailed simulation has been developed and new results with increased statistics will be presented.

Primary author: Dr PESSARD, Henri (LAPP-IN2P3-CNRS)
Presenter: Dr STEFANO, DUSINI (Padova University and INFN)
Session Classification: Neutrino Physics
Track Classification: Neutrino Physics
Density Imaging of Volcanoes With Atmospheric Muons using GRPCs

Thursday, 21 July 2011 12:45 (15 minutes)

Their capability to penetrate through large depths of material renders high-energy atmospheric muons a unique probe for geophysical studies. Provided the topography is known, the measurement of the attenuation of the muon flux permits a cartography of density distributions revealing spatial and possibly also temporal variations.

A Collaboration between volcanologists, astroparticle- and particle physicists, TOMUVOL, has been formed in 2009 to study tomographic muon imaging of volcanoes with high-resolution, large-scale tracking detectors. By exploiting Glass Resistive Plate Chambers (GRPCs) with a semidigital readout developed for ILC hadronic calorimetry within the CALICE collaboration, TOMUVOL aims to improve the understanding of volcanic processes and may finally contribute to reducing volcanic hazards. Presently TOMUVOL is operating a muon telescope at the flank of the Puy de Dôme, an inactive volcanic dome situated in the Massif Central (south-central France). Three GRPC planes are in continuous operation, controlled remotely through a long-range Wifi link.

This contribution presents the geophysical motivation for muon imaging as well as the results after several months of data taking at the Puy de Dôme including measurements of the horizontal muon flux and first radiographic images.

**Primary author:** Dr CARLOGANU, Cristina (LPC Clermont Ferrand)

**Presenter:** Dr CARLOGANU, Cristina (LPC Clermont Ferrand)

**Session Classification:** Astroparticle Physics

**Track Classification:** Astroparticle Physics
LHCf physics results and future perspectives

Thursday, 21 July 2011 12:30 (15 minutes)

The LHCf experiment is a double arm sampling calorimeter, installed +/-140 m away from the Atlas LHC interaction point. The detectors allow precise measurement of energy and impact point of the neutral particles (mainly photons and neutrons) produced very forward in the LHC proton-proton interactions, in the pseudorapidity region greater than 8; this measurement is crucial for the calibration of the hadronic interaction models widely used in the High Energy Cosmic Ray field.

The experiment has successfully taken data in 2010, at 7 TeV center of mass energy, and it was later on removed to avoid radiation damage once the LHC luminosity was increased.

In this talk the main LHCf physics results will be reported, focusing in particular in the single photon energy spectra comparison between experimental data and the expectations of the various models. The upgrade phase, foreseen to reduce the radiation damage effects in the next 14 TeV 2014 center of mass energy run, will also be presented.

Primary author: Prof. TRICOMI, Alessia (University and INFN Catania)
Presenter: Prof. TRICOMI, Alessia (University and INFN Catania)
Session Classification: Astroparticle Physics
Track Classification: Astroparticle Physics
Time-dependent CP asymmetries in D and B decays

CP violation in the charm sector at the precisions accessible by current experiments could be a signature for new physics. So far, time-integrated measurements have provided upper limits in the 1% region, and D0 mixing studies limit any weak mixing phase to be less than 10 or 20 degrees. Future experiments are expected to provide greater precision and may be able to explore time-dependent CP asymmetries in charm decays that can provide a unique insight into the flavour changing structure of the Standard Model. We discuss some of the features that can be explored in such studies. We also point out that current experimental bounds on DeltaGamma translate into a significant systematic uncertainty on the measurement of beta from b -> c c-bar s decays.

Primary author: Dr BEVAN, Adrian (Queen Mary University of London)

Co-authors: Prof. MEADOWS, Brian (University of Cincinnati); Mr INGUGLIA, Gianluca (Queen Mary, University of London)

Presenter: Dr BEVAN, Adrian (Queen Mary University of London)

Track Classification: Flavour Physics and Fundamental Symmetries
Precision Calibration of the Luminosity Measurement in ATLAS

A precision luminosity measurement is of critical importance for the ATLAS physics program, both for searches for new physics as well as for precision measurements of Standard Model cross-sections. The calibration of the luminosity is based on three so-called van der Meer scans that were performed in 2010.

The calibration determines the convolved beam sizes in the vertical and horizontal directions, and together with the precise knowledge of the beam current a luminosity calibration can be determined. Based on this analysis ATLAS has determined the luminosity with a total uncertainty of only 3.4% for the 2010 data at \( \sqrt{s}=7 \text{ TeV} \).

**Primary authors:** KANAYA, Naoko (ICEPP, University of Tokyo); Mr HEDBERG, Vincent (Lund University)

**Presenter:** Mr HEDBERG, Vincent (Lund University)

**Session Classification:** Detector R & D and Data Handling

**Track Classification:** Detector R & D and data handling
Electron-Ion Collisions at a Large Hadron electron Collider

The Large Hadron electron Collider (LHeC) is a proposed facility which will exploit the LHC heavy ion beam for electron-nucleus scattering, using a new electron accelerator. This contribution, which is derived from the draft CERN-ECFA-NuPECC Conceptual Design report (due for release in 2011), addresses the expected physics impact of the LHeC for heavy ion physics. The kinematic coverage at low Bjorken-x extends beyond previous deep inelastic lepton-ion experiments with fixed nuclear targets by nearly four orders of magnitude. It is expected to be comfortably sufficient to reveal the non-linear dynamics which tame the growth of parton densities in order to satisfy the unitarity constraint. The inclusive electron-lead cross section, as well as exclusive and diffractive channels, are explored as means of probing this new region of very high parton densities. The impact of the data on nuclear parton distribution functions and nuclear modifications to fragmentation functions are also explored.

Primary author: Prof. NEWMAN (FOR THE LHEC STUDY GROUP), Paul (University of Birmingham)

Presenter: Prof. NEWMAN (FOR THE LHEC STUDY GROUP), Paul (University of Birmingham)
The complete charm-quark contribution to epsilon_K and Delta M_K

Friday, 22 July 2011 16:50 (15 minutes)

Neutral Kaon mixing plays an important role in the phenomenology of the standard model and its extensions because of its sensitivity to high-energy scales. In this talk I will give a summary of the theory prediction of epsilon_K and Delta M_K and present our new NNLO QCD calculation of the charm-quark contribution eta_cc to the Delta S = 2 effective Hamiltonian.

Primary author: Dr BROD, Joachim (Excellence Cluster Universe, TU Munich)
Presenter: Dr BROD, Joachim (Excellence Cluster Universe, TU Munich)
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
NNLO QCD corrections to $b \rightarrow ul\bar{v}_l$: the real radiation.

The measurements of inclusive semileptonic B-meson decays allow a precise determination of the CKM matrix elements $|V_{ub}|$ and $|V_{cb}|$, relevant for the study of flavor and CP violation in the quark sector. This requires, from the theoretical counterpart, the calculation of the NNLO corrections to differential decay distributions, from which it is possible to derive predictions for partial decay rates with arbitrary experimental cuts. The two-loop virtual corrections to the decay process $b \rightarrow uW^*$, where $b$ and $u$ are a massive and massless quark, respectively, and $W^*$ is an off-shell charged weak boson, that subsequently decays in a lepton anti-neutrino pair, are known already in the literature. In this poster, we present the calculation strategy and first results concerning the real radiation, necessary to complete the NNLO analysis.

Primary author: PAN, Zhao-ting (LPSC Grenoble)

Presenter: PAN, Zhao-ting (LPSC Grenoble)

Track Classification: Top and Electroweak Physics
The Large Hadron electron Collider Detector Design Concept

This year the CERN-ECFA-NuPECC Conceptual Design Report on the Large Hadron Electron Collider (LHeC) will be released. This contribution describes design concepts for a new detector, which combines the demands of very high precision with those of large acceptance into a novel device for electron-proton physics at TeV energies. The physics and technical requirements, choices of detector techniques and the integration of the detector with the 3 beam interaction region including its magnet designs are presented.

**Primary author:** Prof. NEWMAN (FOR THE LHEC STUDY GROUP), Paul (University of Birmingham)

**Presenter:** Prof. NEWMAN (FOR THE LHEC STUDY GROUP), Paul (University of Birmingham)

**Track Classification:** Detector R & D and data handling
A New Limit on Time-Reversal-Invariance Violation in Beta Decay: Results of the emiT-II Experiment

Thursday, 21 July 2011 09:45 (15 minutes)

We have measured the D-coefficient in the triple correlation of the neutron spin with proton and electron momenta by observing coincidences in the decay of polarized neutrons. A non-zero value of D can arise due to parity-even-time-reversal-odd interactions that imply CP violation due to the CPT theorem. (Final-state effects also contribute to D at the level of 1e-5 and can be calculated with precision of 1% or better [1]. The D coefficient is uniquely sensitive to the phase, φ_AV, of the ratio of axial-vector (A) and vector (V) amplitudes: λ = g_A/g_V as well as to scalar and tensor interactions that could arise due to beyond-Standard-Model physics such as leptoquarks [2].

The experiment was performed with the NG-6 cold-neutron beam at the NIST Center for Neutron Research in Gaithersburg, Maryland. The neutron beam is polarized, passes through a spin flipper and is collimated into a spectrometer, which measures proton-electron coincidences in an octagonal detector array concentric with the neutron beam. The recoil protons were accelerated to ~28 keV and detected by surface barrier detectors. The electrons were detected in plastic scintillators. The detector is highly segmented, allowing the triple correlation to be isolated and separated from a variety of systematic effects due to the parity-odd-time-reversal even correlations [3].

A 14-month run in 2002-2003 produced a sample of over 300 million proton-electron coincidence events. A blind analysis and extensive study of all significant systematic effects has recently been completed with the result D = (-0.96±1.89 (stat)±1.01(sys))e-4. The corresponding upper limit on D is a factor of three improvement over the previous upper limit for neutron decay [4,5] and over the upper limit measured in 19Ne decay [6], and thus our result represents the most sensitive test of time-reversal invariance in beta decay. Assuming only vector and axial vector interactions in beta decay, the result can be interpreted as a measure of the phase φ_AV = (180.013±0.028)°. This result also improves constrains on certain non-VA interactions.


Primary authors: Dr MUMM, Hans Pieter (NIST); Prof. CHUPP, Timothy (University of Michigan)

Co-authors: Dr THOMPSON, Alan (NIST); Prof. GARCIA, Alejandro (University of Washington); Dr FUJIKAWA, Brian (Lawrence Berkeley Lab); Dr TRULL, C.A. (Tulane University); Prof. WIETTENDT, Fred (Tulane University); Prof. JONES, Gordon (Hamilton College); Dr NICO, Jeffrey (NIST); Prof. WILKERSOHN, John (University of North Carolina); Dr COULTER, Kevin (University of California); Dr COOPER, Robert (University of Michigan); Prof. FREEDMAN, Stuart (University of California)

Presenter: Dr MUMM, Hans Pieter (NIST)
**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
Large Hadron electron Collider Accelerator Design Concepts

Saturday, 23 July 2011 11:25 (20 minutes)

An overview is presented on the design concepts for a high luminosity electron-nucleon collider (LHeC) of 1.3 TeV centre of mass energy, which can be realized with the addition of a 60 GeV electron ring or linear accelerator to the existing proton and ion LHC beam facility. The LHeC design comprises machine magnets, optics, interaction region, cryogenics, RF, civil engineering and further components of the LHeC. The contribution is a summary of the LHeC design concept report currently being discussed with an international review panel and due for release in 2011.

Primary author: Prof. NEWMAN (FOR THE LHEC STUDY GROUP), Paul (University of Birmingham)

Presenter: Mr BRUENING, Oliver (CERN)

Session Classification: Accelerators

Track Classification: Accelerators
Neutrino oscillation physics with a Neutrino Factory

Saturday, 23 July 2011 12:45 (15 minutes)

We illustrate that the baseline Neutrino Factory configuration being developed within the International Design Study for the Neutrino Factory (the IDS-NF) is optimized for standard oscillation-physics measurements and for searches for new physics. For small values of θ13 (sin²2θ13 < 10⁻²) a Neutrino Factory with two storage rings in which 25 GeV muons decay, pointing to two neutrino detectors, one situated at a distance between 2500—5000 km, the second at 7000—8000 km is optimal. If the value of θ13 is found to be large (sin²2θ13 > 10⁻²) a Neutrino Factory in which 10 GeV muons are stored in a single ring provides the best sensitivity for the discovery of CP violation in the neutrino sector, the determination of the neutrino mass hierarchy and the measurement of θ13. Finally, the crucial role played by near detectors in the determination of the standard oscillation parameters and in the search for non-standard physics at the Neutrino Factory will be presented.

Primary author: Dr SOLER, Paul (University of Glasgow)
Presenter: Dr SOLER, Paul (University of Glasgow)
Session Classification: Neutrino Physics
Track Classification: Neutrino Physics
Reconstruction of Single-Top Events in the Semi-Leptonic t-Channel at $\sqrt{s}=7$TeV

The electro-weak production of single top quarks is of great interest for many aspects in and beyond the standard model. The reconstruction of such events is a demanding task and requires skilful analysis methods in order to achieve a good background suppression. At ATLAS, a simple cut-based analysis is used for the reconstruction of single-top t-channel events, as well as more complex methods. All of them are based on the selection of events containing an isolated high-$p_T$ electron or muon, jets and missing transverse energy. The different methods are described in detail and the results of their application to pp collision data recorded with the ATLAS detector in 2011 at a centre-of-mass energy of $\sqrt{s}=7$TeV is presented.

**Primary author:** Dr KIND, Oliver Maria (Humboldt University Berlin)

**Presenter:** Dr KIND, Oliver Maria (Humboldt University Berlin)

**Track Classification:** Top and Electroweak Physics
Accelerator systems for the International Design Study of the Neutrino Factory

The Neutrino Factory produces high-energy neutrino beams with a well-defined flavour content and energy spectrum from the decay of intense, high-energy, stored muon beams. The muon storage rings include long straight sections that are directed toward neutrino detectors that are sited several thousand kilometers away. This talk describes the status of the accelerator facility described in the Interim Design Report (IDR) recently completed by the International Design Study for a Neutrino Factory (IDS-NF). We give a baseline specification for the accelerator and describe the accelerator subsystems that comprise it. We will briefly indicate some of the accelerator-physics challenges such a facility presents and the alternative designs for some of the subsystems that are being considered to manage the technical risks that these challenges present.

**Primary author:** Dr SOLER, Paul (University of Glasgow)

**Presenter:** Dr SOLER, Paul (University of Glasgow)

**Track Classification:** Accelerators
Detectors for leptonic CP violation at the Neutrino Factory

Studies carried out in the framework of the International Design Study for the Neutrino Factory (the IDS-NF) show that the sensitivity to the CP violating phase and the last unknown mixing angle $\theta_{13}$ is maximised when two far detectors optimized to detect the sub-leading $\nu_e \to \nu_\mu$ oscillation are combined. Several technologies are being discussed for these detectors: magnetised iron calorimeters; giant liquid argon TPCs; and totally active scintillating detectors. The IDS-NF baseline option, a compromise between feasibility, cost, and performance, is documented in the Interim Design Report (IDR) that has recently been completed. It consists of two magnetised iron sampling calorimeters, similar to the existing MINOS detector, but with 10-20 times more mass and improved performance. A detector of mass 100 kton is assumed at the intermediate baseline (between 2500 km and 5000 km) and a 50 kton detector at the long baseline (between 7000 km and 8000 km). The other far-detector options, which have better granularity may be able to detect additional oscillation channels, thus improving the overall performance of the facility. However, these options are likely to be more expensive and require significant R&D. A near detector of much smaller mass for precise measurement of neutrino flux and neutrino cross sections will be situated close to the end of the muon storage ring straight section. The various detector options will be discussed, covering the most important aspects—performance and technological challenges—as well as the R&D program and cost drivers.

Primary author: Dr SOLER, Paul (University of Glasgow)
Presenter: Dr SOLER, Paul (University of Glasgow)
Track Classification: Detector R & D and data handling
Statistical Aspects of High Energy Collisions

The statistical approach first proposed by Hagedorn was successful in the interpretation of many aspects of high energy hadron collisions. One important result of Hagedorn’s theory is the existence of a critical temperature, $T_c$, above which the composed system, the so-called fireball, is impossible to go.

However, when still higher energies were available at new accelerators, as RICH and LHC, it was soon realized that Hagedorn’s theory could no longer explain the experimental results. Indeed, this theory was replaced by a generalization which includes the well-known Tsallis statistics, instead of the Boltzmann statistics used by Hagedorn. The generalized theory, here called Hagedorn-Tsallis theory, can explain the experimental data even at energies as high as those obtained at LHC.

In this work we study how the Hagedorn-Tsallis theory fits to transverse momentum distributions obtained in $p$-$p$ and $A$-$A$ collisions with $\sqrt{s}$ ranging from 200 GeV up to 7 TeV, and verify if the critical temperature limit is still valid.

The results show that Hagedorn-Tsallis theory agrees with experiments even when a critical temperature is supposed to exist. We also obtain the dependence of the correlation parameter, $q$, typical in Tsallis statistics, on the value assumed for the critical temperature.

**Primary author:** Dr DEPPMAN, Airton (São Paulo University)

**Co-author:** SENA, Isaac (São Paulo University)

**Presenter:** Dr DEPPMAN, Airton (São Paulo University)
Experience with CMS Offline and Computing in LHC Runs 2010-2011

Friday, 22 July 2011 11:00 (15 minutes)

In this presentation we will discuss the experience with the CMS computing model during the LHC runs 2010-2011. We will outline how the experiment operations has evolved during the first few months of operations. The current state of the Offline and Computing projects will be presented and we will describe the initial experience with active analysis users and real data. We will include Tier0 processing, reprocessing steps on data and fast turn-around calibrations. We will address the issues that worked well in addition to identifying areas where future development and refinement are needed.

Primary author:  Dr PAOLUCCI, Pierluigi (INFN of Napoli)
Presenter:  VLMANT, Jean-Roch
Session Classification:  Detector R & D and Data Handling
Track Classification:  Detector R & D and data handling
FF-LYNX: project status and perspectives

In future High Energy Physics experiments severe power and radiation hardness requirements and non-homogeneous latency and bandwidth constraints in data transfers from Front-End electronics to remote trigger processors and readout systems will push toward “standard” and flexible protocols and modular architectures. The use of IP-cores available to ASIC and FPGA designers will contribute to meet these requirements with reasonable development and production costs. The FF-LYNX protocol was initially proposed in 2009 to allow physical serial links and interfaces to be used for both the distribution of Timing, Trigger and Control signals and the Data Acquisition, leading to a significant reduction of the amount of physical links and overall material budget.

In this protocol two channels multiplexed in the time domain are used for triggers, frame headers and synchronization patterns, protected by a robust encoding against transmission errors, and data frames. The protocol supports “Fixed Latency Frames” for high-priority information, as data to remote trigger processors, and “Variable Latency Frames” for data with no bounded latency. A key feature is the flexibility with respect to bandwidth requirements, allowed by the different speed options: 4xF, 8xF and 16xF (F = frequency of the reference clock frequency; F = 40MHz in the LHC).

The protocol has been implemented in radiation tolerant interfaces to serial electrical links, with parallel ports to host devices. Receivers have flow control to minimize losses when host devices are not ready to data transfers. The interfaces are currently compatible with “double-wire” electrical links, but in the future “single-wire” links with clock and data encoded onto one serial line will be developed to increase reliability in high speed and long physical connections. Prototypes of the interfaces have been designed as IP Cores in the IBM 130nm CMOS technology and embedded in a test circuit submitted for fabrication in February 2011. This technology provides intrinsic radiation hardness against Total Ionizing Dose while Single Event Effects are mitigated by the adoption of Radiation Hardening By Design (RHBD) techniques.

The potential benefits of the FF-LYNX protocol and interfaces for our community will be described in detail as well as the project status and perspectives.

Primary authors: Mr TONGIANI, Claudio (University of California Santa Barbara (UCSB)); Mr BIANCHI, Giovanni (University of California Santa Barbara (UCSB)); Mr MAGAZZU, Guido Magazzu (University of California Santa Barbara (UCSB) / INFN-Pisa); Prof. INCANDELA, Joseph (University of California Santa Barbara (UCSB)); Prof. FANUCCI, Luca (University of Pisa (Dept. of Information Technology)); Mr COSTANTINO, Nico (University of California Santa Barbara (UCSB)); Prof. SAPONARA, Sergio (University of Pisa (Dept. of Information Technology))

Presenter: Mr MAGAZZU, Guido Magazzu (University of California Santa Barbara (UCSB) / INFN-Pisa)

Track Classification: Detector R & D and data handling
The first complete NLL BFKL study of Mueller Navelet jets at LHC

Saturday, 23 July 2011 12:15 (15 minutes)

We present the first next-to-leading BFKL study of the cross section and azimuthal decorrelation of Mueller Navelet jets. This includes both next-to-leading corrections to the Green’s function and next-to-leading corrections to the Mueller Navelet vertices. The obtained results for standard observables proposed for studies of Mueller Navelet jets show that both sources of corrections are of equal and big importance for final magnitude and final behavior of observables, in particular for the LHC kinematics investigated here in detail. Our analysis reveals that the observables obtained within the complete next-to-leading order BFKL framework of the present study are quite similar to the same observables obtained within next-to-leading logarithm DGLAP type of treatment. The only noticeable difference is the ratio the azimuthal angular moments $< \cos 2 \phi > / < \cos \phi >$ which still differs in both treatments.

**Primary author:** Dr WALLON, Samuel (LPT Orsay and UPMC university)

**Presenter:** Dr WALLON, Samuel (LPT Orsay and UPMC university)

**Session Classification:** QCD

**Track Classification:** QCD
SU(5) X SU(5) SUSY GUT unification

The idea of grand unification in a minimal supersymmetric SU(5)xSU(5) framework is revisited. It is shown that the unification of gauge couplings into a unique coupling constant can be achieved at a high-energy scale compatible with proton decay constraints. This requires the addition of a minimal particle content at intermediate energy scales. In particular, the introduction of the SU(2)_L triplets belonging to the (15,1)+([\bar{15}],1) representations, as well as of the scalar triplet \Sigma_3 and octet \Sigma_8 in the (24,1) representation, turns out to be crucial for unification. The masses of these intermediate particles can vary over a wide range, and even lie in the TeV region. In contrast, the exotic vector-like fermions must be heavy enough and have masses above \(10^8\) GeV. We also show that, if the SU(5)xSU(5) theory is embedded into a heterotic string scenario, it is not possible to achieve gauge coupling unification with gravity at the perturbative string scale.

Primary authors: Dr EMMANUEL-COSTA, David (Instituto Superior Tecnico, Lisboa, Portugal); Dr FRANCO, Edison T. (Campinas State Uni.); GONZALEZ FELIPE, Ricardo ((Lisbon, ISEL & Lisbon, CFTP & Lisbon, IST)

Presenter: Dr EMMANUEL-COSTA, David (Instituto Superior Tecnico, Lisboa, Portugal)
Light Higgs searches with N-subjettiness

*Thursday, 21 July 2011 16:30 (15 minutes)*

We introduce a jet shape observable, N-subjettiness, that helps to discriminate the fat jet from a highly boosted color singlet particle decaying to N partons and the QCD jet. As an illustration, a toy scheme for the light Standard Model Higgs search via fully hadronic decay channels from 'pp -> H W/Z' is suggested. Issues regarding the subjet definition as required by the N-subjettiness are discussed for both the SISCone and the anti-kT jet algorithm.

**Primary author:** Mr KIM, Jihun (Seoul National University)  
**Presenter:** Mr KIM, Jihun (Seoul National University)  
**Session Classification:** Higgs and New Physics
Exclusive production of Higgs boson, $b\bar{b}$ and gluonic jets

Thursday, 21 July 2011 17:30 (15 minutes)

We discuss the central exclusive production of Higgs boson and $q\bar{q}$ pairs in proton-proton (proton-antiproton) collisions at LHC and Tevatron.

The amplitude for both processes is derived within the $k_t$-factorization approach and discussed in different kinematical asymptotia.

In particular, we consider important high-$p_t$ and massless quark limits for $q\bar{q}$ production.

Rapidity distributions, quark jet $p_t$ distributions, invariant $q\bar{q}$ mass distributions, angular azimuthal correlations between outgoing protons and between outgoing jets are presented.

Exclusive $b\bar{b}$ production constitutes an irreducible background for exclusive Higgs production.

The $b\bar{b}$ background is analyzed in detail, in particular we study how to impose cuts to maximize signal-to-background ratio and show some solutions.

We consider also central exclusive production of $gg$ dijets.

The amplitude for the process is derived within the $k_t$-factorization approach (with both the standard QCD and the Lipatov’s effective 3-gluon vertices) and is considered in various kinematical asymptotia, in particular, in the important limit of high-$p_t$ jets. Compared to earlier works we include emissions of gluons from different gluonic $t$-channel lines.

Rapidity distributions, gluon jet $p_t$ distributions, invariant dijet mass distributions, angular azimuthal correlations between outgoing protons and jets are presented. We explore the competition of the standard diagram with both jets emitted from a single $t$-channel gluon and the one with the emission from both $t$-channel gluons. We find that the latter contribution is much smaller than that known from the literature. It becomes comparable only when the jet rapidity difference is large or the gluon transverse momenta are very small. It can, therefore, give contributions to the central diffractive production of mesons.

We compare our results with the Tevatron data for exclusive dijets.


\item R. Maciúł\'{a}, R. Pasechnik and A. Szczurek, “Exclusive $b\bar{b}$ pair production and irreducible background to the exclusive Higgs boson production”, Phys. Rev. \textbf{D82} (2010) 114011.

\item R. Maciúł\'{a}, R. Pasechnik and A. Szczurek, “Central exclusive quark-antiquark dijet and Standard Model Higgs boson production in proton-(anti)proton collisions,”

**Primary author:** Prof. SZCZUREK, Antoni (Rzeszow University and Institute of Nuclear Physics PAN)

**Co-author:** Dr PASECHNIK, Roman (Uppsala Un)

**Presenter:** Prof. SZCZUREK, Antoni (Rzeszow University and Institute of Nuclear Physics PAN)

**Session Classification:** QCD

**Track Classification:** QCD
Production of lepton, quark and meson pairs in peripheral ultrarelativistic heavy ion collisions

Thursday, 21 July 2011 18:15 (15 minutes)

We discuss exclusive production of lepton-antilepton, quark-antiquark, \( \pi^+ \pi^- \) and \( \rho^0 \rho^0 \) and \( DD \) meson pairs in ultraperipheral, ultrarelativistic heavy-ion collisions i.e. processes initiated by photon-photon fusion which could be studied at RHIC and LHC.

The cross sections for exclusive muon pair production in nucleus - nucleus collisions was calculated and several differential distributions are shown. Realistic (Fourier transform of charge density) charge form factors of nuclei are used and the corresponding results are compared with the cross sections calculated with monopole charged form factor of a nucleus often used in the literature. Absorption effects are discussed and quantified. The cross sections obtained with realistic form factors are significantly smaller than those obtained with the monopole form factor. The effect is bigger for large muon rapidities and/or large muon transverse momenta.

We show predictions for STAR and PHENIX collaborations at RHIC as well as ALICE and CMS collaborations at LHC.

The cross section for exclusive heavy quark and heavy antiquark pair \( (Q\bar{Q}) \) production in peripheral ultrarelativistic heavy ion collisions was calculated for the LHC energy \( \sqrt{s_{NN}} = 5.5 \text{ TeV} \). We present results in the impact parameter equivalent photon approximation (EPA) and compare some of them with results obtained by exact calculations of the Feynman diagrams in the momentum space. We include both \( Q\bar{Q}, Q\bar{Q}g \) and \( QQq\bar{q} \) final states as well as photon single-resolved components. Realistic charge densities in nuclei were taken in the calculation. The different components give contributions of the same order of magnitude to the nuclear cross section.

We present for the first time cross section for exclusive production of \( \pi^+ \pi^- \) and \( \pi^0 \pi^0 \) pairs. The elementary process \( \gamma\gamma \to \pi\pi \) is discussed in detail. We concentrate on high-\( p_t \) processes. We consider pQCD processes ala Brodsky-Lepage or alternatively hand-bag mechanism. The nuclear cross section is calculated within b-space EPA for RHIC and LHC.

Similar analysis is performed for \( \rho^0 \rho^0 \) production, where the elementary cross section is less known. Our analysis includes a low-energy phenomenon (close-to-threshold enhancement of the cross section). The cross section for the low-energy phenomenon is parametrized and the high-energy cross section is calculated in a simple Regge model. Predictions for heavy ion collisions are presented.
The cross sections for exclusive $D^+D^-$ and $D^0\bar{D}^0$ meson pair production in peripheral nucleus - nucleus collisions are calculated and several differential distributions are presented. The calculation of the elementary $\gamma\gamma \rightarrow D\bar{D}$ cross section is done within the heavy-quark approximation and in the Brodsky-Lapage formalism with distribution amplitudes describing recent CLEO data on leptonic $D^+$ decay. The cross sections of a few nb are predicted for RHIC and of a few hundreds of nb for LHC with details depending on the approximation made in calculating elementary $\gamma\gamma \rightarrow D\bar{D}$ cross sections.

The speaker will present these different results to demonstrate how reach is the option of ultrarelativistic ultraperipheral collisions at RHIC and LHC.

Literature:

\item M. Kłusek, W. Schäfer and A. Szczurek, “Exclusive production of $\rho^0\rho^0$ pairs in $\gamma\gamma$ collisions at RHIC”, Phys. Lett. {bf B674} (2009) 92.


\item Łuszczak and A. Szczurek, “Exclusive $D\bar{D}$ meson pair production in peripheral ultrarelativistic heavy ion collisions”, arXiv:1103.4268, in print in Phys. Lett.B


**Primary author:** Prof. SZCZUREK, Antoni (Rzeszow University and Institute of Nuclear Physics PAN)

**Presenter:** Prof. SZCZUREK, Antoni (Rzeszow University and Institute of Nuclear Physics PAN)

**Session Classification:** Ultrarelativistic Heavy Ions
the Double Chooz experiment

The Double Chooz neutrino experiment is taking data at the French nuclear plant of Chooz, and will be very soon improving the world best limit on the teta 13 neutrino mixing angle, which is the last non measured oscillation angle.

This experiment is the first of a new neutrino generation of experiment, and the only one currently taking data. These are Reno in Korea, Daya Bay in China, and T2K in Japan.

Double Chooz is a large international experiment, gathering 150 physicists from 35 universities...

Primary author: Dr DE KERRET, HERVE (APC)
Presenter: Dr DE KERRET, HERVE (APC)
Track Classification: Neutrino Physics
Status and Perspectives of the COBRA-Experiment

The determination of two important properties of the neutrino is still pending: its rest mass and its nature - Dirac or Majorana particle. The observation of neutrinoless double beta decay would clarify both, but the expected half-life of more than $10^{25}$ years for this decay is an ambitious challenge.

Recently, first experiments have been commissioned that will be able to probe this magnitude of half-lives. If they succeed, it will be important to verify the results using different isotopes. If they do not succeed, new experimental approaches are required.

The COBRA experiment is an excellent candidate for both: it uses CdZnTe room-temperature semiconductor detectors that contain several double beta decay candidate isotopes, among them also $\beta^+$ emitters and two of the most promising isotopes, Te-130 and Cd-116. Cd-116 has a decay energy well above the most energetic naturally occurring gamma lines reducing its background drastically compared to e.g. Ge-76. In addition, CdZnTe can be used as a solid-state TPC combining the large advantages of a source-equals-detector approach with the possibility of decay identification via particle track reconstruction.

The COBRA collaboration comprises 12 institutes from 8 countries and currently operates detectors with two readout techniques: The commercially available Co-Planar Grid (CPG) technology was developed specifically for CdZnTe, allows the operation of fairly large crystal sizes on the order of some ccm with only one readout channel and reaches energy resolutions better than 2% FWHM @ 662 keV. COBRA operated several R&D-arrays of CPG-type detectors in ultra-low background mode at the Italian underground laboratory LNGS. Half-life limits above $10^{20}$ years for several isotopes and decay modes have been determined with these setups. New readout electronics optimized for low-rate spectroscopy and allowing background reduction by pulse-shape analysis was developed and first results will be shown.

Using semiconductor pixel detectors is unique for a double-beta decay experiment. Three different pixelated CdZnTe/CdTe detector types have been operated in an ultra-low background environment. Results will be shown demonstrating clearly the power of background suppression with this detector type by enabling fiducial cuts, vertexing and coincidence techniques. Finally, concepts for a large-scale setup will be shown.

**Primary author:** MUENSTERMANN, Daniel (CERN)

**Presenter:** MUENSTERMANN, Daniel (CERN)

**Track Classification:** Neutrino Physics
The COMPASS-II program

The COMPASS experiment at CERN uses either muon or hadron beams with a longitudinally or transversely polarized solid target, liquid hydrogen or heavy nuclear targets. The COMPASS Collaboration has recently submitted a proposal for additional measurements in the next years. The proposal (COMPASS-II) was approved by the CERN Research Board in December 2010. It includes studies of: 1) Drell-Yan process using a negative pion beam and a transversely polarized proton target. The resulting measurements give access to the transverse momentum dependent parton distributions. 2) Deeply virtual Compton scattering using positive and negative muon beams with opposite polarization together with an unpolarized proton target. At a later stage a transversely polarized proton target is envisaged. The data will allow a measurement of the generalized parton distributions in the nucleon. 3) Primakoff reactions as a tool for measuring pion and kaon polarizabilities, taking advantage of both pion and kaon in the CERN hadron beam. In this presentation the main motivations for the COMPASS-II proposal will be reviewed and the most important modifications of the experimental set-up, which is necessary for these new programs, will be presented.

Primary author: Dr GUSKOV, Alexey (Joint Institute for Nuclear Research)

Presenter: Dr GUSKOV, Alexey (Joint Institute for Nuclear Research)

Track Classification: QCD
One-loop finite corrections to seesaw neutrino masses

In the standard seesaw mechanism, finite corrections to the neutrino mass matrix arise from one-loop self-energy diagrams mediated by a heavy neutrino. In this talk I will discuss the impact that these corrections may have in the different entries of the tree-level neutrino mass matrix, paying special attention to their dependence with the seesaw model parameters. It will be shown that due to their large size any reliable treatment of the seesaw parameter space should include such corrections.

Primary author: ARISTIZABAL, Diego (Universite de Liege)
Presenter: ARISTIZABAL, Diego (Universite de Liege)

Track Classification: Neutrino Physics
Searches for supersymmetry in pp collisions at $\sqrt{s} = 7$ TeV in final states with missing transverse momentum, b-jets and at least one leptons

Results are presented of a search for new physics in events with large missing transverse energy and heavy flavor jet candidates in $\sqrt{s} = 7$ TeV proton-proton collisions recorded by the ATLAS experiment at the Large Hadron Collider in 2011. Events are required to contain energetic jets, of which one or two must be identified as a b-jet, large missing transverse energy and at least one isolated leptons (electron or muon). Several topologies sensitive to third generation squark production are examined. The results are interpreted in the context of phenomenological MSSM models as well as specific supersymmetry breaking scenarios such as mSUGRA.

**Primary author:** Dr D’ONOFRIO, Monica (University of Liverpool)

**Presenter:** Dr D’ONOFRIO, Monica (University of Liverpool)
Measurement of the top quark pair production cross section in dilepton final states with ATLAS

We present a measurement of the production cross section of top quark pairs in proton-proton collisions at $\sqrt{s} = 7$ TeV recorded with the ATLAS detector at the CERN Large Hadron Collider. Using the 2011 ATLAS dataset, candidate events are selected in the dilepton topology with large missing transverse energy and at least two jets. In this analysis backgrounds from $Z\rightarrow ll$ and mis-identified leptons are estimated from data, while smaller backgrounds come from Monte Carlo evaluation. The result includes detailed studies of the systematic uncertainties in the sub-channels.

Primary author: KACZMARSKA FOR THE ATLAS SPEAKERS COMMITTEE, Anna (INP Cracow)

Presenter: KHANDANYAN, Hovhannes (UI Urbana)

Track Classification: Top and Electroweak Physics
Transverse momentum spectra of identified charged hadrons with the ALICE detector in PbPb collisions at the LHC

Thursday, 21 July 2011 15:45 (15 minutes)

The measurement of identified charged hadron production at mid-rapidity (|y| < 0.5) performed with the ALICE experiment is presented for PbPb collisions at a nucleon-nucleon c.m. energy of 2.76 TeV. The transverse momentum spectra of charged pions, kaons, protons and antiprotons are measured from 200 MeV/c up to 3 GeV/c for pions and kaons and from 400 MeV/c up to 5 GeV/c for protons and antiprotons using the dE/dx and the time-of-flight particle-identification techniques. Preliminary results on charged hadron production yields and particle ratios are reported as a function of pT and collision centrality. Finally, the results are discussed in terms of hydrodynamics-inspired models and compared with published RHIC data in Au+Au collisions at c.m. energy of 200 GeV per nucleon pair and Monte Carlo predictions.

Primary author: Dr PREGHENELLA, Roberto (INFN Bologna)
Presenter: Dr PREGHENELLA, Roberto (INFN Bologna)
Session Classification: Ultrarelativistic Heavy Ions
The recent discovery of neutrino oscillations, has implications for the Standard Model of particle physics (SM). Knowing the contribution of neutrinos to the SM, needs precise measurements of the parameters governing the neutrino oscillations. The EUROv Design Study will review three facilities (the so-called Super-Beams, Beta Beams and Neutrino Factories) and perform a cost assessment that, coupled with the physics performance, will give means to the European research authorities to make a decision on future European neutrino oscillation facility. “Beta Beams” produce collimated pure electron (anti-)neutrino by accelerating beta active ions to high energies and having them decay in a storage ring. EUROv Beta Beams are based on CERN’s infrastructure and existing machines. Using existing machines is an advantage for the cost evaluation, however, this choice is also constraining the Beta Beams. After a brief introduction to beta beams, recent work to make the Beta Beam facility a solid option will be described: tuning of beta beam parameters to give high fluxes and to enhance the physics reach, production of Beta Beam isotopes, the 60 GHz pulsed ECR source development, integration into the LHC-upgrades, ensure the high intensity ion beam stability.

**Primary author:** Dr WILDNER, elena (cern)

**Presenter:** Dr WILDNER, elena (cern)

**Session Classification:** Neutrino Physics

**Track Classification:** Neutrino Physics
The RHIC Beam Energy Scan

Thursday, 21 July 2011 12:00 (30 minutes)

For almost 30 years, hadron production in heavy ion collisions has been an important observable for probing the state of nuclear matter. Mapping out the phase diagram of strongly interacting matter is a challenging open task in quantum chromodynamics (QCD). The goal of the RHIC Beam Energy Scan program (BES) is to study the phase diagram of strongly interacting matter to search for the critical point (CP) and the onset of deconfinement. Currently the most promising predictions for identifying these phenomena are non-monotonic deviations in the energy dependence of elliptic flow, hadron yield production, and the critical point fluctuations of conserved quantum number like baryon number and strangeness. Furthermore a scan would provide more information about where the constituent quark scaling of elliptic flow will break and can be used as a signature for the onset of deconfinement. We will present recent results on particle yield and spectra, directed ($v_1$) and elliptic flow ($v_2$), and event-by-event fluctuations at $\sqrt{s_{NN}} = 7.7$, 11.5, and 39 GeV. The measurements will be compared to measurements at SPS, higher RHIC, and LHC energies, as well as string hadronic and hydrodynamic model calculations.

Primary author: Dr MITROVSKI, Michael (STAR Collaboration)

Presenter: Dr MITROVSKI, Michael (STAR Collaboration)

Session Classification: Ultrarelativistic Heavy Ions
Top quark physics at CDF

Thursday, 21 July 2011 16:30 (30 minutes)

We present the recent results of top-quark physics using up to 8fb-1 of ppbar collisions analyzed by the CDF collaboration. The large number of top quark events analyzed, of the order of several thousands, allows stringent checks of the Standard Model predictions. Also, the top quark is widely believed to be a window to new physics. We will present the latest measurements of top quark intrinsic properties as well as direct searches for new physics in the top sector.

Primary author: Dr CDF, Collaboration (Purdue University)
Presenter: Mr POTAMIANOS, Karolos (Purdue University)
Session Classification: Top and Electroweak Physics
Track Classification: Top and Electroweak Physics
Measurement of the Forward Backward Asymmetry in Top Production at CDF

Saturday, 23 July 2011 11:30 (20 minutes)

In elementary particle physics, symmetry is fundamental to the theories we use to describe the world in which we live. A discrepancy in a symmetry predicted by the standard model can perhaps point to new types of physics, to an anomaly in the data, or it can demonstrate that current theories need revision. Since 2006, scientists at CDF and D0 have been studying the forward backward asymmetry in top quark pair production as a test of discrete symmetries of the strong interaction. Recent CDF results indicate that this production asymmetry is larger than expected by the standard model, and that the asymmetry is dependent on the mass of the top antitop system. This talk will present an update of this study that makes use of the entire available dataset.

Primary author:  Dr CDF, Collaboration (Fermilab)
Presenter:  VELLIDIS, Costas
Session Classification:  Top and Electroweak Physics
Track Classification:  Top and Electroweak Physics
Towards the Very Large Volume Mediterranean Neutrino Telescope, KM3NeT

Thursday, 21 July 2011 09:45 (15 minutes)

KM3NeT ($km^3$ Neutrino Telescope) will be one of the world’s largest particle detectors, built at the bottom of the Mediterranean Sea, providing a window for the observation of the Universe through high energy neutrinos. KM3NeT will complement the South Polar IceCube neutrino telescope in its field of view and significantly surpass it in sensitivity and discovery potential. The underwater KM3NeT facilities will also provide continuous connectivity for long-term deep-sea scientific measurements in the geo- and biological sciences.

In this talk we describe the major technical aspects of the KM3NeT design and we report on results concerning the evaluation of the sensitivity of the neutrino telescope to detect high energy astrophysical neutrinos. In particular, we present results on the discovery potential of the telescope in detecting galactic (point-like and extended) and extragalactic, transient (Gamma Ray Bursts) high energy neutrino sources as well as measuring the ultra high energy, diffuse neutrino flux.

**Primary author:** Dr TSIRIGOTIS, Apostolos (Physics Laboratory, School of Science and Technology, Hellenic Open University)

**Presenter:** Dr TSIRIGOTIS, Apostolos (Physics Laboratory, School of Science and Technology, Hellenic Open University)

**Session Classification:** Astroparticle Physics

**Track Classification:** Astroparticle Physics
Summary of the latest PHENIX Heavy Ion Results

Thursday, 21 July 2011 11:30 (30 minutes)

The PHENIX Experiment at the Relativistic Heavy Ion Collider of the Brookhaven National Laboratory has been taking data for over 10 years. The accumulated data sets span multiple beam energies and collision systems that provide an increasingly detailed picture of the hot and dense medium produced in central heavy ion collisions. I will summarize our latest results and give an outlook of our future program.

Primary author: Dr PINKENBURG, Chris (BNL)
Presenter: Dr PINKENBURG, Chris (BNL)
Session Classification: Ultrarelativistic Heavy Ions
Feasability study for a Muon Forward Tracker in ALICE

ALICE is the experiment dedicated to the study of the quark gluon plasma in heavy-ion collisions at the LHC. Improvement of ALICE sub-detectors for the upgrade plans of the year 2017 are ongoing. The Muon Forward Tracker (MFT) is a proposal in view of this upgrade. The MFT is a silicon pixels detector added in the Muon Spectrometer acceptance ($-4 < \eta < -2.5$) upstream of the hadronic absorber. The MFT upgrade is motivated by several physics improvements. The measurement of the DCA (Distance of Closest Approach) of single muons and secondary vertex from dimuons will permit the identification of open charm ($c \sim 150 \mu m$) and beauty ($c \sim 500 \mu m$) mesons. The MFT, thanks to its tracking capabilities, will allow to improve the mass resolution of the resonances for a better separation between $\rho/\omega$ and $\phi$, $J/\psi$ and $\psi'$, and $\nu$ family resonances. In addition, it will help to reject a large fraction of muons coming from pion and kaon decays, improving the signal over background ratio. Moreover, the MFT will lead to the direct multiplicity measurement, event by event, of charged particles within the spectrometer acceptance.

In order to evaluate the feasibility of this upgrade, a setup composed by five silicon planes was simulated within the AliRoot framework. A detailed study of the influence of the beam pipe geometry on secondary particles production was performed. The method used for tracking in the planes and attaching the MFT clusters to the muon tracks will be presented, together with the performances of the MFT in terms of occupancy rate in the pixel planes, secondary vertex measurement, improvement of the dimuon invariant mass resolution.

Primary author: Dr URAS, Antonio (IPNL Lyon)
Co-author: MASSACRIER, Laure (IPNL & Université Lyon 1, Lyon)
Presenter: Dr URAS, Antonio (IPNL Lyon)
Track Classification: Detector R & D and data handling
Gravitational Energy in Massive Gravity

Friday, 22 July 2011 16:30 (15 minutes)

In GR the static gravitational potential of a self-gravitating body goes as $1/r$ at large distances and any slower decrease leads to infinity energy. We show that in a class of four-dimensional massive gravity theories there exists spherically symmetric solutions with finite total energy, featuring an asymptotic behavior slower than $1/r$ and generically of the form $r^{-\gamma}$. This suggests that configurations with nonstandard asymptotics may well turn out to be physical. The effect is due to an extra field coupled only gravitationally, which allows for modifications of the static potential generated by matter, while counterbalancing the apparently infinite energy budget.

Primary authors:  Dr COMELLI, Denis (INFN Ferrara); Dr NESTI, Fabrizio (ICTP Trieste); Dr PILO, Luigi (Department of Physics University of L’aquila)

Presenter:  Dr PILO, Luigi (Department of Physics University of L’aquila)

Session Classification:  Cosmology and Gravity
Determination of the light quark masses from $\eta \rightarrow 3\pi$

Friday, 22 July 2011 09:45 (15 minutes)

Recently, an important effort has been devoted at KLOE, MAMI and COSY to precisely measure the $\eta \rightarrow 3\pi$ decays. These new measurements require to revisit the theoretical analyses of these decays. In this talk, we will present a new analysis of the $\eta \rightarrow 3\pi$ decay amplitude relying on dispersive methods. We will show how the study of this decay allows to extract a fundamental parameter of the Standard Model, namely the quark mass ratio $(m_d^2-m_u^2)/(m_s^2-\hat{m}^2)$ with a very good precision. We will then discuss the possibility to extract the individual light quark masses.

Primary authors: PASSEMAR, Emilie (IFIC-University of Valencia); COLANGELO, Gilberto (Albert Einstein Center for Fundamental Physics, ITP-Bern); LEUTWYLER, Heinrich (Albert Einstein Center for Fundamental Physics, ITP-Bern); LANZ, Stefan (Albert Einstein Center for Fundamental Physics, ITP-Bern)

Presenter: PASSEMAR, Emilie (IFIC-University of Valencia)

Session Classification: QCD

Track Classification: QCD
The production of quarkonium has been studied to provide information about the hypothesized Quark Gluon Plasma (QGP) that is expected to be created in relativistic heavy ion collisions at RHIC. Lattice QCD predicts a suppression of quarkonium production in the presence of a hot and dense medium relative to proton-proton collisions, with the suppression pattern of the various quarkonium states providing insight into the thermodynamic properties of the QGP. The suppression is expected due to the Debye screening of the potential between heavy quarks in a dense medium. However there are other effects due to the presence of a QGP which may contribute to the modification of heavy quark production, such as statistical coalescence of heavy quark-antiquark pairs, or co-mover absorption. There are also ordinary Cold Nuclear Matter (CNM) effects, such as the modification of nuclear PDFs (shadowing), and final state nuclear absorption, which need to be taken into account in order to fully quantify an anomalous suppression. This can be achieved by studying the production of various quarkonium states in p+p, d+A and A+A collisions. Furthermore, p+p collisions can offer insight to the quarkonium production mechanism and feed down effects from higher states.

In this talk we will report the results on heavy quarkonium production in p+p, d+Au, and Au+Au collisions at midrapidity via the dielectron decay channel at $\sqrt{s_{NN}} = 200$ GeV from STAR. Results from $J/\psi$ production in p+p collisions will be presented to provide a baseline for production and understand the quarkonium production mechanism. The nuclear modification factor for $J/\psi$ will also be reported, along with results from Upsilon production in p+p, d+Au, and Au+Au collisions, to investigate the suppression of quarkonium at STAR.

**Primary author:** MR POWELL, Christopher (Lawrence Berkeley National Laboratory)

**Presenter:** MR POWELL, Christopher (Lawrence Berkeley National Laboratory)

**Session Classification:** Ultrarelativistic Heavy Ions
Neutrino event generators play an important role in the design and execution of neutrino experiments. In this talk I will describe several programs that simulate neutrino-nucleus interactions in the 1-100 GeV energy regime, focusing in particular on a discussion of the underlying physics models and identifying key assumptions.

**Primary author:** Prof. GALLAGHER, Hugh (Tufts University)

**Presenter:** Prof. GALLAGHER, Hugh (Tufts University)

**Session Classification:** Neutrino Physics

**Track Classification:** Neutrino Physics
New Aspects of Non Commutative Space-time Cosmology

New cosmological aspects of Seiberg-Witten noncommutative geometry (NCG) are discussed and an FRW like model is presented. The NCG black hole apparent horizon is determined and the corresponding Hawking temperature is obtained by a Kodama like observer via the tunelling effect. Moreover, it is shown that because of the torsion and anisotropy generated by NCG, a new mechanism explaining leptogenesis is proposed and the related leptonic asymmetry is calculated. Finally, some cosmological parameters are presented and an alternative explanation of the accelerated expansion of the universe is given in the context of this approach.

Primary author: MEBARKI, Noureddine (Mentouri University)
Presenter: MEBARKI, Noureddine (Mentouri University)
Measuring 4th generation CKM parameters at the LHC

CPV measurement in Bs -> J/psi phi at the Tevatron, sin2Phi_Bs, hint at new physics, with the 4th generation the simplest explanation. At the same time, great progress is made already at the LHC for the direct search of 4th generation quarks. We show that a precise measurement of sin2Phi_Bs by LHCb, together with a measurement (combining LHCb, ATLAS and CMS) of Bs -> mu+mu- at slightly above the SM level, normalized with Bs-mixing, can pin down the strength and phase of Vt's^Vt'b for given mt'. This could be achieved as early as 2012. Such a measurement is akin to the measurement of sin2phi1/beta by Belle and BaBar in 2001, i.e. completing a CKM triangle, but the strength of CPV, unlike the 3 generation case, could be linked to the baryon asymmetry of the Universe. A complementary measurement would be to measure Vt'b, by measuring the branching ratio (BR) of the kinematic suppressed, but CKM allowed, t' -> b'W^ decay. The knowledge that |mt' - mb'| < MW implies that the W here is virtual. Precisely when Vt'b is small, the BR for t' -> b'W^ can be amplified, making it a sensitive probe of small values of Vt'b.

**Primary author:** Prof. HOU, George W.S. (National Taiwan University)

**Presenter:** Prof. HOU, George W.S. (National Taiwan University)

**Track Classification:** Flavour Physics and Fundamental Symmetries
Evidence for a new variability in Type Ia Supernovae from The Nearby Supernovae Factory

Friday, 22 July 2011 18:10 (15 minutes)

Type Ia supernovae (SNe–Ia) are used as standard candles to measure the history of the universe expansion. However, precise measurements need an empirical standardization of the luminosities usually done with two light-curve derived parameters (stretch and color): brighter SNe–Ia exhibit a broader light curve, and redder objects are fainter. Employing the flux calibrated spectra sample obtained by the Nearby Supernova Factory, we show that there are actually two main components instead of one entering in the object color law, the first related to intrinsic spectral features, and the other related to extrinsic extinction by dust. We then find a value of the total-to-selective extinction ratio $R_V$ in agreement with the standard Milky-Way value, as opposed by the low values found in pure photometric approaches.

Primary author:  CHOTARD, nicolas (Institut de physique nucléaire de Lyon)
Presenter:  CHOTARD, nicolas (Institut de physique nucléaire de Lyon)
Session Classification:  Cosmology and Gravity
The thermal Sunyaev-Zel’dovich effect with PLANCK

Friday, 22 July 2011 15:15 (15 minutes)

The PLANCK mission will provide the most precise measurement of the cosmic microwave background (CMB) anisotropies in temperature and polarization, allowing us to set tight constraints on the cosmological parameters. In addition, the PLANCK mission, because of its frequency coverage, is sensitive to the interaction of CMB photons and hot electrons in galaxy clusters via the thermal Sunyaev-Zel’dovich (tSZ) effect.

First, we present the reconstruction of the tSZ signal from a set of observed Planck maps at different frequency bands using an adapted component separation algorithm: MILCA.

Second, we will discuss the construction and validation process of the Planck Early Sunayev-Zeldovich (ESZ) based catalogue of clusters of galaxies. This catalogue will allow us to study in details the matter content of the universe and therefore to measure the matter power spectrum as a function of redshift and the properties of matter filaments.

Finally, we will demonstrate the complementarity of the PLANCK tSZ and X-ray observations of clusters of galaxies in order to characterize the properties and spatial distribution of the hot gas of electrons in galaxy clusters and galaxy cluster systems. The measured pressure profiles in galaxy clusters will allow us to constrain large scale structure formation theories.

Primary author: HURIER, Guillaume (LPSC)
Presenter: HURIER, Guillaume (LPSC)
Session Classification: Cosmology and Gravity
Understanding neutrino properties in a 2HDM see-saw

Friday, 22 July 2011 18:15 (15 minutes)

In this talk I will consider an extension of the Standard Model by heavy right-handed neutrinos and a second Higgs doublet. In the decoupling limit of the extra particles, this model provides an explanation for the small neutrino masses and for the mild hierarchy observed between the atmospheric and solar mass splittings without jeopardizing any of the successes of the Standard Model. Finally I will comment on a possible relation between neutrino mixing angles.

**Primary authors:** Prof. IBARRA, Alejandro (TU Munich); Mr SIMONETTO, Cristoforo (TU Munich)

**Presenter:** Mr SIMONETTO, Cristoforo (TU Munich)

**Session Classification:** Neutrino Physics

**Track Classification:** Neutrino Physics
Electroweak baryogenesis and CP violation from fourth generation

We address the electroweak baryogenesis based on the standard model with a fourth generation. The conventional three-generation standard model (SM3) fails to explain the baryon asymmetry of the universe, although it can satisfy all three Sakharov’s conditions in principle. One of the reasons of this failure is the insufficiency of the CP violation from the Kobayashi-Maskawa phase. An existence of fourth generation quarks may solve this problem as new CP violating phases are introduced in the 4 by 4 Cabibbo-Kobayashi-Maskawa matrix. We investigate this possibility in the context of the Farrar-Shaposhnikov mechanism of the electroweak baryogenesis, where a baryon asymmetry is generated due to the CP violating scattering of quasi-particles, which are thermal excitations corresponding to the quarks and the antiquarks, with bubbles of the Higgs condensate. By assuming a strongly first-order electroweak phase transition and existence of bubbles, we demonstrate that the baryon asymmetry is highly enhanced compared to the SM3 case and can be large enough to explain the observed value, due mainly to the large masses of the fourth-generation quarks. We also argue the electroweak phase transition in the four generation case.

Primary author: Dr KOHDA, Masaya (National Taiwan University, Taiwan)

Co-authors: Prof. HOU, Wei-Shu (National Taiwan University, Taiwan); Prof. KIKUKAWA, Yoshio (University of Tokyo, Japan)

Presenter: Dr KOHDA, Masaya (National Taiwan University, Taiwan)
Renormalization constants of fermionic operators in lattice QCD with Nf=4 dynamical Wilson quarks

We report on preliminary non-perturbative computations of the renormalization constants in the RI-MOM scheme relevant for the lattice action with Nf=4 dynamical flavours currently used by the European Twisted Mass Collaboration (ETMC). The knowledge of these constants is necessary in order to extract physical quantities from the rich program of lattice QCD simulations being performed by the ETMC. This step will enable the precise computation (at a few percent level) of quantities like quark masses, leptonic decay constants, form factors, bag-parameters which play a major role in the determination of the CKM matrix elements. For the purpose of this investigation dedicated simulations with four degenerate sea quark flavours are being performed. We also report on the recent coming into operation of the Aurora machine and the associated code optimization issues.

Primary author: Dr SCORZATO, Luigi (ECT*)

Presenter: Dr SCORZATO, Luigi (ECT*)

Track Classification: Flavour Physics and Fundamental Symmetries
The process $W^+W^- + \text{dijet}$ is of great importance at the LHC, not only in itself but also as a primary background to moderately heavy Higgs production in association with two jets. I present next-to-leading order results for this process calculated recently using unitarity methods. By looking at specific kinematic distributions, I will show how the reduced theoretical uncertainty can improve the reliability of discriminating the Higgs signal over this background.

**Primary authors:** ZANDERIGHI, Giulia (University of Oxford); MELNIKOV, Kirill (Johns Hopkins University); Mr RONTSCH, Raoul (University of Oxford); MELIA, Tom (University of Oxford)

**Presenter:** Mr RONTSCH, Raoul (University of Oxford)

**Session Classification:** QCD

**Track Classification:** QCD
New Theoretical Developments in Medium Modifications of Jets

Thursday, 21 July 2011 11:00 (30 minutes)

The LHC offers unprecedented opportunities to study the jets produced in heavy ion collisions. The release of the first LHC heavy ion data on jets has been accompanied by a surge of related theoretical activity. These recent efforts have focused on the identification and development of necessary ingredients to promote and complement the existing theoretical formulations, originally developed for the study of single parton energy loss in the presence of a medium, to the case of fully reconstructed jets. I will review recent efforts including those to account for the colour flow and the role of colour coherence effects in the parton cascade, and the relevance of transport of soft jet components away from the jet. Whenever appropriate I will discuss the phenomenological implications of these novel effects and discuss their relevance to the understanding of the available data.

Primary author: Dr MILHANO, Jose Guilherme (CENTRA-IST, Lisbon & CERN PH-TH)
Presenter: Dr MILHANO, Jose Guilherme (CENTRA-IST, Lisbon & CERN PH-TH)
Session Classification: Ultrarelativistic Heavy Ions
Measurements of Higher-Order Flow Harmonics at PHENIX

Thursday, 21 July 2011 15:15 (15 minutes)

Measurement of anisotropic particle production transverse to the beam direction, referred to as collective flow, has provided a powerful tool for characterizing ultrarelativistic heavy-ion collisions. We will present recent results on higher-order flow harmonics for different particle species at various Au+Au collision energies measured with the PHENIX experiment at the Relativistic Heavy Ion Collider. Through comparison of our flow measurements to hydrodynamic models, we derive constraints on the properties that characterize the strongly-coupled quark gluon plasma created during these collisions.

Primary author:  Dr PAK, Robert (Brookhaven National Laboratory)
Presenter:  Dr PAK, Robert (Brookhaven National Laboratory)
Session Classification:  Ultrarelativistic Heavy Ions
Semi-analytical computation of the non-linear matter power spectrum

Friday, 22 July 2011 15:35 (15 minutes)

I will discuss the new numerical implementation in CLASS of two semi analytical methods for computing the matter power spectrum, namely the one-loop and Time Renormalization Group method. I will present our result compared against accurate N-body simulation and the halofit method on the BAO region. I will also discuss about the new implementation of the one-loop method, showing a great improvement over the more commonly used one.

**Primary authors:** AUDREN, Benjamin (EPFL); LESGOURGUES, Julien (EPFL, CERN)

**Presenter:** AUDREN, Benjamin (EPFL)

**Session Classification:** Cosmology and Gravity
Despite more than 10 years of intense experimental and theoretical work, no plausible explanation to the acceleration of the universe is available yet. Dark energy and modified gravity are two likely candidates. I will review their current status and state the problems that they both face. In particular, it turns out that at low energy both approaches reduce to scalar field models essentially. In both cases, the scalar degree of freedom may induce deviations from Newton’s law in the solar system and the laboratory, a phenomenon which needs to be screened off. I will present the different screening mechanisms and how the study of large scale structures of the Universe may help to distinguish dark energy/modified gravity models. Eventually I will concentrate on possible laboratory tests of these models and even some consequences for collider physics.

**Primary author:** Dr BRAX, Philippe (CEA-Saclay)

**Presenter:** Dr BRAX, Philippe (CEA-Saclay)

**Session Classification:** Cosmology and Gravity
A search for the Higgs boson in $H \rightarrow WW \rightarrow 2l2\nu$ mode with the CMS detector

Friday, 22 July 2011 14:45 (15 minutes)

We present results from a search for the SM Higgs Boson in the channel $H \rightarrow WW \rightarrow 2l2\nu$ with the CMS detector using data accumulated in the 2010 & 2011 running of the LHC at $\sqrt{s} = 7$ TeV. A Higgs signal in the Vector Boson Fusion channel, by exploiting the distinctive signature of the events, where the Higgs decay is accompanied by two high rapidity jets, is also presented.

Primary authors:  Dr MARIOTTI, Chiara (INFN Torino); Mr KOVALSKYI, Dmytro (UCSB/CERN)

Presenter:  Mr KOVALSKYI, Dmytro (UCSB/CERN)

Session Classification:  Higgs and New Physics
Search for MSSM neutral and charged Higgs in ATLAS.

Friday, 22 July 2011 11:00 (15 minutes)

The search for the neutral Higgs boson(s) beyond the Standard Model is presented based on the ATLAS data collected in 2011. A wide region of the MSSM parameter space is tested via searches for Higgs decays into two tau-leptons. Additionally, the obtained results are interpreted in terms of the exclusion limits for the Standard Model-like Higgs boson production. The experimental observation of charged Higgs bosons would provide a clear signature of the physics beyond the Standard Model. The search for these particles is presented, based on the ATLAS data collected in 2011. Several final state topologies are explored, with Higgs bosons originating from the top-quark decays in top pair events and subsequently decaying into $\tau \nu$ or $c\bar{s}$.

Primary author: Dr MARIOTTI, Chiara (INFN Torino)
Presenter: FLECHL, Martin
Session Classification: Higgs and New Physics
A search of the Higgs Boson in H→ZZ (4l, 2l2ν, 2l2j) with the CMS detector

Friday, 22 July 2011 12:35 (20 minutes)

We present results from a search for the SM Higgs Boson in the channels H → ZZ → 4l, 2l 2nu and 2l2j with the CMS detector using data accumulated in the 2010 & 2011 running of the LHC at sqrt(s) = 7 TeV

Primary author: Dr MARIOTTI, Chiara (INFN Torino)
Presenter: SALERNO, Roberto
Session Classification: Higgs and New Physics
Search for $H^{++} \rightarrow l^+ l^+$ and $H^+ \rightarrow \tau^+ \nu$ in CMS

Friday, 22 July 2011 10:15 (15 minutes)

We present results from a search for an exotic Higgs Boson in the channel $H^{++} \rightarrow l^+ l^+$ with the CMS detector using data accumulated in the 2010 & 2011 running of the LHC at $\sqrt{s} = 7$ TeV. We also present results from a search for a charged Higgs Boson in $t\bar{t}$ bar decays in the channel $H^+ \rightarrow \tau^+ \nu$ with the CMS detector using data accumulated in the 2010 & 2011 running of the LHC at $\sqrt{s} = 7$ TeV.

Primary author: Dr MARIOTTI, Chiara (INFN Torino)
Presenter: NAYAK, Aruna Kumar (LIP, Lisbon, Portugal)
Session Classification: Higgs and New Physics
Neutrino mass models at the TeV scale and their tests at the LHC

*Saturday, 23 July 2011 10:10 (20 minutes)*

Assuming that the new particles introduced by type-I, type-II, type-III see-saw in order to mediate neutrino masses are below a TeV, we describe their resulting manifestations at LHC.

**Primary author:** Prof. STRUMIA, Alessandro (Pisa University and INFN)

**Presenter:** Prof. STRUMIA, Alessandro (Pisa University and INFN)

**Session Classification:** Neutrino Physics

**Track Classification:** Neutrino Physics
CMB Power Spectrum Results from the South Pole Telescope

Friday, 22 July 2011 14:30 (35 minutes)

The South Pole Telescope (SPT) is a 10-meter telescope designed to survey the millimeter-wave sky. The telescope and its 960-element bolometric camera were successfully installed at the South Pole in 2007. Since then, the SPT has imaged 2200 square degrees of the sky with low noise and arcminute resolution. I will report on the CMB power spectrum results from SPT. In conjunction with data from the WMAP satellite, the new SPT data leads to a 6 sigma detection of gravitational lensing in the CMB. The SPT+WMAP data also improve constraints on the shape of the primordial power spectrum with implications for inflationary models. Finally, the SPT+WMAP data yield measurements of the primordial helium abundance and the number of relativistic particle species in the early Universe.

Primary author:  Dr REICHARDT, Christian (Dept. of Physics, University of California, Berkeley)

Presenter:  Dr REICHARDT, Christian (Dept. of Physics, University of California, Berkeley)

Session Classification:  Cosmology and Gravity
The Lyman-alpha forest in three dimensions with BOSS

Friday, 22 July 2011 11:00 (35 minutes)

The SDSS-III Baryon Oscillation Spectroscopic Survey (BOSS), a five-year spectroscopic survey of 10,000 deg$^2$, achieved first light in late 2009. One of the key goals of BOSS is to measure the signature of baryon acoustic oscillations in the distribution of Ly-alpha absorption from the spectra of a sample of ~150,000 z>2.2 quasars. Along with measuring the angular diameter distance at z$\approx$2.5, BOSS will provide the first direct measurement of the expansion rate of the Universe at z > 2. During the first year of the BOSS survey, quasar target selection methods were developed and tested to meet the requirement of delivering at least 15 quasars deg$^{-2}$ in this redshift range, out of 40 targets deg$^{-2}$.

Using a sample of approximately 14,000 z>2.2 quasars observed in this first year of BOSS, we measure the three-dimensional correlation function of absorption in the Lyman-alpha forest. A quadrupole distortion of the redshift-space correlation function by peculiar velocities, the signature of the gravitational instability origin of structure in the Lyman-alpha forest, is detected at high significance. These results set the stage for cosmological parameter determinations from three-dimensional structure in the Lyman-alpha forest, including anticipated constraints on dark energy from baryon acoustic oscillations.

Primary author: Dr YECHE, Christophe (IRFU-SPP / CEA-Saclay)

Presenter: Dr YECHE, Christophe (IRFU-SPP / CEA-Saclay)

Session Classification: Cosmology and Gravity
Various channels were explored to look for physics beyond the standard model.
A search for first generation leptoquarks as a unique signal for new physics was augmented by searches for unnaturally large number of events in channels where the number of events predicted in the SM is small. Such a channel is the production of single top. Another such channel is the production of tau pairs.
Limits are presented and SM quantities are evaluated in the absence of an indication of new physics.

**Primary author:** Dr MARIOTTI, Chiara (INFN Torino)

**Presenter:** BELLAGAMBA, Lorenzo

**Session Classification:** Higgs and New Physics
Long Baseline Neutrino Oscillation Experiments

Saturday, 23 July 2011 12:10 (20 minutes)

The talk will summarise the current status and potential of future long baseline experiments.

Primary author: RUBBIA, Andre (ETH Zurich)
Presenter: RUBBIA, Andre (ETH Zurich)
Session Classification: Neutrino Physics
Track Classification: Neutrino Physics
Meaningful characterisation of perturbative theoretical uncertainties

Thursday, 21 July 2011 09:30 (15 minutes)

We consider the problem of assigning a meaningful confidence to uncertainty estimates of perturbative series. We analyse the assumptions which are implicit in the conventional estimates made using renormalisation scale variations. We then formulate a Bayesian model that, given equivalent initial hypotheses, allows one to characterise a perturbative theoretical uncertainty in a rigorous way in terms of the confidence of an interval for the remainder of the series. We compare its outcome to the conventional uncertainty estimates in the simple case of the calculation of QCD corrections to the $e^+e^- \rightarrow$ hadrons process. We find comparable results, but with important conceptual differences. This work represents a first step in the direction of a more comprehensive and rigorous handling of theoretical uncertainties in perturbative calculations used in high energy phenomenology.

Primary authors: Dr CACCIARI, Matteo (LPTHE Paris); HOUDEAU, Nicolas (LPTHE (CNRS - UPMC))

Presenter: HOUDEAU, Nicolas (LPTHE (CNRS - UPMC))

Session Classification: QCD

Track Classification: QCD
This presentation will summarize status and plans of the NA61/SHINE ion program. The NA61/SHINE at the CERN SPS facility is the successor of the former NA49 experiment. The study of central Pb+Pb collisions by NA49 indicate that the threshold for deconfinement is reached already at the low SPS energies. Theoretical considerations predict that SPS accelerator will cover one of the most interesting regions of the phase diagram (T - $m_B$) of strongly interacting matter in which a 1-st order phase boundary between hadronic and partonic phases and the critical point are located.

The main physics goals of the NA61/SHINE ion program are to study the properties of the onset of deconfinement and to find signatures of the critical point by performing an energy (beam momentum 13A-158A GeV/c) and system size (p+p, p+Pb, Be+Be, Ar+Ca, Xe+La) scan. The successful increase in the event rate will give us a unique possibility to obtain the inclusive and correlated yields of high $p_T$ hadrons at 158 GeV/c. The first data for this 2-dimensional scan were taken in 2009 and 2010 for p+p interactions at 13, 20, 31, 40, 80, 158 GeV/c beam momentum.

This contribution will summarize physics arguments for the NA61/SHINE ion program, show the detector performance, the current status of the experiment and plans for the next years. The broad physics program of NA61/SHINE experiment includes also a precision measurements of hadron spectra for the T2K neutrino experiment and for the Pierre Auger Observatory and KASCADE cosmic-ray projects. This subjects will be discussed in separate contribution.

**Primary author:** Dr PLANETA, Roman (Institute of Physics Jagiellonian University)

**Presenter:** Dr PLANETA, Roman (Institute of Physics Jagiellonian University)

**Session Classification:** Ultrarelativistic Heavy Ions
Neutrinos and the Flavour Puzzle: A Mini-Review

Friday, 22 July 2011 17:40 (20 minutes)

What is the origin of the observed fermion masses and mixing parameters? Neutrinos, with their small mass and large mixing, contribute an important part of this flavour puzzle. Could they possibly also provide the key towards its solution? We review the present status and discuss some recent developments regarding the flavour puzzle, from the neutrino physics perspective.

Primary author: Prof. ANTUSCH, Stefan (Basel University)
Presenter: Prof. ANTUSCH, Stefan (Basel University)
Session Classification: Neutrino Physics
Track Classification: Neutrino Physics
LHCb is one of the four LHC experiments that started collecting pp collisions in 2010 at a centre-of-mass energy of 7 TeV. With its forward geometry, LHCb is dedicated to the study of heavy-flavor production and decay. The copious production of quarkonia at large rapidity is a powerful tool to study quarkonium production as well as the performance of the detector providing fundamental building blocks for more sophisticated analyses such as searches for new physics in rare decays. We present results on J/Ψ, Χ_c and Υpsilon production. All the results will be interpreted in the framework of several theory models, and their impact on quarkonium production will be discussed.

Primary author: Dr LANFRANCHI, Gaia (Laboratori Nazionali di Frascati - INFN)
Presenter: Mr ZHANG, Yanxi (TUHEP)
Session Classification: QCD
Track Classification: QCD
Measurements of $W/Z + \text{jets}$ production in $\boldmath{pp}$ collisions at $\sqrt{s} = 1.96 \text{ TeV}$

Friday, 22 July 2011 18:15 (15 minutes)

We present measurements of inclusive $W/Z + n$ jet cross sections ($n=1-4$), presented as total inclusive cross sections and differentially in the $n^{th}$ jet transverse momentum and rapidity, as well as the heavy flavor content in these jets up to $n=2$. The measurements are made using 4.2 to 6 fb$^{-1}$ of data collected by the D0 detector at the Fermilab Tevatron Collider. The measurements are compared to next-to-leading order (NLO) perturbative QCD calculations.

**Primary author:** Dr VERZOCCHI, Marco (Fermilab - PPD Division)

**Presenter:** Mr PENNING, Bjoern (University of Freiburg)

**Session Classification:** QCD

**Track Classification:** QCD
Inclusive Z-boson plus jets cross sections are measured in a final state where the Z-boson has decayed in two muons or electrons. Results are based on \( \sim 6 \text{ fb}^{-1} \) of data in pp collisions at \( \sqrt{s} = 1.96 \text{ TeV} \) collected with the CDF detector in Run II. Differential cross sections are presented as a function of several variables, among which jet transverse momentum, jets multiplicity and di-jet invariant mass. The measurements are compared to next-to-leading order perturbative QCD predictions. Additionally, we present preliminary results on bottom quark jet production in association with a Z boson. The measurements are carried out in events for which the Z boson decays into muons or electrons, and the results are compared to theoretical predictions. The analysis is performed in the context of studies on irreducible backgrounds in searches for new physics.

**Primary author:** Dr MESROPIAN, Christina (The Rockefeller University)

**Presenter:** ORTOLAN, Lorenzo

**Session Classification:** QCD

**Track Classification:** QCD
**Study of rare $\Upsilon(2S)$ transitions to charmonia and lower bottomonia with the Belle detector**

*Friday, 22 July 2011 11:30 (15 minutes)*

We report a search for the rare hadron transitions $\Upsilon(2S) \rightarrow \eta, \pi^0 \Upsilon(1S)$ from 158 million $\Upsilon(2S)$ decays collected with the Belle detector at KEK. The $\eta$'s are detected via their $\pi^0\pi^+\pi^-$ and $\gamma\gamma$ decay modes. The $\Upsilon(1S)$'s are detected via their exclusive decays to dileptons. A major challenge is represented by the discrimination of these rare transitions from peaking backgrounds due to the dominant decay modes: $\Upsilon(2S) \rightarrow \pi\pi \Upsilon(1S)$ and $\Upsilon(2S) \rightarrow \gamma\chi_{cJ} \rightarrow \Upsilon(1S)$. New branching ratio measurements on the two photon cascades via $\chi_{cJ}$ states will be discussed. The $\chi_{cJ}$ is detected in $\gamma J/\psi$ final states, and $\eta_c$ in hadronic final states. The X(3872) is searched for in $J/\psi\pi^+\pi^-$ and $J/\psi\pi^+\pi^-\pi^0$ final states. The X(3915) in $J/\psi\pi^+\pi^-$. We also searched for the Y (4140) and X(4350) in $J/\psi\phi$ mode. No significant signals of radiative transitions from $\Upsilon(2S)$ to charmonia and XYZ states have been found. Upper limits on all related branching ratios will be given.

**Primary author:** Dr TRABELSI, Karem (KEK)

**Presenter:** TAMPONI, Umberto

**Session Classification:** QCD

**Track Classification:** QCD
The WiggleZ Dark Energy Survey on the Anglo-Australian Telescope has measured redshifts for 220,000 emission line galaxies. The galaxies sample a volume of 1 cubic Gpc and a redshift range of 0.2<z<1. This is the first survey to measure the cosmology of the universe over such a wide range of epochs. Our analysis provides strong evidence that dark energy is real.

In our first major results we made two successful tests of the standard ("LCDM") cosmological model dominated by a cosmological constant (L) and cold dark matter (CDM). First, we measured the effect of dark energy on the gravitational growth rate of cosmic structure. The measured growth rate is entirely consistent with the LCDM model over the whole redshift range measured. Second, we detected the imprint of baryon acoustic oscillations in the clustering of the WiggleZ galaxies, allowing us to measure the cosmological distance-redshift relation at z=0.6. The results confirm the LCDM model, as well as providing evidence for accelerating expansion of the universe that is independent of earlier supernova measurements.

In a very different analysis of the WiggleZ data we used a novel method to make a direct, geometric measurement of the expansion rate of the Universe as a function of time. The increase in the expansion rate over the last 7 billion years shows that the universe is accelerating, independent of any cosmological model.

Primary author: Prof. DRINKWATER, Michael (University of Queensland)

Presenter: Prof. DRINKWATER, Michael (University of Queensland)

Session Classification: Cosmology and Gravity
Unintegrated parton densities at small $x$

*Saturday, 23 July 2011 12:00 (15 minutes)*

We present a definition of an unintegrated seaquark density for the LO CCFM Monte-Carlo CASCADE and discuss determination of a NLO BFKL unintegrated gluon density from a fit to combined HERA data. The $k_T$-dependent sea-quark density is defined using high energy factorization, while the quark-gluon splitting is treated with exact kinematics. The latter is found to agree with the $k_T$-dependent splitting function obtained by Catani and Hautmann. The result is implemented into CASCADE and a comparison of exact versus factorized matrix element is carried out for forward $Z$ production. The unintegrated gluon density is obtained as a convolution of NLO BFKL Green’s function and non-perturbative proton impact factor. We discuss several aspects of the construction of the collinear improved Green’s function, which is taken with the full NLO running coupling corrections. For the proton impact we construct a model, where free parameters are determined by the fit.

**Primary author:** Dr HENTSCHINSKI, Martin (IFT-UAM Madrid)

**Co-authors:** Dr SABIO VERA, Agustin (IFT-UAM Madrid); Ms SALAS HERNANDEZ, Clara (IFT-UAM Madrid)

**Presenter:** Dr HENTSCHINSKI, Martin (IFT-UAM Madrid)

**Session Classification:** QCD

**Track Classification:** QCD
QCD and low-x physics at a Large Hadron electron Collider

Saturday, 23 July 2011 12:45 (15 minutes)

The Large Hadron electron Collider (LHeC) is a proposed facility which will exploit the new world of energy and intensity offered by the LHC for electron-proton scattering, through the addition of a new electron accelerator. This contribution, which is derived from the draft CERN-ECFA-NuPECC Conceptual Design report (due for release in 2011), addresses the expected impact of the LHeC precision and extended kinematic range for low Bjorken-x and diffractive physics, and detailed simulation studies and prospects for high precision QCD and electroweak fits.

Numerous observables which are sensitive to the expected low-x saturation of the parton densities are explored. These include the inclusive electron-proton scattering cross section and the related structure functions $F_2$ and $F_L$, as well as exclusive processes such as deeply-virtual Compton scattering and quasi-elastic heavy vector meson production and diffractive virtual photon dissociation.

With a hundred times the luminosity that was achieved at HERA, salient expectations for the LHeC include the complete determination of all light and heavy quark parton distributions for the first time, the high precision extraction of the gluon density, the determination of the strong coupling constant to per-mil accuracy and the precision study of the running of the electroweak mixing angle.

Primary author: Prof. NEWMAN, Paul (University of Birmingham)

Presenter: LAYCOCK, Paul

Session Classification: QCD

Track Classification: QCD
Search for narrow resonances in the lepton, photon, and jet final states at CMS

Thursday, 21 July 2011 12:20 (15 minutes)

We discuss the results of searches for narrow resonances decaying into pairs of leptons, photons, or jets, using pp collisions at 7 TeV delivered by LHC and collected with the CMS detector in 2010 and 2011. These include searches for Z' bosons, RS gravitons, dijet resonances, and excited leptons.

**Primary author:** Dr MARIOTTI, Chiara (INFN Torino)

**Presenter:** TUCKER, Jordan

**Session Classification:** Higgs and New Physics
Search for Non-Resonant New Phenomena in the Lepton and Photon Final States

Thursday, 21 July 2011 11:40 (20 minutes)

We present the results of a search for non-resonant signal for new physics in leptonic and photonic final states in pp collisions at 7 TeV collected with CMS in 2010 and 2011. These include searches for $W'(lv)$, first and second generation leptoquarks, large extra dimensions in dilepton and diphoton channel, quark-lepton compositeness, anomalies in the transverse momentum of the leptonically decaying Z-bosons, and RPV SUSY in multilepton final states.

**Primary author:** Dr MARIOTTI, Chiara (INFN Torino)

**Presenter:** LEONIDOPoulos, Christos (FNAL)

**Session Classification:** Higgs and New Physics
Search for long-lived massive particles at CMS

*Thursday, 21 July 2011 12:35 (15 minutes)*

Several models of new physics, including split supersymmetry, predict the existence of a heavy particle, which is long-lived on timescales of the bunch spacing of the LHC. We present the results of several searches for these particles, using various experimental techniques, from out-of-time decays in the CMS calorimeter to use of highly displaced vertices, timing, and $dE/dx$ techniques. We present results of these searches based on data recorded with CMS in 2010 and 2011.

**Primary author:** Dr MARIOTTI, Chiara (INFN Torino)

**Presenter:** CHEN, Jie

**Session Classification:** Higgs and New Physics
Search for New Physics in the All-Hadronic Final States at CMS

Thursday, 21 July 2011 11:00 (20 minutes)

We present results of a number of searches for new physics in all-hadronic final state using pp data at the center-of-mass energy of 7 TeV collected with the CMS detector at the LHC in 2010 and 2011. The sought signals include monojet production in models with large extra dimensions, high-mass resonances decaying in t\bar{t} pairs in all-hadronic decay channel, microscopic black holes, quark compositeness, and resonances decaying into multijet final states.

Primary author: Dr MARIOTTI, Chiara (INFN Torino)
Presenter: YI, Kai
Session Classification: Higgs and New Physics
Searches for Supersymmetry in Final States with Leptons or photons and missing energy.

Saturday, 23 July 2011 12:15 (20 minutes)

We present the results of searches for Supersymmetry in various topologies that lead to final states with jets and missing transverse momentum together with one or more isolated leptons, one or two photons or a photon and a lepton. The searches are performed using data collected by the CMS experiment at the LHC in pp-collisions at a center-of-mass energy of 7 TeV. Various data-driven techniques used to measure the Standard Model backgrounds are discussed. The results are interpreted in a range of Supersymmetric scenarios.

Primary authors:  Dr MARIOTTI, Chiara (INFN Torino); PADHI, Sanjay (University of California, San Diego)

Presenter:  PADHI, Sanjay (University of California, San Diego)

Session Classification:  Higgs and New Physics
Status of neutrino oscillations and sterile neutrinos

Friday, 22 July 2011 17:20 (20 minutes)

We present an up-to-date global analysis of solar, atmospheric, reactor and accelerator neutrino data in the framework of three-neutrino oscillations, discussing in detail the statistical significance of the observed “hint” of non-zero $\theta_{13}$ and determining the presently allowed ranges of masses and mixing. We then turn to models with one or two sterile neutrinos and present a re-analysis of global short-baseline neutrino oscillation data, taking into account the new predictions for the anti-neutrino flux emitted by nuclear reactors.

Primary author:  Prof. MALTONI, Michele (Instituto de Fisica Teorica UAM/CSIC)
Presenter: Prof. MALTONI, Michele (Instituto de Fisica Teorica UAM/CSIC)
Session Classification: Neutrino Physics
Track Classification: Neutrino Physics
W and Z production measured using the ATLAS detector, and impact on partons densities of the proton

*Friday, 22 July 2011 18:00 (15 minutes)*

Cross sections, both inclusive and differential, and ratios of cross sections for W and Z boson production in proton-proton collisions are presented. The measurements are compared to the predictions of precise QCD calculations using and range of PDF fits. The impact of these measurements on event generators, future fits and their uncertainties is studied.

**Primary author:** Dr BARONCELLI, Antonio (INFN/Roma TRE)

**Presenter:** BELLOMO, Massimiliano

**Session Classification:** QCD

**Track Classification:** QCD
Measurement of the production cross section for W- and Z-bosons in association with jets in pp collisions at sqrt(s) = 7 TeV with the ATLAS detector

Measurements of W+jets and Z+jets cross sections (including the case where at least one jet contains a b-hadron) in proton-proton collisions with the ATLAS detector are reported. Cross sections, in both the electron and muon decay modes of the bosons, are presented as a function of jet multiplicity and of the transverse momentum of the leading and next-to-leading jets in the event. Measurements are also presented of the ratios of cross sections. The measured cross sections are compared to particle-level predictions based on higher-order perturbative QCD.

Primary author: Dr BARONCELLI, Antonio (INFN/Roma TRE)

Presenter: Dr BARONCELLI, Antonio (INFN/Roma TRE)

Track Classification: QCD
Measurements of isolated prompt photons in pp collisions with the ATLAS detector

Satuday, 23 July 2011 09:15 (15 minutes)

Measurements of the cross section for the inclusive production of isolated prompt photons, photons produced in association with jets and diphotons in pp collisions at a centre-of-mass energy $\sqrt{s} = 7$TeV are presented. Photon candidates are identified by combining information from the calorimeters and from the inner tracker. Residual background in the selected sample is estimated from data based on the observed distribution of the transverse isolation energy in a narrow cone around the photon candidate. The results are compared to predictions from next-to-leading order perturbative QCD calculations.

Primary author: Dr BARONCELLI, Antonio (INFN/Roma TRE)
Presenter: POLCI, Francesco
Session Classification: QCD
Track Classification: QCD
Jet resolution and energy scale uncertainty in ATLAS

Thursday, 21 July 2011 12:45 (15 minutes)

About one year after the first proton proton collisions at a centre of mass energy of \(\sqrt{s}=7\) TeV the ATLAS experiment has achieved an accuracy of the jet energy measurement between 2-4% for jet transverse momenta from 20 GeV to 2 TeV in the pseudo-rapidity region up to \(\eta=4.5\). The jet energy scale uncertainty is derived from in-situ single hadron response measurement along with systematic variations in the Monte Carlo simulation. In addition, the transverse momentum balance between a central and a forward jet in events with only two jets at high transverse momentum is exploited. The obtained uncertainty is confirmed by direct in-situ measurements exploiting the transverse momentum balance between a jet and a well measured reference like the photon transverse in photon-jet events or the total transverse track momentum. Jets in the TeV-energy regime can be also tested using a system of well calibrated jets at low transverse momenta against a high-pt jet.

The jet energy resolution can be determined in-situ from the measurement of the transverse momentum balance of a system of two jets (transverse momentum asymmetry). The measurement is based on the direct transverse momentum balance and a decomposition of the transverse jet momentum along the bi-sector of the two jets. Good agreement between data and Monte Carlo simulations is found. Sophisticated jet calibration schemes based on cell energy weighting or exploiting the internal jet structure are also presented. Such calibration schemes improve the jet resolution by 20-30% and in addition reduce the flavour dependence of the jet response.

Primary author: Dr BARONCELLI, Antonio (INFN/Roma TRE)
Presenter: DOGLIONI, Caterina
Session Classification: QCD
Track Classification: QCD
Heavy Flavor Production in ATLAS

Thursday, 21 July 2011 17:00 (15 minutes)

We present a measurement of the inclusive and dijet differential cross sections of heavy flavoured hadrons and b-jets produced in proton–proton collisions at s=7\,\text{TeV}, using data collected with the ATLAS detector. Jets are reconstructed using the anti-kt algorithm with jet radius parameter R=0.4\,. The presence of a displaced vertex from the decay of long-lived hadrons, or the presence of a muon with significant transverse momentum relative to the jet axis, is used to select a jet sample enriched in b-jets and the invariant mass of the charged particle tracks forming the vertex is fitted to extract the fraction of jets from b-quark production. The inclusive cross section is measured as a function of jet transverse momentum, in the range 20<\pt<260\,\text{GeV}, and of rapidity, in the range 0<|y|<2.1, where jets are fully contained in the tracking detectors of ATLAS. The dijet cross section is measured in the same rapidity range as a function of the dijet invariant mass, extending up to 670\,\text{GeV}. The resulting cross sections are compared with next-to-leading-order QCD predictions.

**Primary author:** Dr BARONCELLI, Antonio (INFN/Roma TRE)

**Presenter:** SALZBURGER, Andreas

**Session Classification:** QCD

**Track Classification:** QCD
Measurement of single and multi-jet cross sections in proton-proton collisions at 7 TeV centre-of-mass energy with ATLAS

Thursday, 21 July 2011 10:15 (15 minutes)

Single and multiple jet cross sections have been measured in proton-proton collisions at a centre-of-mass energy of 7 TeV using the ATLAS detector. The anti-kt algorithm is used to identify jets. Inclusive single-jet differential cross sections are presented as functions of jet transverse momentum and rapidity. Dijet cross sections are presented as functions of dijet mass and angle. The measurements extend the previously measured kinematic region to higher rapidities, and to both higher and lower values of transverse momentum. The results are compared to next-to-leading-order QCD calculations matched to leading-logarithmic parton showers.

Additionally, measurements are presented of multijet cross sections, and of the azimuthal correlation between dijets, which are sensitive to higher or QCD effects. Measurements of dijets separated by large intervals of rapidity are also presented, where a veto is applied based on the presence of further jets with the rapidity interval. The measurements are compared to NLO QCD and higher multiplicity LO QCD calculations matched to parton showers using leading-logarithmic approximations in the scale, Q2. The large rapidity-interval distributions are also compared to calculations using approximations based on resumming the leading-logarithmic terms in rapidity.

Primary author: Dr BARONCELLI, Antonio (INFN/Roma TRE)
Presenter: Mr FRANCAVILLA, Paolo (Università di Pisa)
Session Classification: QCD
Track Classification: QCD
Status of The MicroBooNE Experiment

The high resolution 3D tracking offered by liquid argon time projection chambers make them an excellent candidate for future neutrino detectors in the next generation of long baseline experiments. In order to utilize this emerging detector design for such experiments, the scalability and physics capabilities of the technology must be proven.

The MicroBooNE experiment is a 170 ton liquid argon time projection chamber detector which will run in the booster neutrino beam at Fermilab, starting in 2013. The experiment incorporates two sensitive subsystems: a time projection chamber with a 2.5m drift, which provides high resolution 3D tracking by measuring ionization charge deposits from charged particles traversing the argon bulk; and an optical system comprised of cryogenic photomultiplier tubes, which will measure scintillation light and provide a trigger and few-nanosecond level timing information. As well as providing a training ground for US based liquid argon technology, MicroBooNE will investigate the MiniBooNE / LSND anomaly and perform several neutrino cross section and nuclear physics measurements to world leading precision.

I will discuss the current status of experiment, elaborate upon its physics goals and indicate some potential future impacts of the knowledge obtained during the R&D phase of the project upon future LArTPC technology.

**Primary author:** Mr JONES, Benjamin (Massachusetts Institute of Technology)

**Presenter:** Mr JONES, Benjamin (Massachusetts Institute of Technology)

**Track Classification:** Neutrino Physics
Exotics Searches in Photon and Lepton Final States with the ATLAS Detector

Thursday, 21 July 2011 12:00 (20 minutes)

Studies of leptons and photons at the Large Hadron Collider are some of the most direct and sensitive ways to search for new phenomena. We present the results based on data collected with the ATLAS detector at the LHC and discuss current sensitivities and future discovery prospects.

**Primary author:** Dr MARIOTTI, Chiara (INFN Torino)

**Presenter:** HRYN’OVA, Tetiana (LAPP)

**Session Classification:** Higgs and New Physics
Exotics Searches in Top, Top-like and Diboson Final States with the ATLAS Detector

*Thursday, 21 July 2011 10:15 (15 minutes)*

We summarize the analysis of events with top, top-like and diboson final states in pp collision data recorded with the ATLAS detector. The data are compared to the Standard Model predictions with the goal of searching for new phenomena, e.g. searches for anomalous top-quark production and decay in several channels, including a search for top-quark pair production with anomalous missing transverse energy, top-quark pair resonances, fourth generation quarks decaying to top quarks, gravitons and heavy gauge bosons decaying into dibosons.

**Primary author:** Dr MARIOTTI, Chiara (INFN Torino)

**Presenter:** KUHL, Thorsten

**Session Classification:** Higgs and New Physics
Searches for new physics at HERA (H1)

Thursday, 21 July 2011 15:00 (15 minutes)

New results on searches at HERA with the H1 Experiment are presented.

**Primary author:** Dr MARIOTTI, Chiara (INFN Torino)

**Presenter:** Mr PIRUMOV, Hayk (PI Heidelberg)

**Session Classification:** Higgs and New Physics
Supernova Legacy Survey 3-years data sample

Friday, 22 July 2011 09:45 (35 minutes)

We present the recent results from the analysis of the Supernova Legacy Survey 3-years data sample.

For the dark energy equation of state, assuming a flat universe, we measure a $w$ parameter consistent with a cosmological constant with a precision of 0.2. We have paid particular attention to the systematic uncertainties.

We combine the SNe data with baryon acoustic oscillation measurements from the Sloan Digital Sky Survey (SDSS) and measurements of the cosmic microwave background power spectrum from the WMAP-7 year data, to obtain, under the flat universe hypothesis, a measurement of the dark energy equation of state $w = -1.068$ with a precision of 0.08.

**Primary author:** Dr HARDIN, Delphine (LPNHE)

**Presenter:** Dr HARDIN, Delphine (LPNHE)

**Session Classification:** Cosmology and Gravity
COMPASS results on gluon polarisation

Friday, 22 July 2011 09:00 (15 minutes)

One of the missing keys in the present understanding of the spin structure of the nucleon is the contribution from the gluons: the so-called gluon polarisation. This quantity can be determined in DIS through the Photon-Gluon Fusion (PGF) process, in which two analysis methods may be used: (i) identifying open charm events or (ii) selecting events with high-\(p_T\) hadrons. The data used in the present work were collected by the COMPASS Experiment, where a naturally polarised muon beam of 160 GeV, impinging on a polarised nucleon fixed target, is used. Preliminary results for the gluon polarisation from high-\(p_T\) and open charm analyses are presented. The gluon polarisation result for high-\(p_T\) hadrons is divided, for the first time, into 3 independent \(x_g\) bins at LO. The result from open charm analysis is obtained at LO and NLO. In both analyses a new weighted method based on a neural network approach is used.

Primary author: Dr SILVA, Luis (LIP Lisbon)

Presenter: Dr SILVA, Luis (LIP Lisbon)

Session Classification: QCD

Track Classification: QCD
Measurements performed by the CMS experiment of the cross section for inclusive b-quark production in proton-proton collisions at $\sqrt{s} = 7$ TeV are presented. The measurements are based on different methods, such as inclusive jet measurements with secondary vertex tagging or selecting a sample of events containing jets and at least one muon, where the transverse momentum of the muon with respect to the closest jet axis or its impact parameter discriminate b events from the background. Measurements of the total and differential cross sections versus transverse momentum and rapidity for $B^+$, $B^0$, $B_s$ mesons are also presented. Finally, a measurement of the angular correlations between beauty and anti-beauty hadrons is presented, probing for the first time the small angular separation region. The B hadrons are identified by the presence of secondary vertices from their decays and their kinematics reconstructed combining the decay vertex with the primary interaction vertex. The results are compared with predictions based on perturbative QCD calculations at leading and next-to-leading order.

**Primary author:** Dr KRAMER, Manfred (HEPHY, Vienna)

**Presenter:** DINARDO, Mauro

**Session Classification:** QCD

**Track Classification:** QCD
The compact linear collider study (CLIC) is aiming at delivering a conceptual design for a multi-TeV linear electron-positron collider in 2011. This concept is based on high gradient normal-conducting accelerating structures. The RF power for the acceleration of the colliding beams is produced by a novel two beams acceleration scheme, where power is extracted from a high current drive beam that runs in parallel with the main linac.

In order to establish the feasibility of this concept a number of key issues have been addressed. A short summary of the progress and status of the corresponding studies will be given, as well as an outline of the studies and work towards an implementation plan by 2016.
LHC Upgrade Options

Saturday, 23 July 2011 09:30 (30 minutes)

In the last year CERN has organized a project, called High Luminosity LHC, regrouping all studies and hardware development needed to improve the luminosity performance of LHC by a factor five above its design (nominal) value, namely reaching $5 \times 10^{34}$ cm$^{-2}$ s$^{-1}$ with luminosity leveling. This performance, which should be reached after 2021, will enable to obtain some 250 fb$^{-1}$ per year of operation, to meet the goal set by ATLAS and CMS collaborations of reaching 3000 fb$^{-1}$ per experiment. In the talk we will discuss the baseline plan for the lumi upgrade, the most likely variants and the organization of the international collaboration around the LHC upgrade. Finally, the first results and future plans of the study for upgrading the collision energy, in the 27-33 TeV range, will be presented, too.

**Primary author:** ROSSI, Lucio (CERN)

**Presenter:** ROSSI, Lucio (CERN)

**Session Classification:** Accelerators

**Track Classification:** Accelerators
Search for the Standard Model Higgs boson in final states with b quarks at the Tevatron

*Thursday, 21 July 2011 17:50 (20 minutes)*

We present the result of searches for a low mass Standard Model Higgs boson produced in association with a $W$ or a $Z$ boson at a center-of-mass energy of $\sqrt{s} = 1.96$-TeV with the CDF and D0 detectors at the Fermilab Tevatron collider. The search is performed in events containing one or two $b$-tagged jets in association with either two leptons, or one lepton and an imbalance in transverse energy, or simply a large imbalance in transverse energy. Datasets corresponding to up to 8.5-fb$^{-1}$ of integrated luminosity are considered in the analyses. These are the most powerful channels in the search for a low mass Higgs boson at the Tevatron. Recent sensitivity improvements will be discussed.

**Primary author:** Dr MARIOTTI, Chiara (INFN Torino)

**Presenter:** POTAMIANOS, Karolos

**Session Classification:** Higgs and New Physics
Search for the Standard Model Higgs boson in final states with photons or taus at the Tevatron

Thursday, 21 July 2011 18:10 (15 minutes)

Although the sensitivity to a low mass Standard Model Higgs boson at the Fermilab Tevatron is highest for channels involving the $H \rightarrow b\bar{b}$ decay, other channels contribute significantly to the combined Higgs search. We report the results of searches for the Higgs boson in the diphoton final state using up to 8.5 fb$^{-1}$ of integrated luminosity collected by the CDF and D0 detectors at $\sqrt{s} = 1.96$ TeV. Both gluon fusion and associated production processes are exploited. Whilst the branching ratio to the diphoton final state is small in the Standard Model, this channel contributes appreciably to the overall Higgs sensitivity at the Tevatron. Combined limits from the Tevatron experiment for this channel are presented and the result of these searches are also interpreted in fermiophobic models where the diphoton branching ratio is considerably larger. In addition we present the results of searches in final states with two taus and two jets. These final states are sensitive to a combination of associated production, gluon-gluon fusion and vector boson fusion production processes and further enhance the sensitivity to the Standard Model Higgs boson.

Primary author:  Dr MARIOTTI, Chiara (INFN Torino)
Presenter:  KASMI, Azeddine
Session Classification:  Higgs and New Physics
Measurement of diboson production in lepton plus jets decays at the Tevatron

Thursday, 21 July 2011 16:45 (15 minutes)

We present the result of measurements of the cross sections for the simultaneous production of two vector bosons ($WW$, $WZ$, $ZZ$) in lepton plus jets decays at a center-of-mass energy of $\sqrt{s} = 1.96$ TeV using data collected with the CDF and D0 detectors at the Fermilab Tevatron. We then present the results of searches for the $WZ$ or $ZZ$ production where one of the bosons decays leptonically ($W \rightarrow \ell \nu$, $Z \rightarrow \ell^+ \ell^-$ or $Z \rightarrow \nu \bar{\nu}$) and the other $Z$ boson decays to $b\bar{b}$. These final states are direct analogs of the final states used in the Standard Model Higgs searches in final states with leptons and $b$ quark pairs and thus provide a crucial validation benchmark of the Higgs boson signal isolation techniques involved.

Primary author: Dr MARIOTTI, Chiara (INFN Torino)
Presenter: Mr GUILLEMIN, Thibault (LAPP)
Session Classification: Higgs and New Physics
Search for the Higgs boson in the W+W- decay at Tevatron

Thursday, 21 July 2011 17:00 (20 minutes)

We present the result of searches for the Standard Model Higgs boson produced via the $H \rightarrow WW^{(*)} \rightarrow \ell^+ \ell^-$ ($\ell, \ell' = e, \mu, \tau$) process at a center-of-mass energy of $\sqrt{s} = 1.96$ TeV with the CDF and D0 detectors at the Fermilab Tevatron collider. A Higgs particle with a mass greater than 140 GeV decays primarily into a pair of $W$-bosons and the leptonic decay channels of the $W$ provide a clear signature. This decay channel provides the highest sensitivity to the Higgs boson at the Tevatron and sensitivity to the Standard Model Higgs boson is expected with the dataset considered in these analyses, corresponding to integrated luminosities of up to 8.9 fb$^{-1}$. Recent improvements to the sensitivity will be discussed.

**Primary author:** Dr MARIOTTI, Chiara (INFN Torino)

**Presenter:** TUCHMING, Boris (Saclay)

**Session Classification:** Higgs and New Physics
Other searches for a high mass Higgs boson at Tevatron.

Thursday, 21 July 2011 17:20 (15 minutes)

We present the result of searches for the Standard Model Higgs boson at the Tevatron in channels which provide additional sensitivity in the high mass region. These include specialized searches for the $H \rightarrow WW^{(*)} \rightarrow \ell^+ \ell^-$ associated production with a $W$ or a $Z$ boson, resulting in three-leptons final states, searches for the $H \rightarrow WW^{(*)}$ decay in final states with 2 jets, a lepton and missing transverse energy, and searches for the $H \rightarrow ZZ^{(*)}$ decay in final states with four leptons or two leptons and two jets. These searches complement the main search channel $H \rightarrow WW^{(*)} \rightarrow \ell^+ \ell^-$. 

Primary author:  Dr MARIOTTI, Chiara (INFN Torino)

Presenter:  Dr LIMOSANI, Antonio (University of Melbourne)

Session Classification:  Higgs and New Physics
Searches for Supersymmetric Higgs bosons at Tevatron

Friday, 22 July 2011 10:00 (15 minutes)

We present searches for Higgs bosons in final states with $b$-quarks and/or taus at a center-of-mass energy of $\sqrt{s} = 1.96$-TeV using up to $8.5$-fb$^{-1}$ of data collected with the D0 detector. In Supersymmetric models the Higgs boson production cross section can be significantly enhanced compared to the Standard Model, and in such models the Higgs boson has a significant branching fractions to $\tau$ leptons at all masses and the gluon fusion production process can be exploited directly. In addition, the cross-section for production of neutral Higgs bosons in association with bottom quarks is greatly enhanced compared to the Standard Model. Therefore we also search for an excess of events above the multijet background in events with 3 and 4 $b$-jets exploiting the dominant decay channel of the Higgs boson to $b$ quarks, and also exploit the hybrid channel with $b$-quarks and tau leptons. We combine the result of these 3 searche channels in the context of different scenarios within the Minimal Supersymmetric Standard Model.

Primary author: Dr MARIOTTI, Chiara (INFN Torino)
Presenter: Dr COUDERC, Fabrice (CEA/DAPNIA/SPP)
Session Classification: Higgs and New Physics
Combined upper limit on Standard Model Higgs boson production in collisions at \( \sqrt{s} = 1.96 \) TeV at CDF

Friday, 22 July 2011 09:30 (15 minutes)

We present the combination of the searches for the Standard Model Higgs boson at a center-of-mass energy of \( \sqrt{s} = 1.96 \) TeV, using up to 8.9 fb\(^{-1}\) of data collected with the CDF detector at the Fermilab Tevatron collider. The major contributing processes include associated production \((WH \to \ell\nu bb, ZH \to \nu\nu bb, ZH \to \ell\ell bb, \) and \(WH \to WWW^{(*)})\) and gluon fusion \((gg \to H \to WW^{(*)})\).

The significant improvements across the full mass range resulting from the larger data sets, improved analyses and inclusion of additional channels are discussed. The combination of all channels results in significantly improved sensitivity across the 100-200 GeV mass range, and in particular around 160 GeV.

Primary author: Dr MARIOTTI, Chiara (INFN Torino)

Presenter: BUZATU, Adrian

Session Classification: Higgs and New Physics
An outline of the present and future long-baseline neutrino facilities with emphasis on the possibilities at CERN is presented. Accelerator-made neutrinos for long baseline oscillation experiments open the exploration to a broad and rather interesting field of physics experiments, with the measurement of the neutrino mixing angle ($\theta_{13}$), the determination of the sign of neutrino mass hierarchy ($\Delta m^{2}_{32}$) and the search for CP violation in neutrino sector as an ultimate goal. CERN presently operates the CNGS neutrino beam servicing the OPERA and ICARUS experiments at Grand Sasso aiming at the discovery of $\nu_{\mu}$ to $\nu_{\tau}$ oscillation appearance. Options for future facilities include high-intensity muon neutrino beams from pion decay (Super-Beams), electron neutrino beams from nuclei decays (Beta Beam'), or muon and electron neutrino beams from muon decay (Neutrino Factory'), each associated with one or several options for detector systems. Synergistic possibilities between the proposed facilities and the technical challenges for the accelerators will be discussed.

**Primary author:** EFTHYMIOPOULOS, Ilias (CERN)

**Presenter:** EFTHYMIOPOULOS, Ilias (CERN)

**Session Classification:** Accelerators

**Track Classification:** Accelerators
We report the result of searches for final states with 2 vector bosons, either two photons or one photon plus one $Z$, in association with large missing transverse energy produced in $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ TeV. The data were collected with the D0 detector at the Fermilab Tevatron Collider and correspond to up to 6.3 fb$^{-1}$ of integrated luminosity. The observed missing transverse energy distributions are used to set limits on different realizations of theories beyond the standard model, including limits on the breaking scale $\Lambda$ of gauge mediated supersymmetry models.

**Primary author:** Dr MARIOTTI, Chiara (INFN Torino)

**Presenter:** Prof. ADAMS, Mark (University of Illinois at Chicago)

**Session Classification:** Higgs and New Physics
We present two searches involving final states with top quarks or with topologies similar to those observed in top quark decays. The first is a search for the pair production of a fourth generation $t'$ quark and its antiparticle, followed by their decay to a W boson and a jet, based on an integrated luminosity of $5.3 \text{ fb}^{-1}$ of $p\bar{p}$ collisions at $\sqrt{s} = 1.96 \text{ TeV}$. The second is a search for the production of a heavy gauge boson $W'$, that decays to third generation quarks. In both cases we set 95\% C.L.-upper limits on the production cross sections and translate these into limits on the mass of the fourth generation quarks or of the $W'$ boson in a variety of models.

**Primary author:** Dr MARIOTTI, Chiara (INFN Torino)

**Presenter:** Prof. CHAKRABORTY, Dhiman (Northern Illinois University)

**Session Classification:** Higgs and New Physics
SUSY searches at the Tevatron

Friday, 22 July 2011 17:45 (15 minutes)

We present the result of various searches for the production of supersymmetric particles in $pp$ collisions at $\sqrt{s} = 1.96$ TeV using data collected by the CDF and D0 detectors at the Fermilab Tevatron Collider and corresponding to integrated luminosities of up to 6 fb$^{-1}$. We present results for the searches for the pair production of stop squark and searches for the associated production of charginos and neutralinos in final states with $\tau$ leptons. We also present the results for the search for pairs of isolated jets of leptons, predicted in hidden valley models. The results of these searches are interpreted in various frameworks of physics beyond the Standard Model.

Primary author: Dr MARIOTTI, Chiara (INFN Torino)
Presenter: KAJFASZ, Eric (CPPM)
Session Classification: Higgs and New Physics
Measurements of Drell-Yan differential cross sections at the LHC and W Charge Asymmetry in pp collisions at 7 TeV with the CMS detector

Friday, 22 July 2011 09:30 (30 minutes)

Measurements of inclusive W, Z and Drell-Yan production cross sections and the W lepton charge asymmetry in pp collisions at 7 TeV center-of-mass energy, based on data recorded by the CMS detector at the LHC in 2010 and 2011 are presented. The measurements are performed in the electron and muon channels. The charge asymmetry measurements cover the central region up to 2.4 in lepton pseudo rapidity. These results can be used to constrain the parton densities for valence quarks and sea anti quarks

Primary author: Dr KRAMMER, Manfred (HEPHY)
Presenter: BOURILKOV, Dimitri (University of Florida)
Session Classification: Top and Electroweak Physics
Track Classification: Top and Electroweak Physics
Measurements of the top quark pair production cross section in pp collisions at 7 TeV using the CMS detector

Thursday, 21 July 2011 11:30 (30 minutes)

We present several measurements of the top-pair production cross section in proton-proton collisions at the LHC at a centre-of-mass energy of 7 TeV. We use data collected with the CMS experiment during the year 2011. Measurements are presented in the lepton+jets final state, where events are selected by requiring exactly one isolated and highly energetic muon or electron, and at least four jets. In addition the di-lepton final state, consisting of two electrons or muons, at least two jets, and significant missing energy in the transverse plane, is used. First measurements of the cross section for the production of top quark pairs in proton-proton collisions at the LHC in the fully hadronic channel, as well as in final states involving tau leptons, specifically the tau+jets mode and the e-tau / mu-tau dilepton modes are also shown. The results, superseding previous measurements based on 2010 data, are combined and compared with the theory predictions.

Primary author: Dr KRAMMER, Manfred (HEPHY)
Presenter: MEYER, Andreas (DESY)
Session Classification: Top and Electroweak Physics
Track Classification: Top and Electroweak Physics
Measurement of Top Quark Pair Production and Decay Properties in pp collisions at 7 TeV using the CMS detector

Thursday, 21 July 2011 15:30 (15 minutes)

We present measurements of various differential cross sections in top pair production in proton-proton collisions at the LHC at a centre-of-mass energy of 7 TeV. We use data collected by the CMS experiment during the year 2011. Cross sections are measured differentially as a function of various variables.

We also present a measurement of the charge asymmetry in top-pair production. In order to measure the charge asymmetry in charge-symmetric initial state processes, the difference of absolute pseudo rapidities of top and anti-top is used. The results are compared with various theory predictions, and discussed in the context of forward-backward asymmetry measurements at Tevatron.

Primary author: Dr KRAMMER, Manfred (HEPHY)
Presenter: Dr DEISHER, Amanda (UCLA/ETH)
Session Classification: Top and Electroweak Physics
Track Classification: Top and Electroweak Physics
We present measurements of the top quark mass in proton-proton collisions at the LHC at a centre-of-mass energy of 7 TeV using data collected by the CMS experiment during the year 2011. Measurements are presented in all possible final states originating from top-pair production, and the different reconstruction methods to extract the top quark mass are discussed. Particular emphasis will be given to the contribution of systematic uncertainties. The results of the various channels are combined and compared to the world average. The determination of the top-pair invariant mass is also presented, and the result interpreted in the light of possible new physics signatures in the production of top-quark pairs.

**Primary author:** Dr KRAMMER, Manfred (HEPHY)

**Presenter:** MULDERS, Martijn (CERN)

**Session Classification:** Top and Electroweak Physics

**Track Classification:** Top and Electroweak Physics
Measurement of single top production in pp collisions at 7 TeV with the CMS detector

Thursday, 21 July 2011 10:10 (20 minutes)

We present a measurement of the inclusive single top production cross section in proton-proton collisions at the LHC at a centre-of-mass energy of 7 TeV, using data collected with the CMS experiment during the year 2011. The analysis considers decay channels where the W from the top decays into electron-neutrino or muon-neutrino, and makes use of kinematic characteristics of electroweak single top production for the separation of signal from backgrounds using multivariate methods. The result, which supersedes an earlier measurement based on 2010 data, is compared with the most precise standard model theory predictions. We also present measurements of various differential single top quark production cross sections.

In addition, we present the first measurement of single top quark production in the tW-channel in pp collisions, in which a top quark is produced in association with a W boson. The experimental signature is similar to top pair production, and there is interference at higher orders between the two processes. The measurement is performed using final states in which the associated W boson as well as the one originating from the top quark decay leptonically. Multivariate methods are used to extract the cross section. The result is compared with current standard model theory predictions.

Primary authors: IORIO, Alberto Orso Maria (stituto Nazionale di Fisica Nucleare (INFN)); Dr KRAMMER, Manfred (HEPHY)

Presenter: IORIO, Alberto Orso Maria (stituto Nazionale di Fisica Nucleare (INFN))

Session Classification: Top and Electroweak Physics

Track Classification: Top and Electroweak Physics
Measurements of Diboson Production in pp collisions at 1.96 TeV with the D0 detector

Friday, 22 July 2011 16:30 (30 minutes)

The diboson cross sections in the WZ, ZZ, Wgamma and Zgamma channels are measured using data collected with by the D0 experiment. The results are compared to SM predictions and constraints are set on anomolous triple gauge couplings.

Primary author:  Dr VERZOCCHI, Marco (Fermilab)
Presenter:  BASSLER, Ursula (LPNHE-Paris)
Session Classification:  Top and Electroweak Physics
Track Classification:  Top and Electroweak Physics
Measurement of the properties of Electroweak bosons with the D0 detector

Friday, 22 July 2011 11:20 (25 minutes)

We present precision measurements of the properties of W and Z bosons using D0 data. These include a measurement of W boson mass using the electron decay channel and the charged asymmetry in the muo decay channel. We also present a direct measurement of the W boson width using the events with large transverse mass and the mass dependence of the forward-backward charge asymmetry in $pp \rightarrow Z/\gamma^* \rightarrow e^+e^-$ interactions.

**Primary author:** Dr VERZOCCHI, Marco (Fermilab)

**Presenter:** Dr LI, Hengne (LPSC)

**Session Classification:** Top and Electroweak Physics

**Track Classification:** Top and Electroweak Physics
Measurement of the top pair production cross section and properties of top quark production and decay in proton-antiproton collisions at $\sqrt{s}=1.96$ TeV using the D0 Detector

Thursday, 21 July 2011 11:00 (30 minutes)

We present measurements of the inclusive top quark pair production cross section in $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ TeV utilizing data collected with the D0 detector at the Fermilab Tevatron Collider. Results for the lepton (e or mu)+jet, dilepton, tau+jet and fully hadronic decay modes are provided. We also present a measurement of the forward-backward charge asymmetry in top quark production and use the cross section measurements to extract the branching ratio $B(t \rightarrow Wb)/B(t \rightarrow Wq)$

**Primary author:** Dr VERZOCCHI, Marco (Fermilab)

**Presenter:** Dr SCHWANENBERGER, Christian (University of Manchester)

**Session Classification:** Top and Electroweak Physics

**Track Classification:** Top and Electroweak Physics
Measurement of the top pair production cross section and properties of top quark production and decay in proton-antiproton collisions at \( \sqrt{s} = 1.96 \text{ TeV} \) using the D0 Detector

Thursday, 21 July 2011 17:30 (30 minutes)

A number of results on the production and decay properties of top quark are presented. Results include a study of spin correlations in ttbar production, a search for flavor changing neutral currents in top decays, a measurement of color-flow in ttbar events and a measurement of the W boson helicity.

**Primary author:** Dr VERZOCCHI, Marco (Fermilab)

**Presenter:** GROHSJEAN, Alexander (CEA Saclay Irfu/SPP)

**Session Classification:** Top and Electroweak Physics

**Track Classification:** Top and Electroweak Physics
Precise measurements of the top mass and direct measurement of the mass difference between top and antitop quarks at D0

Thursday, 21 July 2011 15:00 (30 minutes)

We report on measurements of the top quark mass using dilepton and lepton+jet data collected with the D0 detector. These results are compared to the top mass extracted from the $t\bar{t}$ cross section using higher-order quantum chromodynamics calculations. We also present a direct measurement of the mass difference between top and antitop quarks ($\Delta m$) in lepton+jets $t\bar{t}$ final states using the “matrix element” method.

Primary author: Dr VERZOCCHI, Marco (Fermilab)
Presenter: PETRILLO, Gianluca (University of Rochester)
Session Classification: Top and Electroweak Physics
Track Classification: Top and Electroweak Physics
Measurements of single top production in $p\bar{p}$ collisions at $\sqrt{s} = 1.96$ TeV utilizing data collected with the D0 detector at the Fermilab Tevatron Collider

Thursday, 21 July 2011 09:30 (20 minutes)

We present studies of single top production using the D0 experiment. Single top events are selected with an isolated electron or muon missing transverse energy, two, three or four jets, with one or of them identified as originating from the fragmentation of $b$ quarks. From the cross section measurement we obtain new bounds on the Kobayashi-Maskawa $|V_{tb}|$ matrix element. A model-independent measurement of $t$-channel electroweak production of single top gives a cross section $\sigma(p\bar{p} \to tbq + X) = 2.90 \pm 0.59(stat + syst)$ pb for a top quark mass of 172.5 GeV. We estimate the probability of the background to fluctuate and produce a signal as large as the one observed to be $1.6 \times 10^{-8}$, corresponding to a significance of 5.5 standard deviations. We also present search for anomalous top quark production and for CP violation in single top production. The total width of the top quark, $\Gamma_t$, is measured from the partial decay width $\Gamma(t \to Wb)$ measured using the $t$-channel cross section for single top quark production and from the branching fraction $B(t \to Wb)$ measured in $tt$ events.

Primary author: Dr VERZOCCHI, Marco (Fermilab)
Presenter: JABEEN, Shabnam (Brown University)
Session Classification: Top and Electroweak Physics
Track Classification: Top and Electroweak Physics
Measurements of Diboson Production in pp collisions at 7 TeV with the ATLAS detector

*Friday, 22 July 2011 17:45 (20 minutes)*

Measurements of the diboson cross sections in the WW, WZ, and ZZ channels are presented. The data are compared to SM predictions and constraints are set on anomolous triple gauge couplings.

**Primary author:** Dr BARONCELLI, Antonio (INFN / Roma TRE)

**Presenter:** OH, Alexander

**Session Classification:** Top and Electroweak Physics

**Track Classification:** Top and Electroweak Physics
Top-quark production at hadron colliders

Thursday, 21 July 2011 09:00 (30 minutes)

Mini-review.

Primary author:  Dr BONCIANI, Roberto (LPSC)
Presenter:       Dr BONCIANI, Roberto (LPSC)
Session Classification:  Top and Electroweak Physics
Track Classification:  Top and Electroweak Physics
Production of electroweak gauge bosons at hadron colliders

Friday, 22 July 2011 09:00 (30 minutes)

Mini-review.

**Primary author:** Dr KASPRZIK, Tobias (KIT)

**Presenter:** Dr KASPRZIK, Tobias (KIT)

**Session Classification:** Top and Electroweak Physics

**Track Classification:** Top and Electroweak Physics
The Top-Quark Forward-Backward Asymmetry

Saturday, 23 July 2011 11:00 (30 minutes)

A theory review of the forward-backward anomaly observed in top-quark pair production at the Tevatron is presented. I discuss various attempts to explain the large forward-backward asymmetry by physics beyond the Standard Model model. Significant constraints arise from flavour and electroweak precision observables, as well as direct production of new particles at hadron colliders. A large top-quark asymmetry from proton-antiproton collisions is strongly correlated with the observation of a charge asymmetry and effects in the decay spectra of the top-antitop pair at the LHC.

Primary author:  Dr WESTHOFF, Susanne (Mainz University)
Presenter:  Dr WESTHOFF, Susanne (Mainz University)
Session Classification:  Top and Electroweak Physics
Track Classification:  Top and Electroweak Physics
A wide research program provided by heavy ion collisions is ongoing at the Large Hadron Collider with the aim of studying the properties of QCD matter at extreme temperatures and densities. The large acceptance, high granularity and broad pseudorapidity coverage of the ATLAS Detector is well suited to perform detailed analyses on bulk phenomena, jets and leptonic probes. Measurements of these observables provided by the 9 \text{mb}^{-1} of Pb+Pb collision data collected during the Fall 2010 Pb+Pb run at the nucleon-nucleon center of mass energy of 2.76 GeV are presented.
Medium Induced Collinear Radiation from Soft Collinear Effective Theory (SCET)

Thursday, 21 July 2011 12:30 (15 minutes)

The propagation of hard partons through the strongly interacting matter created in high energy heavy-ion collisions involves widely separated scales. The methods of Effective Field Theories (EFT) can provide a factorized description at lowest nontrivial order, and a formalism where the correction to this factorization are calculable systematically order by order in the small ratios between the different scales. In this talk I will present our recent results on the calculation of the spectrum of the gluons emitted by the hard parton, where the radiated gluons are collinear with the incoming hard parton and with arbitrary energy (not necessarily much softer than the energy of the hard parton). I will also briefly discuss how to extend the analysis to include the emission of gluons collinear in arbitrary directions and gluons with all the components of their momentum scaling as the medium characteristic energy scale (soft gluons).

Primary author: Mr D’ERAMO, Francesco (MIT)
Presenter: Mr D’ERAMO, Francesco (MIT)
Session Classification: Ultrarelativistic Heavy Ions
Initial conditions in heavy ion collisions: from RHIC to the LHC

Thursday, 21 July 2011 14:30 (30 minutes)

I will present a brief review of the different approaches to the description of bulk particle production in heavy ion collisions at RHIC and the LHC, with emphasis in the Color Glass Condensate approach (CGC). In the CGC approach coherence effects are taken into account through non-linear QCD renormalization group equations and also in the use of semi-classical methods appropriate at high gluon densities. Recent improvements in the phenomenological implementations of CGC ideas, such as inclusion of running coupling corrections or the use of Monte Carlo techniques, allow for a consistent, unified description of data from different systems: from e+p to A+A collisions, including latest LHC data.

Primary author: Dr ALBACETE, Javier L. (Universidade de Santiago de Compostela)
Presenter: Dr ALBACETE, Javier L. (Universidade de Santiago de Compostela)
Session Classification: Ultrarelativistic Heavy Ions
ALICE results for Pb-Pb collisions

*Thursday, 21 July 2011 10:00 (30 minutes)*

ALICE (A Large Ion Collider Experiment) is the LHC experiment specifically designed to study QCD matter under extreme conditions of temperature and pressure. The aim is to study the Quark-Gluon Plasma obtained with high energy nucleus-nucleus collisions and to characterize its properties. Results from the ALICE experiment for $\sqrt{s_{NN}}=2.76$ TeV Pb-Pb collisions will be presented and compared with predictions and lower energy heavy-ion collisions.

**Primary author:** Dr HIPPOLYTE, Boris (IPHC Strasburg)

**Presenter:** Dr HIPPOLYTE, Boris (IPHC Strasburg)

**Session Classification:** Ultrarelativistic Heavy Ions
Tevatron anomalies and LHC cross-checks

Thursday, 21 July 2011 09:00 (30 minutes)

Tevatron anomalies and LHC cross-checks

Primary author:  Dr GRIPAIOS, Ben (CERN)
Presenter:  RODRIGO, German
Session Classification:  Higgs and New Physics
W/Z plus jets/multi-jets

Friday, 22 July 2011 09:00 (30 minutes)

Primary author: Dr GRIPAIOS, Ben (CERN)
Presenter: ENGLERT, Christoph
Session Classification: Higgs and New Physics
Higgs/Top tagging

Saturday, 23 July 2011 09:00 (30 minutes)

Higgs/Top tagging

Primary author: Dr GRIPAIOS, Ben (CERN)
Presenter: TWEEDIE, Brock
Session Classification: Higgs and New Physics
Higgs searches

Thursday, 21 July 2011 15:30 (30 minutes)

Primary author: Dr GRIPAIOS, Ben (CERN)
Presenter: MUEHLLEITNER, Margarete
Session Classification: Higgs and New Physics
SUSY Searches

Friday, 22 July 2011 17:15 (30 minutes)

Primary author: Dr GRIPAIOS, Ben (CERN)
Presenter: PAPUCCI, Michele
Session Classification: Higgs and New Physics
Contribution ID: 905

Type: Parallel session talk

Flavour/LHC interplay

Saturday, 23 July 2011 12:35 (25 minutes)

Primary author: Dr GRIPAIOS, Ben (CERN)
Presenter: WEILER, Andreas
Session Classification: Higgs and New Physics
Searches for new physics at the Tevatron
First observation of the $h_{b}(1P)$ and $h_{b}(2P)$ bottomonium states and study of $\Upsilon(5S)$ to Bottomonium decays

Friday, 22 July 2011 11:45 (30 minutes)

We report the observation of the $h_{b}(1P)$ and $h_{b}(1P)p$ spin-singlet bottomonium states produced in the reaction $e^{+}e^{-} \rightarrow h_{b}(1P)n\pi^{+}\pi^{-}$ with significances of 5.5 $\sigma$ and 11.2 $\sigma$, respectively. We find that $M[h_{b}(1P)] = (9898.25\pm1.06^{+1.03}_{-1.07})$ MeV/$c^{2}$ and $M[h_{b}(1P)p] = (10259.76\pm0.64^{+1.43}_{-1.03})$ MeV/$c^{2}$, which correspond to measurements of the P-wave hyperfine splittings $\Delta M_{HF} = (1.62\pm1.52)$ MeV/$c^{2}$ and $(0.48\pm1.22)$ MeV/$c^{2}$, respectively. We also report measurements of the cross sections for $e^{+}e^{-} \rightarrow h_{b}(1P)n\pi^{+}\pi^{-}$ relative to the cross section for the $e^{+}e^{-} \rightarrow \Upsilon(2S)\pi^{+}\pi^{-}$ reaction and examine the Dalitz plots of $\Upsilon(5S) \rightarrow \Upsilon(nS)\pi^{+}\pi^{-}$ and $\Upsilon(5S) \rightarrow h_{b}(mP)\pi^{+}\pi^{-}$ decays and search for resonant substructure.

These results are obtained from a 121.4 $fb^{-1}$ data sample collected with the Belle detector near the $\Upsilon(5S)$ resonance at the KEKB asymmetric-energy $e^{+}e^{-}$ collider.

Primary author: Dr TRABELSI, Karim (KEK)

Presenter: WICHT, Jean

Session Classification: QCD
Contribution ID: 949

Type: Plenary talk

Opening addresses

Monday, 25 July 2011 09:00 (20 minutes)

Session Classification: Plenary
Cocconi Prize award and talks by recipients

Monday, 25 July 2011 09:55 (25 minutes)

Session Classification: Plenary
Highlight talk: The Cosmic Frontier (EPS Invited Speaker)

Monday, 25 July 2011 10:30 (30 minutes)

Presenter:  SMOOT, George (LBNL & UC Berkeley & Univ. Paris 7)

Session Classification:  Plenary
Searches for new physics at the Tevatron

Monday, 25 July 2011 11:30 (30 minutes)

Presenter: DUPERRIN, Arnaud (CPPM-Marseille)

Session Classification: Plenary
Highlights and searches in CMS

Monday, 25 July 2011 12:00 (30 minutes)

Presenter: TONELLI, Guido (INFN & Univ. Pisa)

Session Classification: Plenary
Highlights and searches in ATLAS

Monday, 25 July 2011 12:30 (30 minutes)

Presenter:  CHARLTON, Dave (Univ. Birmingham)

Session Classification:  Plenary
Standard Model theory for collider physics

Monday, 25 July 2011 15:00 (30 minutes)

Presenter: ZANDERIGHI, Giulia (Oxford Univ.)
Session Classification: Plenary
W and Z physics

Monday, 25 July 2011 15:30 (30 minutes)

Presenter: ALCARAZ, Juan (CIEMAT-Madrid)
Session Classification: Plenary
Contribution ID: 958

Type: Plenary talk

Top physics

Monday, 25 July 2011 16:00 (30 minutes)

Presenter: DELIOT, Frederic (CEA - Saclay)

Session Classification: Plenary
Scattering amplitudes in Quantum Field Theory

Monday, 25 July 2011 17:00 (30 minutes)

Presenter: DIXON, Lance (CERN & SLAC)
Session Classification: Plenary
Contribution ID: 960

Type: Plenary talk

Heavy Ions: experiment

Monday, 25 July 2011 17:30 (30 minutes)

Presenter: ANTINORI, Federico (INFN - Padova)

Session Classification: Plenary
Contribution ID: 961  Type: Plenary talk

Heavy Ions: theory

Monday, 25 July 2011 18:00 (30 minutes)

Presenter: SALGADO, Carlos (Univ. Santiago de Compostela)

Session Classification: Plenary
Direct searches for dark matter

Tuesday, 26 July 2011 09:00 (30 minutes)

Presenter: SUZUKI, Yoichiro (Kamioka Obs. & IPMU Tokyo)
Session Classification: Plenary
Dark matter theory

Tuesday, 26 July 2011 09:30 (30 minutes)

Presenter: BERGSTROM, Lars (Univ. Stockholm)

Session Classification: Plenary
Cosmic Rays

*Tuesday, 26 July 2011 10:00 (30 minutes)*

**Presenter:** TKACHEV, Igor (INR-Moscow)

**Session Classification:** Plenary
Cosmic neutrinos

Tuesday, 26 July 2011 11:00 (30 minutes)

Presenter: MONTARULI, Teresa (Univ. Wisconsin & INFN & Univ. Bari)
Session Classification: Plenary
Cosmology and dark energy: theory

Tuesday, 26 July 2011 11:30 (30 minutes)

Presenter: LESGOURGUES, Julien (LAPTh - Annecy & CERN & LPHE Lausanne)

Session Classification: Plenary
Cosmology and dark energy: experiment

*Tuesday, 26 July 2011 12:00 (30 minutes)*

**Presenter:** KOWALSKI, Marek (Univ. Bonn)

**Session Classification:** Plenary
Detector R & D

Tuesday, 26 July 2011 14:30 (30 minutes)

Presenter: HORISBERGER, Roland (PSI-Villingen)
Session Classification: Plenary
LHC: machine status and prospects, including upgrades

Tuesday, 26 July 2011 15:00 (30 minutes)

Presenter: MYERS, Steve (CERN)
Session Classification: Plenary
Accelerator R & D

Tuesday, 26 July 2011 15:30 (30 minutes)

**Presenter:** RAUBENHEIMER, Tor (SLAC)

**Session Classification:** Plenary
AdS/CFT and applications

Tuesday, 26 July 2011 16:30 (30 minutes)

Presenter: BEISERT, Niklas (AEI Potsdam)
Session Classification: Plenary
Neutrinos: experiments with accelerators

Tuesday, 26 July 2011 17:00 (30 minutes)

Presenter: NISHIKAWA, Koichiro (KEK)
Session Classification: Plenary
High Q2 Neutral and Charged Current in polarised collisions at HERA II with H1

Thursday, 21 July 2011 14:30 (15 minutes)

The inclusive single differential cross section \(d\sigma/dQ^2\) and the reduced double differential cross section \(\tilde{\sigma}(x, Q^2)\) are presented for neutral and charged current processes, \(e^\pm p \rightarrow \nu X\), in interactions with longitudinally polarised lepton beams using the complete HERA-II data set. The cross sections are measured in the region of large negative four-momentum transfer squared \(Q^2 \geq 200\) GeV\(^2\) and inelasticity \(y < 0.9\). Together with the corresponding cross section obtained from the previously published unpolarised data, the polarisation dependence of the charged current cross section is measured and found to be in agreement with the Standard Model prediction. The neutral current data are consistent with the expected \(Q^2\) dependence of polarised cross sections. The data are compared to predictions of the Standard Model which is able to provide a good description of the data.

**Primary author:** Dr KRUEGER, Katja (KIP, Heidelberg University, H1 Collaboration)

**Presenter:** HABIB, Shiraz

**Session Classification:** QCD
Neutrinos: non-accelerator experiments

Tuesday, 26 July 2011 17:30 (30 minutes)

Presenter: SCHOENERT, Stefan (TU München)
Session Classification: Plenary
QCD experiment

Wednesday, 27 July 2011 09:00 (30 minutes)

Presenter:  VARELAS, Nikos (Univ. Illinois)
Session Classification:  Plenary
Flavour physics at the LHC

Wednesday, 27 July 2011 09:30 (30 minutes)

Presenter: WILKINSON, Guy (Oxford Univ.)

Session Classification: Plenary
Diffractive deep-inelastic scattering and jet production in ep collisions at HERA II with H1

Saturday, 23 July 2011 12:30 (15 minutes)

The cross section for the diffractive deep-inelastic scattering process ep -> e X p is measured, with the leading final state proton detected in the H1 Forward Proton Spectrometer. The data are compared to perturbative QCD predictions at next-to-leading order based on diffractive parton distribution functions previously extracted from complementary measurements of inclusive diffractive deep-inelastic scattering. The ratio of the diffractive to the inclusive ep cross section is studied as a function of Q2, beta and x_pom. Measurements of single and double-differential dijet cross sections in diffractive photoproduction are also presented. Ratios of the diffractive to the inclusive dijet cross sections are measured for the first time and are compared with Monte Carlo models. The production of dijets in diffractive deep inelastic scattering, ep -> e gamma* p -> e p jet1 jet2 X, has been measured with the H1 detector at HERA using Very Forward Proton Spectrometer to measure the scattered proton momentum. The cross sections are compared to the predictions from leading-logarithm parton-shower RapGap Monte Carlo and next-to-leading-order QCD calculations based on recent diffractive parton densities extracted from inclusive diffractive deep inelastic scattering data. Finally, the cross section for inclusive jet production in diffractive deep-inelastic scattering is presented. The presented cross sections are corrected to the level of stable hadrons and compared to the Monte Carlo generator level predictions and NLO predictions with applied hadronisation corrections.

Primary author: Dr KRUEGER, Katja (KIP, Heidelberg University, H1 Collaboration)
Presenter: POLIFKA, Richard
Session Classification: QCD
Flavour physics at the Tevatron

Wednesday, 27 July 2011 10:00 (30 minutes)

Presenter:  TONELLI, Diego (Fermilab)
Session Classification:  Plenary
Flavour theory

Wednesday, 27 July 2011 11:00 (30 minutes)

Presenter: NEUBERT, Matthias (Univ. Mainz)
Session Classification: Plenary
Heavy flavour production at HERA with H1

Thursday, 21 July 2011 18:00 (15 minutes)

Measurements of cross sections for events with charm and beauty jets in deep inelastic scattering with the H1 detector at HERA are presented. The numbers of charm and beauty jets are determined using variables reconstructed using the H1 vertex detector with which the impact parameters of the tracks to the primary vertex and the position of secondary vertices are measured. The measurements are compared with QCD predictions and with previous measurements where heavy flavours are identified using muons. The cross section of b bar(b) photoproduction in ep collisions is also measured. Events containing b-quarks are identified through detection of two low momentum electrons in the final state. The differential b-quark production cross section is measured as a function of the transverse b-quark momentum and extends the previously experimentally accessible phase space towards the b-quark production threshold.

The inclusive production of D(2010) mesons in deep-inelastic ep scattering is measured in the kinematic region of photon virtuality 100 < Q2 < 1000 GeV2 and inelasticity 0.02 < y < 0.7. The charm contribution, F_2^{ccbar}, to the proton structure function F_2 is determined. Photoproduction of events containing a D meson and two jets are investigated with the H1 detector using the HERA-II data sample. The D mesons are reconstructed in the golden decay channel D -> K pi pi_s. Differential cross sections are measured in different variables and compared to QCD calculations. Inclusive production of D mesons in deep-inelastic scattering at HERA is studied in the range 5 < Q2 < 100 GeV2 of the photon virtuality and 0.02 < y < 0.7 of the inelasticity of the scattering process. The visible range for the D meson is p_T(D) > 1.25 GeV and |eta(D)| < 1.8. Single and double differential cross sections are measured. The results are compared to QCD predictions.

Primary author: Dr KRUEGER, Katja (KIP, Heidelberg University, H1 Collaboration)

Presenter: MEYER, Andreas

Session Classification: QCD
Flavour physics at the intensity frontier

*Wednesday, 27 July 2011 11:30 (30 minutes)*

**Presenter:** KRIZAN, Peter (Ljubljana Univ. & Stefan Inst.)

**Session Classification:** Plenary
Charged lepton flavour and dipole moments

Wednesday, 27 July 2011 12:00 (30 minutes)

Presenter: MORI, Toshinori (ICEPP Univ. Tokyo)
Session Classification: Plenary
New theories for the Fermi scale

*Wednesday, 27 July 2011 14:30 (30 minutes)*

**Presenter:**  RYCHKOY, Slava (LPTENS & Univ. Paris-6)

**Session Classification:**  Plenary
Higgs searches at the Tevatron

Wednesday, 27 July 2011 15:00 (30 minutes)

Presenter:  JAMES, Eric (Fermilab)
Session Classification:  Plenary
Higgs searches at the LHC

Wednesday, 27 July 2011 15:30 (30 minutes)

Presenter:  MURRAY, William (RAL)
Session Classification:  Plenary
An outlook from America

Wednesday, 27 July 2011 16:30 (20 minutes)

Presenter: ODDONE, Pier (Fermilab)
Session Classification: Plenary
Jet Production at HERA and determination of alpha_s with H1

Thursday, 21 July 2011 09:15 (15 minutes)

Inclusive-jet, dijet and trijet differential cross sections have been measured in neutral current deep-inelastic ep scattering for exchanged boson virtualities $150 < Q^2 < 15000$ GeV$^2$ with the H1 detector at HERA. The measurements are used to determine value of the strong coupling $\alpha_s(M_Z)$. Additionally, the production of jets is studied at low four momentum transfer squared $5 < Q^2 < 100$ GeV$^2$ using integrated luminosity of 300 pb$^{-1}$. Cross sections are measured as a function of $Q^2$ and jet transverse momentum and compared to the perturbative next-to-leading order QCD calculations corrected for hadronisation effects. Finally, the production of jets is studied in deep-inelastic $e+p$ scattering at low negative four momentum transfer squared $5 < Q^2 < 100$ GeV$^2$ and at inelasticity $0.2 < y < 0.7$ using data recorded by the H1 detector at HERA in the years 1999 and 2000, corresponding to an integrated luminosity of 43.5 pb$^{-1}$. Inclusive jet, 2-jet and 3-jet cross sections as well as the ratio of 3-jet to 2-jet cross sections are measured as a function of $Q^2$ and jet transverse momentum. The 2-jet cross section is also measured as a function of the proton momentum fraction $x_I$. The measurements are well described by perturbative quantum chromodynamics at next-to-leading order corrected for hadronisation effects and are subsequently used to extract the strong coupling $\alpha_s$.

Primary author: Dr KRUEGER, Katja (KIP, Heidelberg University, H1 Collaboration)

Presenter: BAGHDASARYAN, Artem

Session Classification: QCD
An outlook from Asia

Wednesday, 27 July 2011 16:55 (20 minutes)

Presenter: SUZUKI, Atsuko (KEK)
Session Classification: Plenary
An outlook from Europe

Wednesday, 27 July 2011 17:20 (20 minutes)

Presenter: HEUER, Rolf (CERN)
Session Classification: Plenary
An outlook from theory

Wednesday, 27 July 2011 17:45 (20 minutes)

Presenter:  GROSS, David (KITP Santa Barbara)
Session Classification:  Plenary
Diffractive structure functions and extraction of PDFs with H1

Thursday, 21 July 2011 15:15 (15 minutes)

In 2004, the H1 Collaboration at HERA installed the Very Forward Proton Spectrometer (VFPS) located at 220m from the interaction point, in the cold section of the proton ring. The spectrometer consists of two Roman Pot stations equipped with scintillating fiber detectors. The device allows the measurement of diffractive proton momentum in the range $0.009 < \text{xpom} < 0.025$, where xpom is the energy fraction lost by the proton in the interaction, with a very high acceptance (above 90%). The inclusive diffractive deep inelastic scattering, $e p \rightarrow e \gamma^* p \rightarrow e X p$, has been measured with the H1 detector at HERA using VFPS to measure the scattered proton momentum. The cross section is measured differentially in $Q^2$, xpom and beta and compared to previously measured cross section at HERA. A measurement of the longitudinal diffractive structure function $F_L^D$ at low $Q^2$ is also presented. Measurements of the diffractive cross-section at centre of mass energies $\sqrt{s}$ of 225 and 252 GeV in the $Q^2$ range of $[2.5; 7]$ GeV$^2$, using HERA data taken in 2007, are combined with a published measurement at $\sqrt{s}$ of 300 GeV. The structure function $F_L^D$ is extracted from these cross-sections at high values of inelasticity $y$. Measurements of the cross section for the diffractive process $e p \rightarrow e X Y$ are also presented, where $Y$ is a proton or a low mass proton excitation carrying a fraction $1 - x\_IP > 0.95$ of the incident proton longitudinal momentum and the squared four-momentum transfer at the proton vertex satisfies $|t| < 1.0$ GeV$^2$. The cross section is measured for photon virtuality in the range $3.5 < Q^2 < 90$ GeV$^2$, triple differentially in $x\_IP$, $Q^2$ and beta=$x/x\_IP$, where $x$ is the Bjorken scaling variable. These measurements are done after selecting diffractive events showing a large rapidity interval between the hadronic systems X and Y. Recent H1 measurements of the diffractive DIS cross section based on the reconstruction of a large rapidity gap or the detection of the scattered proton in the FPS or VFPS detectors have been used to extract a new set of diffractive parton distribution functions. The NLO QCD fit fully exploits the possibility that, according to the DDIS factorisation theorem which holds at fixed $x\_pom$, the parton content of the colourless exchange may depend continuously on the $x\_pom$ variable. In particular the new fitting strategy does not assume proton vertex factorisation nor inputs from Regge theory in its $x\_pom$ dependence.

Primary author: Dr KRUEGER, Katja (KIP, Heidelberg University, H1 Collaboration)

Presenter: LAYCOCK, Paul

Session Classification: QCD
Closing

Wednesday, 27 July 2011 18:10 (20 minutes)

Session Classification: Plenary
Inclusive e-p cross sections at HERA and determinations of $F_L$

Thursday, 21 July 2011 14:45 (15 minutes)

A combination of the inclusive cross sections measured by the H1 and ZEUS Collaborations in neutral and charged current deep-inelastic ep scattering at HERA is presented. The combination uses data from unpolarised ep scattering taken during the HERA-I phase as well as measurements with longitudinally polarised electron or positron beams from the HERA-II running period. The combination method takes the correlations of systematic uncertainties into account. The inclusion of the large HERA-II data set leads to an improved uncertainty especially at large four momentum transfer squared $Q^2$.

A combination is presented of the inclusive deep inelastic cross sections measured in neutral and charged current unpolarised $e^\pm p$ scattering at HERA during the period 1994-2000. The combined data are the sole input in a NLO QCD analysis which determines a new set of parton distributions HERAPDF1.0 with small experimental uncertainties. This set includes an estimate of the model and parametrisation uncertainties of the fit result.

A combination of the inclusive deep inelastic cross sections measured by the H1 and ZEUS Collaborations for ep scattering with nominal and reduced proton-beam energies, $E_p = 920$ GeV, $E_p = 460$ GeV and 575 GeV, is presented. The combination method used takes the correlations of systematic uncertainties into account, resulting in improved accuracy. From the combined data the proton structure function, $F_L$, is extracted in the region of $2.5 < Q^2 < 800$ GeV$^2$.

Finally, a measurement is presented of the inclusive neutral current $e^\pm p$ scattering cross section using data collected by the H1 experiment at HERA during the years 2003 to 2007 with proton beam energies $E_p$ of 920, 575, and 460 GeV. The kinematic range of the measurement covers low absolute four-momentum transfers squared, $1.5 \text{ GeV}^2 < Q^2 < 120 \text{ GeV}^2$, small values of Bjorken $x$, $2.9 \times 10^{-5} < x < 0.01$, and extends to high inelasticity up to $y = 0.85$. The structure function $F_L$ is measured by combining the new results with previously published H1 data at $E_p = 920$ GeV and $E_p = 820$ GeV. The new measurements are used to test several phenomenological and QCD models applicable in this low $Q^2$ and low $x$ kinematic domain.

**Primary author:** Dr BEHNKE, Olaf (DESY)

**Presenter:** CHEKELIAN, Vladimir

**Session Classification:** QCD
PDF Fits at HERA

Friday, 22 July 2011 16:30 (30 minutes)

This talk will present a summary of QCD fits of H1 and ZEUS data to determine improved PDFs. The QCD fit analysis of the combined HERA-I inclusive deep inelastic cross sections has been extended to include combined HERA II measurements at high Q2. The precision of the PDFs at high-x is considerably improved - particularly in the valence sector. A preliminary NNLO QCD analysis is presented using the NC and CC inclusive DIS cross sections obtained from the combination of the measurements from H1 and ZEUS based on the published HERA I and the preliminary HERA II data. The HERAPDF1.5NNLO fit is performed in the NNLO DGLAP scheme as implemented in the evolution code QCDNUM 17. In comparison to the most recent HERAPDF1.5 NLO, a more flexible parameterisation for the present QCD fits has been chosen which affects most gluon distribution at low x. A full set of the PDF uncertainties for HERAPDF1.5NNLO is determined.

A NLO QCD PDF fit analysis with simultaneous determination of the strong coupling constant $\alpha_s(M_Z)$ is also presented. The analysis is based on the same combined H1 and ZEUS inclusive DIS measurements as HERAPDF1.5 fit, together with jet measurements provided by both H1 and ZEUS collaborations. A QCD fit analysis to the combined HERA-I inclusive deep inelastic cross sections measured by the H1 and ZEUS collaborations for ep scattering, including the HERA-II measurements with reduced proton-beam energies, $E_p = 460\text{GeV}$ and $E_p = 575\text{GeV}$, is also presented. The effect of including the new data on the determination of HERA parton distribution functions is analysed, using fits similar to those performed for HERAPDF1.0. The combined H1 and ZEUS data on inclusive ep cross-sections together with the combined data on the semi-inclusive structure function $F_2(\text{charm})$ are used to extract the parton densities of the proton at NLO.

Finally, a preliminary global NLO QCD analysis of the HERA data is presented. The following data sets are used in this analysis: the NC and CC inclusive DIS cross sections obtained from the combination of the measurements from H1 and ZEUS based on HERA I and HERA II data at the nominal proton beam energy, the preliminary combined inclusive NC DIS cross sections at reduced proton beam energies, the inclusive jet cross sections from H1 and ZEUS and the preliminary combined HERA results on the structure function $F_2(\text{charm})$. A NLO QCD fit is performed on these data sets to determine simultaneously the proton PDF, the strong coupling constant $\alpha_s$ and the heavy flavour scheme dependent parameter of the charm quark mass.

Primary author: Dr BEHNKE, Olaf (DESY)

Presenter: COOPER-SARKAR, Amanda

Session Classification: QCD
Jet Production at HERA with ZEUS

Thursday, 21 July 2011 09:00 (15 minutes)

Differential inclusive-jet cross sections have been measured in photoproduction for boson virtualities $Q_2 < 1 \text{ GeV}^2$ with the ZEUS detector at HERA using an integrated luminosity of 300 pb$^{-1}$. These cross sections have the potential to constrain the gluon density in the proton and the photon when included as input to fits to extract the proton parton distribution functions. A value of $\alpha_s(M_Z)$ has been extracted from the measurements. For the first time, differential inclusive-jet cross sections have been measured in neutral current deep inelastic ep scattering using the anti-kt and SIScone algorithms, as well as the nominal kt cluster algorithm. The measurements were made for boson virtualities $Q_2 > 125 \text{ GeV}^2$ and the jets were identified in the Breit frame. Measurements of the ratios of cross sections using different jet algorithms are also presented and values of $\alpha_s(M_Z)$ are extracted from the data. Single- and double-differential inclusive dijet cross sections in neutral current deep inelastic ep scattering have been measured using an integrated luminosity of 374 pb$^{-1}$. The measurement was performed at large values of the photon virtuality, $Q_2$, between 125 and 20000 GeV$^2$. Single- and double-differential dijet cross sections have also been measured in photoproduction for boson virtualities $Q_2 < 1 \text{ GeV}^2$ with the ZEUS detector at HERA using an integrated luminosity of 300 pb$^{-1}$. These cross sections have the potential to constrain the gluon density in the proton and the photon when included as input to fits to extract the proton parton distribution functions. Next-to-leading-order QCD calculations give a good description of the measurements.

Primary author: Dr LEVY, Aharon (Tel Aviv University)
Presenter: BEHR, Joerg
Session Classification: QCD
Isolated photon production in deep inelastic ep scattering has been measured with the ZEUS detector at HERA using an integrated luminosity of 320pb$^{-1}$. Measurements were made in the isolated-photon transverse-energy and pseudorapidity ranges $4 < \text{ET} < 15$ GeV and $-0.7 < \text{eta} < 0.9$ for exchanged photon virtualities, $Q^2$, in the range $10 < Q^2 < 350$ GeV and for invariant masses of the hadronic system $WX > 5$ GeV. Differential cross sections are presented for inclusive isolated photon production as functions of $Q^2$, $x$, ET and eta. Isolated-photon+jet production in ep collisions at a centre-of-mass energy of 318 GeV has also been measured with the ZEUS detector at HERA using an integrated luminosity of up to 300 pb$^{-1}$. Measurements of prompt-photon+jet cross sections are presented as functions of the photon transverse energy and pseudorapidity in a wide range of exchanged-photon virtuality. In addition, differential gamma+jet cross sections are presented as functions of the jet transverse energy and pseudorapidity. Leading-logarithm parton-shower Monte Carlo predictions and perturbative QCD calculations were compared to the data.

Primary author: Dr LEVY, Aharon (Tel Aviv University)
Presenter: BUSSEY, Peter
Session Classification: QCD
The proton-dissociative diffractive photoproduction of J/psi mesons has been studied in ep collisions with the ZEUS detector at HERA using an integrated luminosity of 112 pb. The cross section is presented as a function of the photon-proton centre-of-mass energy and of the squared four-momentum transfer at the proton vertex. The results are compared to perturbative QCD calculations. The double differential inelastic J/psi photoproduction cross section as function of the squared transverse momentum of the J/psi in bins of the inelasticity $z$ has been measured. An integrated luminosity of 468 pb$^{-1}$ was used corresponding to the full data sample collected by the ZEUS experiment. The events were required to have $0.1 < z < 0.9$, $p_t > 1$ GeV and $60 < W < 240$ GeV, where $p_t$ is the transverse momentum of the J/psi and $W$ is the photon-proton centre-of-mass energy. The J/psi mesons were identified through their decay into muon pairs. The double differential cross section measurements are compared to the most recent theoretical predictions.

**Primary author:** Dr LEVY, Aharon (Tel Aviv University)

**Presenter:** BRUGNERA, Riccardo

**Session Classification:** QCD
Heavy Flavor production at HERA with ZEUS

Thursday, 21 July 2011 17:45 (15 minutes)

The production of $D^+$, $D_0$, $D^+_s$ and $\lambda_c^+$ charm hadrons in $ep$ scattering at HERA was measured with the ZEUS detector using the full HERA II data sample. The measurement has been performed in the photoproduction regime. The fractions of $c$ quarks hadronising as a particular charm hadron, $f(c\rightarrow D,\lambda_c)$ were derived and are compared to the previous HERA results and to those obtained in $e^+e^-$ annihilations. Inclusive photoproduction of $D$ mesons has also been measured with the ZEUS detector at HERA. The measurement was performed for photon-proton centre-of-mass energies in the range $150 < W < 285$ GeV and photon virtuality $Q^2 < 1$ GeV$^2$. The $D$ mesons have been reconstructed from the decay channels $D^+ \rightarrow D_0 \pi_+ \pi^+$ or $D^0 \rightarrow K^- \pi^+ \pi^+ \pi^- (+c.c.)$. Charm production has been measured with the ZEUS detector in deep inelastic $ep$ scattering at HERA. The measurement is based on the full reconstruction of the decay chain $D\rightarrow D_0\pi_0$, $D_0\rightarrow K\pi$ and exploits the full HERA II statistics. Differential cross sections have been measured and the charm contribution to the proton structure function, $F_2c$, has been extracted. Charm production in deep inelastic scattering has also been measured. The hadronic decay channels $D^+ \rightarrow K_0^S \pi^+$, $\Lambda_c^+ \rightarrow p \Lambda_0^S$ and $\Lambda_c^+ \rightarrow \Lambda \pi^+$, and their charge conjugates, were reconstructed. The presence of a neutral strange hadron in the final state reduces the combinatorial background and extends the measured sensitivity into the low transverse momentum region. The kinematic range is $0 < p_T(D^+,\Lambda_c^+) < 10$ GeV, $|\eta(D^+,\Lambda_c^+)| < 1.6$, $1.5 < Q^2 < 1000$ GeV$^2$ and $0.02 < y < 0.7$. Inclusive and differential cross sections for the production of $D^+$ mesons are compared to next-to-leading-order QCD predictions. The fraction of $c$ quarks hadronising into $\Lambda_c^+$ baryons is extracted.

Primary author: Dr LEVY, Aharon (Tel Aviv University)

Presenter: BACHYNSKA, Olena

Session Classification: QCD
Charm and beauty jet production at HERA with ZEUS

Thursday, 21 July 2011 18:15 (15 minutes)

The production of charm and beauty quarks in deep inelastic scattering has been measured with the ZEUS detector using the full HERA II data set. The charm and beauty contents in events with a jet were determined using the decay length significance and invariant mass of inclusive secondary decay vertices. Differential cross sections as functions of $Q^2$, Bjorken $x$, $E_T^{jet}$ and $\eta^{jet}$ were measured and compared to theoretical predictions. The open charm and beauty contributions to the proton structure function $F_2$ were extracted. Beauty production in deep inelastic scattering with events in which a muon and a jet are observed in the final state has been measured using an integrated luminosity of 114 pb$^{-1}$. The fraction of events with beauty quarks in the data was determined using the distribution of the transverse momentum of the muon relative to the jet. The cross section for beauty production was measured in the kinematic range of photon virtuality, $Q^2 > 2$ GeV$^2$, and inelasticity, $0.05 < y < 0.7$, with the requirement of a muon and a jet. Total and differential cross sections are presented and compared to QCD predictions. The beauty contribution to the structure function $F_2$ was extracted and is compared to theoretical predictions. The production of charm and beauty quarks was measured in photoproduction at centre-of-mass energy of 320 GeV using the properties of their secondary vertices, specifically by exploiting the lifetimes and masses of the $\pi^-$ and $\eta^-$ hadrons. This procedure is considerably more precise than previously used exclusive methods, where the reconstruction of selected decay channels puts a limit on the statistics. Kinematics of the outgoing quarks and their correlations were investigated.

Primary author: Dr LEVY, Aharon (Tel Aviv University)
Presenter: Mr LISOVYI, Mykhailo (DESY)
Session Classification: QCD
The study of $B_{(u,d,s)}$ and $D$ decays at SuperB can provide both stringent constraints on new physics scenarios, and over constraints on the CKM description of quark mixing and CP violation in the Standard Model. The rich landscape of new physics sensitive observables in both tree dominated and loop or flavor changing neutral current rare decays complements measurements possible at existing facilities. We discuss the physics potential of what can be learned from $B$ and $D$ decays at SuperB. One of the unique features of SuperB is a polarized electron beam. This opens the way for SuperB to be a Super tau factory, capable of performing precision tau measurements and searches for CP violation and charged Lepton Flavor Violation, as well as performing precision electroweak physics, including the measurement of $\sin^2\theta_W$ at energies corresponding to the $Y(4S)$ and $\psi(3770)$.

**Primary author:** Dr SCHUNE, Marie-Hélène (LAL-Orsay IN2P3-CNRS)

**Presenter:** Mr LUSIANI, Alberto

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
Observation of the X(3872) state at CMS

Friday, 22 July 2011 15:30 (15 minutes)

A measurement of the ratio of X(3872) and \( \psi(2S) \) signal yields in pp collisions at 7 TeV is presented, using data recorded with the CMS experiment in 2010. The corresponding integrated luminosity is 36/pb. X and \( \psi(2S) \) decays are reconstructed in the final state \( J/\psi\pi^+\pi^- \), with the subsequent decay of the \( J/\psi \) into two muons. The measured ratio is compared to theoretical expectations.

In this talk we present preliminary measurements of the \( B_c \) mass and lifetime in the \( J/\psi+p\)ion decay performed with the CMS experiment. The lifetime is measured for the first time using a fully kinematically reconstructed channel; Unlike previous measurements from the Tevatron, the fully reconstructed channel does not require corrections for undetected neutrinos from Monte Carlo simulation.

Primary author: Dr KRAMMER, manfred (HEPHY, Vienna)
Presenter: Dr FASANELLA, Daniele (INFN and University of Bologna)
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
Kaon programme at CERN: recent results and future plans.

Friday, 22 July 2011 17:05 (15 minutes)

The results from the CERN kaon experiments are presented. A precision test of lepton universality by measurement of the helicity suppressed ratio of kaon leptonic decay rates \( BR(K^- \rightarrow e^- \nu)/BR(K^- \rightarrow \mu^- \nu) \) has been performed with over \( 10^5 \) \( K^- \rightarrow e^- \nu \) decays collected by the NA62 experiment in 2007-08. A record accuracy of 0.4% has been achieved, which constrains the parameter space of new physics models with extended Higgs sector. An improved upper limit on the rate of the lepton number violating decay \( K^+ \rightarrow \pi^0 \mu^+ \mu^- \), which is sensitive to the existence of Majorana neutrinos, has been established with a \( K^+ \) sample collected by the NA48/2 experiment in 2003-04. A new precise measurement of the \( K^+ \rightarrow \pi^0 \mu^+ \nu \) (Kmu3) decay form factors with more than 3 million events collected by NA48/2 with a minimum trigger setup is presented, which is an indispensable input for the determination of the CKM matrix element \( |V_{us}| \) from semileptonic kaon decays. Finally, the status of a future experiment aiming to measure the rate of the ultra-rare flavour changing neutral current decay \( K^+ \rightarrow \pi^+ \nu \bar{\nu} \) to a record 10% precision with a low background sample of about 100 decays is discussed.

**Primary authors:** Dr LAZZERONI, Cristina (University of Birmingham); Dr GOUDZOFSKI, Evgeni (University of Birmingham)

**Presenter:** Dr GOUDZOFSKI, Evgeni (University of Birmingham)

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
Measurements of CP violation in the Bs system at D0

Thursday, 21 July 2011 15:15 (15 minutes)

We report a new measurement of the $CP$-violating phase $\phi_s$, of the decay width difference for the two mass eigenstates $\Delta \Gamma_s$, of the mean $B_s^0$ lifetime $\tau_s$, and of magnitudes of the decay amplitudes, from the flavor-tagged decay $B_s^0 \rightarrow J/\psi \phi$. For the first time, we consider possible contributions from the decay $B_s^0 \rightarrow J/\psi K^+ K^-$, with the $K^+ K^-$ in a $s$ wave. This measurement is based on 8 fb$^{-1}$ of $p\bar{p}$ collisions recorded with the D0 detector at a center-of-mass energy $\sqrt{s} = 1.96$ TeV at the Fermilab Tevatron collider. We also present a combination of the constraints on the $B_s^0$ width difference, $\Delta \Gamma_s$, and of the $CP$-violating phase, $\phi_s$ obtained combining with measurement with the results from the search for CP violation in semileptonic $B_s^0 \rightarrow \mu^+ D_s^- X$ decays, the measurement of the branching ratio for the decay $B_s^0 \rightarrow D_s^{(*)+} D_s^{(*)-}$ and the measurement of the like-sign asymmetry for semileptonic $b$ decays. Finally the prospects for including additional information from the $B_s^0 \rightarrow J/\psi f_0(980)$, $f_0(980) \rightarrow \pi^+ \pi^-$ decay are also discussed.

Primary author: Dr BURDIN, Sergey (University of Liverpool, UK)

Presenter: Dr BURDIN, Sergey (University of Liverpool)

Session Classification: Flavour Physics and Fundamental Symmetries

Track Classification: Flavour Physics and Fundamental Symmetries
The measurements of inclusive semileptonic B-meson decays allow a precise determination of the CKM matrix elements $|V_{ub}|$ and $|V_{cb}|$, relevant for the study of flavor and CP violation in the quark sector. This requires, from the theoretical counterpart, the calculation of the NNLO corrections to differential decay distributions, from which it is possible to derive predictions for partial decay rates with arbitrary experimental cuts. The two-loop virtual corrections to the decay process $b \rightarrow uW^*$, where $b$ and $u$ are a massive and massless quark, respectively, and $W^*$ is an off-shell charged weak boson, that subsequently decays in a lepton anti-neutrino pair, are known already in the literature. In this poster, we present the calculation strategy and first results concerning the real radiation, necessary to complete the NNLO analysis.

**Primary author:** Dr PAN, Zhao-Ting (LPSC Grenoble)

**Presenter:** Dr PAN, Zhao-Ting (LPSC Grenoble)

**Track Classification:** Flavour Physics and Fundamental Symmetries
The RPC muon system of the CMS detector at the CERN LHC remains uninstrumented in the pseudorapidity region 1.6<|eta|<2.4. An ongoing project aims at covering the region of the muon endcaps with large-area triple-GEM detectors whose features are suited to enhance muon tracking and preserve triggering capabilities for the CMS detector upgrade. The design and assembling of small (10cm×10cm) and full-size trapezoidal (1m×0.5m) triple-GEM prototypes will be described. The prototypes have been tested with soft x-rays and with a pion/muon test beam at the CERN SPS. Results from measurements with different experimental set-up on detector resolution and efficiency as well as timing performance will be reported. Preliminary simulation results will be discussed, related to studies on performance variations of the expected muon tracks reconstruction and trigger performance for different upgraded muon system scenarios with several physics processes.

Micro-Pattern Gas Detectors (MPGDs) are the detector technology of choice for simultaneously providing precision tracking and fast trigger information. They can be designed with sufficiently fine segmentation to cope with the hostile environment at a high-luminosity LHC and are being considered for a CMS high-eta muon upgrade. Several Triple Gas Electron Multiplier (GEM) prototypes have been built for this project with conventional construction techniques over the last two years. Here we report on a novel design and construction technique for a small Triple-GEM detector prototype. This method uses a purely mechanical way to stretch GEM foils in situ and does not require spacer frames or gluing, making it potentially very interesting for large-scale, cost-effective industrial production of GEM detectors. We will present details of the detector assembly procedure and results of preliminary performance tests of the resulting detector prototype.

Primary author: KRAMMER, Manfred (HEPHY, Vienna)
Presenter: Mr TUPPUTI, Salvatore Alessandro (Politecnico di Bari and INFN Sezione di Bari)
Session Classification: Detector R & D and Data Handling
Track Classification: Detector R & D and data handling
CMS started a campaign to identify the future silicon sensor technology baseline for a new Tracker for the high-luminosity phase of LHC, coupled to a new effective way of providing tracking information to the experiment trigger. To this end a large variety of 6" wafers was acquired in different thickness’s and technologies at HPK and new detector module designs were investigated. Detector thickness’s ranging from 50µm to 300µm are under investigation on float zone, magnetic Czochralski and epitaxial material both in n-in-p and p-in-n versions. P-stop and p-spray are explored as isolation technology for the n-in-p type sensors as well as the feasibility of double metal routing on 6” wafers. Each wafer contains different structures to answer different questions, e.g. influence of geometry, Lorentz angle, radiation tolerance, annealing behaviour, validation of read-out schemes. Dedicated process test-structures, as well as diodes, mini-sensors, long and very short strip sensors and real pixel sensors have been designed for this evaluation. The structures will be exposed to fluences composed of protons and neutrons representing the mixture of charged hadrons and neutrons as expected in the CMS Tracker after an integrated luminosity of 3000/fb at several radii. At the same time simulation studies were performed on how identification of high-momentum particle tracks, as a part of the Level 1 Trigger, can be achieved by correlating hits on two closely spaced sensors (stacked modules), making use of their strip or pixel cluster widths and positions to estimate the track bending in the high CMS magnetic field. This contribution provides an overview of the individual sensor structures and their characteristics and of the construction of different types of stacked modules for trigger studies, and summarizes interesting measurements performed so far.

**Primary author:** KRAMMER, Manfred (HEPHY, Vienna)

**Presenter:** D’ALESSANDRO, Raffaello (Università di Firenze INFN-Firenze)

**Session Classification:** Detector R & D and Data Handling

**Track Classification:** Detector R & D and data handling
Distributed processing and analysis of ATLAS experimental data

Friday, 22 July 2011 11:30 (15 minutes)

The ATLAS experiment is taking data steadily since Autumn 2009, collecting close to 1 fb-1 of data (several petabytes of raw and reconstructed data per year of data-taking). Data are calibrated, reconstructed, distributed and analysed at over 100 different sites using the World-wide LHC Computing Grid and the tools produced by the ATLAS Distributed Computing project.

In addition to event data, ATLAS produces a wealth of information on detector status, luminosity, calibrations, alignments, and data processing conditions. This information is stored in relational databases, online and offline, and made transparently available to analysers of ATLAS data world-wide through an infrastructure consisting of distributed database replicas and web servers that exploit caching technologies. This paper reports on the experience of using this distributed computing infrastructure with real data and in real time, on the evolution of the computing model driven by this experience, and on the system performance during the first two years of operation.

Primary author: KANAYA, Naoko (ICEPP, University of Tokio)
Presenter: Mr BARBERIS, Dario (Genoa University/INFN)
Session Classification: Detector R & D and Data Handling
Track Classification: Detector R & D and data handling
With the LHC collecting data at 7 TeV, plans are already advancing for a series of upgrades leading eventually to about five times the LHC design luminosity some 10 years from now in the high luminosity LHC (HI-LHC) project. The upgrades for the ATLAS detector will be staged in preparation for HI-LHC. The first upgrade for the pixel detector will be the construction of a new pixel layer which will be installed during the first shutdown of the LHC machine foreseen in 2013-14. The new detector, called the Insertable B Layer (IBL) will be installed between the existing pixel detector and a new, smaller radius beam-pipe at a radius of 3.2 cm. The IBL will require the development of several new technologies to cope with increased radiation and pixel occupancy and also to improve the physics performance through reduction of the pixel size and a more stringent material budget. Two different and promising silicon sensor technologies, planar n-in-n and 3D, are currently under investigation for the IBL. An overview of the IBL module design and the qualification for these sensor technologies with particular emphasis on irradiation and beam tests will be presented. This talk will also summarize the improvements expected to the ATLAS detector at the HI-LHC.

**Primary author:** KANAYA, Naoko (ICEPP, University of Tokio)  
**Presenter:** Mr LA ROSA, Alessandro (University of Wisconsin)  
**Session Classification:** Detector R & D and Data Handling  
**Track Classification:** Detector R & D and data handling
A detector for the measurement of the ultrarare decay \( \text{K^+} \rightarrow \text{pi}^+ \text{nu} \text{nubar}: \text{NA62 at the CERN SPS} \)

*Friday, 22 July 2011 12:00 (15 minutes)*

The NA62 experiment at CERN aims at the very challenging task of measuring with 10% relative error the Branching Ratio of the ultrarare decay of the K+ into pi+ neutrino and antineutrino, which is expected to occur only in about 8 out of 10^11 kaon decays. This will be achieved by means of an intense hadron beam, an accurate kinematical reconstruction and a redundant veto system for identifying and suppressing all spurious events. The good resolution on the missing mass in the decay is achieved using a performant beam tracker (Gigatracker) to measure the kaon momentum and with a spectrometer equipped with straw tubes operating in vacuum. Hermetic veto (up to 50 mrad) of the photon from p0 decays is achieved with a combination of large angle veto (with a creative reuse of the old OPAL lead glass blocks), the NA48 LKr calorimeter and two small angle calorimeters to cover the angle down to zero. The identification of the muons and the consequent veto is performed by a fast hodoscope plane (used in the first level of the trigger to reduce the rate) and by a 18-meter, neon-filled RICH counter which is able to separate pions and muons in the momentum interval between 15 and 35 GeV. Particle identification in the beam (kaon-pion separation) is achieved with an hydrogen differential Cherenkov counter (CEDAR).

The trigger for the experiment is based on a multilevel structure with a first level implemented in the readout boards and with the subsequent level done in software. The aim is to reduce the 10 MHz L0 rate to few KHz sent to the CERN computing center. Studies are underway to use GPU boards in some key point of the trigger system to improve the performance.

The talk will review the layout of the detector and give an update on the construction status and prospects.

**Primary author:** FANTECHI, Riccardo (INFN Pisa and Cern)

**Presenters:** Dr VALENTE, Paolo (INFN Roma1); FANTECHI, Riccardo (INFN Pisa and Cern)

**Session Classification:** Detector R & D and Data Handling

**Track Classification:** Detector R & D and data handling
CMOS sensors with high resistivity epitaxial layer

Friday, 22 July 2011 15:30 (15 minutes)

CMOS Pixel Sensors (CPS) are foreseen to equip vertex detectors where priority is given to granularity, material budget and power consumption, potentially at the expense of read-out speed and radiation tolerance. Being initially developed for an experiment at the ILC, the sensors came out to be well suited to Heavy Ion Collision experiments (STAR at RHIC, CBM at FAIR, ...) and their intrinsic potential offers attractive perspectives for the vertex detector to be operated at the SuperB factory. Another trend motivating their continuous development concerns trackers, where granularity is less an issue but material budget, power consumption and fabrication costs may be significantly reduced when using CMOS pixel sensors instead of usual semi-conducting devices.

For many years, CPS were manufactured with commercial wafers featuring exclusively low resistivity (i.e. typically 10 ohm.cm) epitaxial layers. The interest of industry for high resistivity epitaxial layers is a rather recent event, with a considerable impact on the potential of the CPS (e.g. a typical signal-to-noise ratio of about 35-40). Several sensors were fabricated since early 2010 with a 400 ohm.cm resistivity epitaxial layer, available in a 0.35 mum process, and tested on particle beams. Their detection performances were assessed extensively, mainly in perspective of their implementation in the two internal layers of the STAR-HFT. Featuring a total material budget per layer of 0.37 % of radiation length, the HFT is foreseen to start data taking in 2013/2014.

The talk will summarise the test results of the STAR-HFT sensor and provide insight of the next steps of the R&D, which are based on an emerging CMOS technology using a 0.18 mum feature size and offering a >= 1 kohm.cm epitaxy. Moreover, the development of a very light ladder equipped on both faces with 50 mum thin sensors, as well as supportless pixelated systems featuring < 0.15 % of radiation length, will be described. Finally, the evolution of the R&D, exploiting specific features of the 0.18 mum technology, will be overviewed, including a large area beam telescope for the EU-FP7 project AIDA.

Primary author: BESSON, Auguste (IReS)

Presenter: Dr BESSON, auguste (Institut Pluridisciplinaire Hubert Curien)

Session Classification: Detector R & D and Data Handling

Track Classification: Detector R & D and data handling
PANDA detector R&D study

Friday, 22 July 2011 16:30 (15 minutes)

PANDA is an experiment designed for the future FAIR facility at GSI to challenge our understanding of the strong interaction and of hadronic matter. Exploiting the high luminosity and good quality of the cooled antiproton beam, PANDA will search for new forms of matter, namely for precise measurements of possible exotic states, such as glueballs, hybrids, pentaquarks etc. in the quark confinement area.

One of the major detector components for the study of electromagnetic probes is compact and fast electromagnetic barrel calorimeter constructed out of high quality lead tungstate (PWO) crystals. The most forward region will be covered by a fine-segmented small cell sampling electromagnetic calorimeter as another key detector at PANDA. We report on the R&D study of both PANDA calorimeters including the achieved performance of both PWO and Shashlik calorimeter prototypes. The report includes studies of long-term radiation hardness of PWO crystals at low temperature using infrared-light or temperature for recovery.

The PANDA physics program requires the construction of a Silicon Micro Vertex detector with utmost capability to reconstruct primary vertex and secondary vertices from D meson decays. Inhomogeneous distribution of the radiation damage with a strong peak in the forward direction imposes innovative solutions and asymmetric layout. Besides limited material budget and trigger-less system, capable to handle large amounts of data in real-time, are requested. For the inner layers of the detector, thinned epitaxial silicon hybrid pixels are under study with custom readout chips, called ToPix. For the outer layers a double-sided silicon strip detector is under development. R&D study of other PANDA detectors is also presented.

Primary author: MOCHALOV, Vasily (IHEP,Protvino)
Presenter: MOCHALOV, Vasily (IHEP,Protvino)
Session Classification: Detector R & D and Data Handling
Track Classification: Detector R & D and data handling
Bs decays at Belle

Using fully reconstructed $B_s$ mesons, we measure the branching fractions for the decays of $B_s \to D_s^{(*)+}D_s^{(*)-}$ exclusively. Assuming these decay modes saturate decays to $CP$-even final states, the branching fraction determines the relative width difference between the $CP$-odd and $CP$-even $B_s$ states.

We also report the first evidence for $B_s^{(*)}$ $B_s^{(*)}$ pairs.

We have also performed the first search for charmed baryonic $B_s^0$ decay, $B_s^0 \to \Lambda_c^+\pi^-\Lambda$.

The measurement precision of the $B_s^0$ branching fraction at Belle is limited by the poor knowledge of the $B_s^0$ production fraction, $f_s = \sigma(B_s^{(*)}B_s^{(*)}/\sigma(b\bar{b})$.

We present a measurement of the CP violation parameter $\sin 2\phi_1$ at the $\Upsilon(5S)$ resonance using a new tagging method called the B-$\pi$ tagging. This method in general uses a $\Upsilon(5S)$ decay to a charged B meson, a neutral B meson, and a charged pion. The neutral B meson decays to a CP eigenstate, and the charged B meson is reconstructed as missing mass of the neutral B meson and the charged pion. The initial flavor of the neutral B meson is determined by the charge of the pion at the moment of the $\Upsilon(5S)$ decay. CP violating parameters can be derived from asymmetry of the number of $BB\pi^+$ and $BB\pi^-$ events without measuring decay time. Since the B-$\pi$ tagging method have
different systematic errors from the analyses on the $\Upsilon(4S)$
resonance and thus complementary. In this analysis, the neutral B meson
is reconstructed as $J/\psi K_S$.

All these results are based on a data sample
collected with the Belle detector at the $\Upsilon(5S)$ resonance
with an integrated luminosity of 121.4 fb$^{-1}$ at the KEKB
asymmetric-energy $e^+e^-$ collider.

**Primary author:** Dr LOUVOT, Remi (EPFL, Lausanne)

**Presenter:** Dr LOUVOT, Remi (EPFL, Lausanne)

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
We report a measurement of $D^0 - \overline{D}^0$ mixing in $D^0 \rightarrow K_S^0 \pi^+ \pi^-$ decays using a time-dependent Dalitz plot analysis.

We will also present an updated measurement of the mixing parameter $y_{CP}$ in decays $D^0 \rightarrow K^+ K^-$ and $D^0 \rightarrow \pi^+ \pi^-$. 

We will present a measurement to search for $CP$ violation in charged $D$ meson decays by measuring the $CP$ violating asymmetry difference between Cabibbo-suppressed decays $D^+ \rightarrow K^+ K^- \pi^+$ and Cabibbo-favored decays $D_s^+ \rightarrow K^+ K^- \pi^+$ in a mass region of the $\phi$ resonance.

We have searched for $CP$ violation in the decays $D^0 \rightarrow K_S^0 P^0$ where $P^0$ denotes a neutral pseudo-scalar meson which is either a $\pi^0$, $\eta$, or $\eta'$. No evidence of significant $CP$ violation is observed.

We report the most precise $CP$ asymmetry measurement in the decay $D^0 \rightarrow K_S^0 \pi^0$ to date: 

$A_{CP}^{D^0 \rightarrow K_S^0 \pi^0} = (-0.28 \pm 0.19 \pm 0.10)$ asymmetries in the decays $D^0 \rightarrow K_S^0 \eta$ and $D^0 \rightarrow K_S^0 \eta'$:

$A_{CP}^{D^0 \rightarrow K_S^0 \eta} = (+0.54 \pm 0.51 \pm 0.16)A_{CP}^{D^0 \rightarrow K_S^0 \eta'} = (+0.98 \pm 0.67 \pm 0.14)$ respectively.

We report the first observations of the decay $D^+ \rightarrow K^+ \eta'$ and the search for the $CP$ violation in the decay $D^+ \rightarrow \pi^+ \eta'$. The branching ratios with respect to their normalization modes and $CP$ measurements will be presented.

We report preliminary results on the time-integrated asymmetry of the decays $D^0 \rightarrow K^- \pi^+ \pi^0$ and $\overline{D}^0 \rightarrow \pi^- \pi^+ \pi^0$.

Results of the Dalitz plot analysis of $A_{CP}$ for two approaches – model dependent and model independent – are presented.

The results are obtained from a large data sample collected on the $\Upsilon(4S)$ and $\Upsilon(5S)$ resonance with the Belle detector at the KEKB asymmetric energy $e^+ e^-$ collider.

**Primary author:** Dr STARIC, Marko (Jozef Stefan Institute)

**Presenter:** Dr STARIC, Marko (Jozef Stefan Institute)

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
Exclusive (semi-)leptonic B meson decays at Belle

Thursday, 21 July 2011 18:00 (15 minutes)

We report a search for $B$ decays into invisible final states. The signal is identified by fully reconstructing the accompanying $B$ meson and requiring no other charged particles and no extra energy deposited in the calorimeter. The upper limit obtained will be reported and the corresponding physics will be discussed.

We report measurements of the $B \rightarrow D^{(*)}_s K \ell \nu$ decay branching fractions and of the characteristics of the $D^{(*)}_s K$ system.

We report a measurement of $B \rightarrow \tau \nu$ decays. A sample of $B\bar{B}$ pair events are tagged by reconstructing one $B$ meson decaying to hadronic final states. We obtain the branching fraction of $B \rightarrow \tau \nu$ and present a direct determination of the product of the $B$ meson decay constant $f_B$ and the magnitude of the Cabibbo-Kobayashi-Maskawa matrix element $V_{ub}$. We also discuss constraints on the charged Higgs.

The branching fractions of the purely leptonic decays

$B^+ \rightarrow \ell^+ \nu_\ell, (\ell = e, \mu)$ are expected to be very small due to helicity suppression in the Standard Model. With contributions from new physics beyond the Standard Model, helicity suppression may be avoided. Moreover, these modes have a very clean experimental signature. In this study, we present a search for $B^+ \rightarrow \ell^+ \nu_\ell$ decays using the hadronic $B$-meson tagging method, where a novel technique of neural-network-based $B$-meson tagging method is applied for the optimal background suppression.

We also report a study of the charmless semileptonic $B$-meson decays

$B^+ \rightarrow \eta \ell^+ \nu_\ell$ and $B^+ \rightarrow \eta' \ell^+ \nu_\ell$, in events in which the decay of one $B$ meson is fully reconstructed in an hadronic final state.

These results are obtained from the large data sample collected at the $\Upsilon(4S)$ resonance with the Belle detector at the KEKB asymmetric-energy $e^+e^-$ collider.

Primary author:  Dr URQUIJO, Phillip (University of Bonn)

Presenter:  Dr URQUIJO, Phillip Urquijo (University of Bonn)

Session Classification:  Flavour Physics and Fundamental Symmetries
**Track Classification:** Flavour Physics and Fundamental Symmetries
Using the large data sample collected at the Y(4S) resonance with the Belle detector at the KEKB asymmetric-energy $e^+e^-$ collider, we present an improved measurement of time-dependent CP violation in the neutral $B$ decays into charmonium and $K^0$.

CPT is expected to be a fundamental symmetry with no significant deviations. Nonetheless we can introduce an artificial perturbation parameter to the $B^0 - \bar{B}^0$ mixing system that violates CPT symmetry. The CPT violating parameter, which is a complex number but expected to be zero, can be probed through proper time difference distributions in correlated $B$ meson pair decays. We present a measurement of the CPT violating parameter.

We report measurements of branching fractions and CP violation parameters in the neutral $B$ meson decays into $D^+D^-$ and $D^{**}D^{*-}$.

We report the first observation of the radiative decay $B^0 \rightarrow \phi K^0\gamma$ and measurements of time-dependent $CP$-violation. These measurements are sensitive to new physics from right-handed currents.

We also report an updated measurement of the branching fraction in $B^+ \rightarrow \phi K^+\gamma$ as well as measurements of a new radiative penguin decay $B \rightarrow \omega K^+(K^0)\gamma$.

**Primary author:** Dr HIGUCHI, takeo (KEK, Tsukuba)

**Presenter:** Dr HIGUCHI, takeo (KEK, Tsukuba)

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
We present a time-dependent measurement of CP violation parameters in $B^0 \rightarrow \pi^+\pi^-$ decays.

We present also a measurement of the branching fraction of $B^0 \rightarrow \rho^0\rho^0$ decays, which could provide a tighter constraint of the CKM angle $\phi_2$.

In addition we present measurements of branching ratios of other charmless $B$ decays into 4 charged pions.

We present a measurement of the branching fraction and time-dependent CP violation parameters of $B^0 \rightarrow a_1^\pm \pi^\mp$ decays.

The measurement of $B \rightarrow \pi^0\pi^0$ is vital in the extraction of the UT angle $\phi_2$, from an isospin analysis of the $B \rightarrow \pi\pi$ system. In addition, this process is expected to exhibit direct CP violation, a measurement of which would place additional constraints on $\phi_2$, and a new measurement of $B \rightarrow \pi^0\pi^0$ would help resolve the significant disagreement in the Belle and BaBar measurements of this mode.

The decay $B^- \rightarrow D^{(*)}K^-$ ($D = D^0$ or $D^0$) includes the $b \rightarrow u$ transition and plays a crucial role in the measurement of the CP-violating angle $\phi_3$. We present the results of a study of the decay $B \rightarrow D^{(*)}K^-$ where the $D$ meson is reconstructed from $K^+\pi^-$ and from $CP$ modes.

We report the first measurement of the angle $\phi_3$ of the unitarity triangle using a binned model-independent Dalitz plot analysis technique of $\bar{B}^\pm \rightarrow D K^{\pm}$, $D \rightarrow K_S^0\pi^+\pi^-$ decay chain.

These results are obtained from the final data sample that contains 772 million $\bar{B}B$ pairs collected at the $\Upsilon(4S)$ resonance with the Belle detector at the KEKB asymmetric-energy $e^+e^-$ collider.

**Primary author:** Dr DALSENO, Jeremy (MPI, Munich)

**Presenter:** Dr DALSENO, Jeremy (MPI, Munich)

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
Direct CPV and charmless B decays at Belle

Thursday, 21 July 2011 11:45 (15 minutes)

We report the measurements of branching fractions and direct $CP$ asymmetries for neutral $B$ meson decays to the $hh$ final states, where $h$ stands for a pion or a kaon. We also study the charged $B$ meson decays into one charged and one neutral kaon or pion.

We present improved measurements of the branching fraction and the $CP$ asymmetry of $B \to \eta h$. Here $h$ denotes $\pi^\pm$, $K^\pm$ or $K^*_{S,L}$, and the $\eta$ is reconstructed through the decay channels $\eta \to \gamma \gamma$ and $\eta \to \pi^+ \pi^- \pi^0$.

We report the results of a search for the charmless hadronic decay $B^+ \to \omega p^+$.

These analyses are performed using the large data sample collected with the Belle detector near the $\Upsilon(4S)$ resonance at the KEKB asymmetric $e^+e^-$ collider.

Primary author: Dr CHANG, Paoti (NTU, Taipei)

Presenter: Dr CHANG, Paoti (NTU, Taipei)

Session Classification: Flavour Physics and Fundamental Symmetries

Track Classification: Flavour Physics and Fundamental Symmetries
Other B decays at Belle

Friday, 22 July 2011 15:15 (15 minutes)

We report measurements of branching fractions and $CP$ violation asymmetries for $B \to \phi\phi K$ decays. Results of the study of $B^{\pm} \to J/\psi K^{\pm}$ and $B^{\pm} \to \eta c K^{\pm}$, that result in a final state of five kaons, will also be presented.

We study the $B^{-}$ meson decays to the final state of $\bar{p}\Lambda D^{0}$. The decay $B^{-} \to \bar{p}\Lambda D^{0}$ is observed for the first time, with the invariant mass of the $\bar{p}\Lambda$ system peaking near threshold. Furthermore, we set an upper limit on decay branching fraction of $B^{-} \to \bar{p}\Lambda D^{0}$ in absence of a statistically significant signal.

We report on a search for the $X_{0}^{0}$ particle in $B^{0} \to K^{+}(\pi^{+})\pi^{-}X_{0}^{0}$ decays. We extend the search to a mass region from 212 MeV/$c^{2}$ to 500 MeV/$c^{2}$ with several different $X_{0}^{0}$ lifetime assumptions.

We measured the branching fraction of the decay $B^{0} \to J/\psi\eta^{(')}$ based. The branching fraction results were used to constrain the $\eta^{(')}$ mixing angle.

These analyses are performed using the large data sample collected with the Belle detector near the $\Upsilon(4S)$ resonance at the KEKB asymmetric $e^{+}e^{-}$ collider.

Primary author: Dr WANG, Min-Zu (NTU, Taipei)

Presenter: Dr WANG, Min-Zu (NTU, Taipei)

Session Classification: Flavour Physics and Fundamental Symmetries

Track Classification: Flavour Physics and Fundamental Symmetries
Rare tau decays at Belle

Thursday, 21 July 2011 10:15 (15 minutes)

We report results of a search for tau lepton decays strongly suppressed in the Standard Model based on the world-largest data sample accumulated with the Belle detector at the KEKB asymmetric-energy $e^+e^-$ collider. The decays include: lepton flavor and lepton number violating tau decays into a lepton ($e$ or $\mu$) and two charged mesons ($K$ or $\pi$), lepton flavor violating decays into a lepton ($e$ or $\mu$) and a photon as well as lepton and baryon number violating tau decays into a $\Lambda$ and a charged meson ($K$ or $\pi$). The sensitivity to the branching fractions is significantly improved compared to our previous results and in some cases reaches $O(10^{-8})$.

Primary author: Dr HAYASAKA, Kiyoshi (Nagoya University)
Presenter: Dr HAYASAKA, Kiyoshi (Nagoya University)
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
Charmonium and X, Y, Z at Belle

Friday, 22 July 2011 14:30 (15 minutes)

We report results of a study of charmonium and X, Y, Z states using the world-largest data sample accumulated with the Belle detector at the KEKB asymmetric-energy e+e- collider.

We present results from a study of $X(3872) \rightarrow J/\psi \pi^+ \pi^-$ decays produced in exclusive $B \rightarrow K \pi^+ \pi^- J/\psi$ decays using the full Belle data set. We present new measurements of the $X(3872)$ mass and width and the $BF(B \rightarrow K X(3872))$ product branching fractions for both charged and neutral $B$ mesons. A new measurement of the difference in mass between $X(3872)$ signals in $B^+$ and $B^0$ decays and results of a search for a charged partner of the $X(3872)$ in the decay $B \rightarrow K X^+, X^+ \rightarrow \pi^+ \pi^0 J/\psi$ are reported.

In addition, we examine possible $J^{PC}$ quantum number assignments for the $X(3872)$ based on comparisons of angular correlations among final state particles in $X(3872) \rightarrow \pi^+ \pi^- J/\psi$ decays with simulated data for $J^{PC}$ values of $1^{++}$ and $2^{++}$. We examine the influence of $\rho - \omega$ interference in the $M(\pi^+ \pi^-)$ spectrum. The analysis is based on a 711 fb$^{-1}$ data sample that contains 772 million $B\overline{B}$ meson pairs collected at the $\Upsilon(4S)$ resonance in the Belle detector at the KEKB collider.

We report a study of $B \rightarrow (J/\psi \gamma) K$ and $B \rightarrow (\psi' \gamma) K$ decay modes using $772 \times 10^6 B\overline{B}$ events collected at the $\Upsilon(4S)$ resonance. We observe $X(3872) \rightarrow J/\psi \gamma$ and report the first evidence for $\chi_c2 \rightarrow J/\psi \gamma$ in $B \rightarrow (X_c \pi \gamma) K$ decays, while in a search for $X(3872) \rightarrow \psi' \gamma$ no significant signal is found.

We measure the cross section for $e^+e^- \rightarrow \pi^0 \pi^0 J/\psi$ from threshold up to 6 GeV using initial state radiation events from $e^+e^-$ annihilation at $\sqrt{s} = 10.58$ GeV. We reconstruct the $J/\psi$ in its di-muon decay mode. Using this data we search for evidence of $Y(4260)$ decaying to $\pi^0 \pi^0 J/\psi$. This analysis is based on a data sample with an integrated luminosity of 791 fb$^{-1}$ collected with the Belle detector.

We present the results of an amplitude analysis of the $B^0 \rightarrow J/\psi K^- \pi^+$ decays. A search for charged charmonium-like states in the $J/\psi \pi^+$ system has been performed. We have measured the helicity amplitudes of the resonances in the $K^- \pi^+$ system. The analysis is based on 711 fb$^{-1}$ data sample collected by the Belle detector.

We report the results of a study of $B^\pm \rightarrow K^\pm \eta_c$ and $B^\pm \rightarrow K^\pm \eta_c(2S)$ decays followed by $\eta_c$ and $\eta_c(2S)$ decays to $(K_S K \pi)^0$. 

May 30, 2021
The results are obtained from a data sample containing 535 million $B\bar{B}$-meson pairs collected in the Belle experiment. We measure the products of the branching fractions 

\[ \mathcal{B}(B^\pm \to K^\pm \eta_c)\mathcal{B}(\eta_c \to K_S K^{\pm}\pi^{\mp}) \] 

and 

\[ \mathcal{B}(B^\pm \to K^{\pm} \eta_c(2S))\mathcal{B}(\eta_c(2S) \to K_S K^{\pm}\pi^{\mp}). \]

Interference with the non-resonant component leads to significant model uncertainty in the measurement of these product branching fractions. Our analysis accounts for this interference and allows the model uncertainty to be reduced. We also obtain the masses and widths of the above mentioned charmonia. In the $\eta_c(2S)$ case the results are significantly affected by the interference and also include a model uncertainty.

The subject of this analysis is the $Y(3940)$ enhancement at about 3940 MeV. The mass and decay width have been determined by the Belle collaboration upon discovery and were later confirmed by BaBar. Additional quantum numbers, however have not been measured yet. The decay channels, used in this analysis are $B^0 \to J/\psi K^0_S$ and $B^+ \to J/\psi K^+$ (and charge conjugate). $J^{PC}$ shall be determined through an angular distribution analysis of Belle data equivalent to 711 fb$^{-1}$, as well as improvements made in mass and decay width measurements. With a better understanding of the resonances quantum numbers, hopefully statements regarding its theoretical interpretation can be made.

**Primary author:** Ms VINOKUROVA, Anna (Budker Institute)

**Presenter:** Ms VINOKUROVA, Anna (Budker Institute)

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
Performance of the CMS Level-1 Electron Photon trigger

The CMS high-resolution electromagnetic calorimeter (ECAL) comprises 75848 lead tungstate (PbWO4) crystals and is optimized for the discovery of the SM Higgs boson in its two-photon decay mode. With the unprecedented collision rate at the Large Hadron Collider (LHC), the electron/photon (EG) Trigger plays a major role in selecting the collisions most likely to yield something new and interesting. Since start of physics in March 2010 the LHC instantaneous luminosity has increased by six orders of magnitude to more than 10e33 cm-2 s-1 today, presenting a major challenge for the stability of the trigger system. This poster presents the performance of the EG trigger based on data recorded by the CMS detector in 2011.

Primary author: NADIR, Daci (Cern)
Presenter: NADIR, Daci (Cern)

Track Classification: Detector R & D and data handling
Development and Performance of spark-resistant Micromegas Detectors

The luminosity upgrade of the Large Hadron Collider at CERN (sLHC) foresees a luminosity increase by a factor five compared to the LHC. To cope with the corresponding increase in background rates, the Muon System of the ATLAS experiment at CERN will need major changes in the high rapidity region. The Muon ATLAS MicroMegas Activity (MAMMA) focuses on the development and testing of large-area muon detectors based on the bulk-Micromegas technology as candidates for such an upgrade. In order to overcome the spark problem a novel protection scheme using resistive strips above the readout electrode has been developed. A study of the response and sparking properties of resistive micromegas detectors in a mixed (neutron and gamma) high radiation field has been performed. The neutrons are supplied by the Tandem accelerator, at the N.C.S.R. "Demokritos" in Athens. Furthermore the chambers have been studied in a X-ray test facility in hadron beams, and in the ATLAS cavern with two-dimensional readout.

Results on the performance of these chambers will be presented which will combine trigger and precision tracking in a single device. Monte-Carlo studies have been employed to study the effect of 5.5 MeV neutrons and also response of the detector on the photons originating from the inevitable neutron inelastic scattering in comparison with experimental data. Finally the layout of the 2D chambers and their performance, with special focus on the charge-up behavior of the chambers under high particle fluxes, is presented.

Primary authors: IAKOVIDIS, Georgios (NTUA, Athens); KARAKOSTAS, Konstantinos (NTUA, Athens); SCHOTT, Matthias (CERN)

Presenter: Mr IAKOVIDIS, George (NTUA)

Track Classification: Detector R & D and data handling
The study of gamma/\phi_3-sensitive hadronic decays at LHCb

Thursday, 21 July 2011 12:30 (15 minutes)

The relative abundances of the three decay modes B0 -> DK, B0 -> D\pi and Bs -> Ds\pi produced in 7 TeV pp collisions at the LHC are determined from data corresponding to an integrated luminosity of \( \sim 35 \text{ pb}^{-1} \). The relative branching ratio of B0 -> DK with respect to B0 -> D\pi is found to be \( B(\text{B}^0 \rightarrow \text{DK}) = (2.01 \pm 0.18 \text{ stat} \pm 0.12 \text{ syst}) \times 10^{-4} \). The ratio of fragmentation fractions fs/\( f_d \) is determined through the relative abundances of B0 -> DK and B0 -> D\pi with respect to Bs -> Ds\pi, leading to \( \frac{f_s}{f_d} = 0.253 \pm 0.017 \pm 0.018 \pm 0.020 \), where the uncertainties are respectively statistical, systematic, and theoretical.

Using a large data sample accumulated at a centre-of-mass energy \( \sqrt{s} = 7 \text{ TeV} \) with the CERN LHCb experiment, we study the decays B± -> DK± where the neutral D meson decays into two track final states. These measurements are sensitive to the value of the CKM Unitarity Triangle angle gamma.

Using data collected by the LHCb detector we reconstruct a sample of the main charmless charged two-body \( B \) hadron decay modes, namely

\[
B^0 \rightarrow \pi^+\pi^-, \quad B^0 \rightarrow K^+\pi^-, \quad B^0_s \rightarrow K^+K^-, \quad B^0 \rightarrow \pi^+K^-, \quad \Lambda_b \rightarrow pK^- \quad \text{and} \quad \Lambda_b \rightarrow p\pi^-.
\]

We provide preliminary values of the direct \( CP \) asymmetries in the \( B^0 \rightarrow K^+\pi^- \) and \( B^0_s \rightarrow \pi^+K^- \) decays, of the relative branching fractions and of the \( B^0 \rightarrow K^+K^- \) lifetime. We also discuss the prospects for the measurement of time-dependent \( CP \) violation in the \( B^0 \rightarrow \pi^+\pi^- \) and \( B^0_s \rightarrow K^+K^- \) decays.

Primary author: Dr LAFRANCHI, Gaia (LNF INFN)

Presenter: Mr CARBONE, Angelo

Session Classification: Flavour Physics and Fundamental Symmetries

Track Classification: Flavour Physics and Fundamental Symmetries
Time dependent CP-violation measurements and related studies in B_s decays at LHCb

Thursday, 21 July 2011 15:45 (15 minutes)

The determination of the CP-violating phase $\phi_s$ in $B_s^0 \rightarrow J/\psi\phi$ decays is one of the key goals of the LHCb experiment. Its value is predicted to be very small in the Standard Model but can be significantly enhanced in many models of new physics. To perform the first LHCb analysis of $\phi_s$ on 2010 data at a centre of mass energy of 7 TeV, many milestones needed to be achieved first, such as for example the measurements of the $B$ hadron lifetimes, the measurement of the polarization amplitudes in $B^0 \rightarrow J/\psi K^+$ decays and the measurement of the CP violation in mixing in $B^0 \rightarrow J/\psi K_s$ decays.

We will present our latest result of the $\phi_s$ analysis and related measurements.

One of the challenges for all measurement of time dependent asymmetries in the $B_s$ system is to resolve the extremely fast $B_s$ oscillation. Due to its excellent proper time resolution, the LHCb collaboration was able to performed the world most precise $\Delta m_s$ measurement based on a data set of 36 pb$^{-1}$ only. One of the key ingredients to this analysis is the flavour tagging. We will present in this talk the status of opposite and same side flavour tagging and the latest $\Delta m_s$ result.

The LHCb collaboration has performed a first analysis of the CP-violating phase $\phi_s$ in tree dominated $B_s^0 \rightarrow J/\psi\phi$ decays exploiting an angular analysis to separate CP even and CP odd eigenstates.

Additional modes have been studied for complementary analysis, e.g. by using penguin decays or by using decays to CP eigenstates. In this talk we will present the first observation of the decay $B_s \rightarrow J/\psi f_0$ and of $B_s \rightarrow K^+ K^-$. The potential of these decays an other alternative $B_s$ modes to study CP violation in mixing will be discussed.

We investigate the resonance structure in the $\pi^+\pi^-$ system produced in $B_s \rightarrow J/\psi\pi^+\pi^-$ decays. Such decays can be used to measure the CP violating phase in $B_s$ decays. This final state is known to have large component of scalar $f_0(980)$ and a spectrum of additional events at higher masses. While the $f_0(980)$ part is a CP eigenstate, higher mass states could also be scalars and be simply added into the analysis. Using pp collisions at 7 TeV centre-of-mass energy collected by the LHCb detector, the angular distributions of the decays are analyzed and the spin-parity of the various components is determined.

**Primary author:** Dr LANFRANCHI, Gaia (LNF INFN)

**Presenter:** Mr LINN, Christian

**Session Classification:** Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
Hadronic and semileptonic b-hadron decays at LHCb

Thursday, 21 July 2011 18:15 (15 minutes)

In a data sample corresponding to \(36 \text{ pb}^{-1}\) of pp collisions at a centre-of-mass energy \(\sqrt{s} = 7\) TeV, we make the first observation of the decay \(\Lambda_b \rightarrow \Lambda_c^+ D_s^-\) and measure its branching fraction relative to that of \(\Lambda_b \rightarrow \Lambda_c^+ \pi^-\). We also present related measurements of B hadron decays.

In a data sample corresponding to \(36 \text{ pb}^{-1}\) of pp collisions at a centre-of-mass energy \(\sqrt{s} = 7\) TeV, we observe for the first time the decay \(B_s \rightarrow D^0 K^*0\). A clear signal of \(34.5 \pm 6.9\) events is obtained with a statistical significance over 9 standard deviations and we measure its branching ratio relative to that of \(B_0 \rightarrow D_0 \rho^0\):

\[
\frac{B(B_s \rightarrow D^0 K^*0)}{B(B_0 \rightarrow D^0 \rho^0)} = 1.39 \pm 0.31 \pm 0.17 \pm 0.18,
\]

where the first uncertainty is statistical, the second systematic and the third is due to uncertainty in the hadronisation fraction \(f_d/f_s\).

We report first observations of the Cabibbo-suppressed decays \(B_{s,0}^{-} \rightarrow D_{s,0}^{-} K\pi\pi\) and measure their branching fractions relative to the \(B_{s,0}^{-} \rightarrow D_{s,0}^{-} \pi\pi\pi\) Cabibbo-favoured modes. The measurements are conducted with the LHCb experiment using \(35 \text{ pb}^{-1}\) of data collected at \(\sqrt{s} = 7\) TeV.

The LHCb experiment is pursuing a broad programme of measurements of \(B_S\) and \(L_b\) semileptonic decays, with the goal of identifying exclusive hadronic final states and measuring their form factor shapes. We report first measurements of \(B_S \rightarrow D_S \mu\nu X\), \(B_S \rightarrow D K \mu\nu X\), and \(\Lambda_b \rightarrow \Lambda_c \mu\nu X\) based on the 2010 and early 2011 LHCb data samples.

**Primary author:** Dr LANFRANCHI, Gaia (LNF INFN)

**Presenter:** Mrs ARTUSO, Marina

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
Mixing and CP-violation studies in charm decays at LHCb

Friday, 22 July 2011 10:00 (15 minutes)

LHCb has collected a large sample of open charm events in the 2010 run. Indirect CP violation in charm is an excellent probe for new physics due to the smallness of the standard model predictions. Preliminary measurements of mixing parameters and searches for CP violation in the time-dependence of two-body charm decays are presented. The prospects of improving the sensitivity of these measurements in the 2011-12 run are discussed. Preliminary results of searches for time-integrated CP violation in two, three and four-body charm decays at LHCb are presented, using 37 pb-1 of data collected in 2010. We construct observables that are sensitive to direct CP violation, which is predicted to be small in the Standard Model, but insensitive to production and detector asymmetries. These searches are complementary to the time-dependent searches presented elsewhere. We conclude by discussing prospects for the 2011-12 run.

Primary author: Dr LANFRANCHI, Gaia (LNF INFN)
Presenter: Mr CHARLES, Matthew
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
The search for the very rare decays $B_{(s,d)} \rightarrow \mu^+ \mu^-$ at LHCb

*Friday, 22 July 2011 11:45 (15 minutes)*

Review of the search for the very rare decays $B^0_s \rightarrow \mu^+ \mu^-$ and $B^0 \rightarrow \mu^+ \mu^-$ with the LHCb experiment is presented. These decays are suppressed within the Standard Model as they can only occur via helicity suppressed loop diagrams. However, their amplitudes can be significantly different in many New Physics scenarios, especially in those with an extended Higgs sector. Therefore, these decays are a sensitive probe of physics beyond the Standard Model. The data collected in 2010 ($\sim 37 \text{ pb}^{-1}$) allowed LHCb to reach similar sensitivities to the existing limits from the CDF and D0 Collaborations. With the data accumulated so far in 2011 LHCb is entering uncharted territory.

**Primary author:** Dr LANFRANCHI, Gaia (LNF INFN)

**Presenter:** Mrs SERRANO, Justine

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
Angular analysis of the decay $B_d \rightarrow K^* \mu \mu$ at LHCb

*Friday, 22 July 2011 12:45 (15 minutes)*

The first LHCb measurements of the decay $B_d \rightarrow K \mu \nu$ will be presented. In particular, the forward-backward asymmetry, fraction of $K$ longitudinal polarisation and partial branching fraction as a function of the di-muon invariant mass squared will be shown from 309pb$^{-1}$ of the 2011 data.

**Primary author:** Dr LANFRANCHI, Gaia (LNF INFN)

**Presenter:** PATEL, Mitesh

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
Scalar Dark Matter Revisited

We present a scalar extension of the Standard Model with two singlets. The first singlet is stable and will be considered as WIMP candidate and the second is unstable and will mix to the Higgs boson field. The WIMP candidate will have mass of few GeV (the DAMA/LIBRA and CoGenT collaborations). The Higgs boson decay modes into dark(hidden) sector is discussed.

Primary author: Mr GHAFFOR, Djamel (Laboratoire de Physique Théorique d’Oran)
Presenter: Mr GHAFFOR, Djamel (Laboratoire de Physique Théorique d’Oran)

Track Classification: Higgs and New Physics
Search for a light charged Higgs boson decaying to csbar in pp collisions at sqrt(s)=7 TeV

We present the search results for a light charged Higgs boson produced in top pair events and decaying into csbar in pp collisions at sqrt(s)= 7 TeV with the ATLAS detector. The analysis uses a data sample corresponding to an integrated luminosity of 35 pb⁻¹. The search is based on the semi-leptonic channel of ttbar candidates and analyzes the invariant mass distribution of two jets in the final state. With no observation of the charged Higgs signal, we set 95% upper limits on the decay branching ratio of top quarks to charged Higgs bosons.

Primary author: Dr MARTYNIUK, Alex (University of Manchester)

Presenter: Dr MARTYNIUK, Alex (University of Manchester)

Track Classification: Higgs and New Physics
Search for Higgs with $H \rightarrow WW (\ast) \rightarrow l\nu l\nu$ ($l = e, \mu$) decay mode with the ATLAS detector at LHC

Using about 1 fb\(^{-1}\) of ATLAS data at 7 TeV proton-proton centre-of-mass energy taken in 2011, Higgs boson searches in the Higgs decay mode $H \rightarrow WW (\ast) \rightarrow l\nu l\nu$ ($l = e, \mu$) have been performed with sensitivity exceeding anything currently available. Important sensitivity to Higgs bosons masses between about 140 and 180GeV is available. The results are also interpreted in a model with a fourth sequential generation of fermions with heavy masses where enhanced production gives greater sensitivity.

**Primary author:** RUAN, Xifeng (LAL)

**Presenter:** RUAN, Xifeng (LAL)

**Track Classification:** Higgs and New Physics
Phenomenology of G(221) models at the LHC

We present the phenomenology of a class of models with an extended electroweak gauge group of the form SU(2)\times SU(2)\times U(1), often denoted as G(221) models. This includes Grand Unified Theory motivated models such as “left-right” as well as “non-universal” models. Given the most recent bounds on the parameter space derived from the low-energy precision measurements, we show expected signals for various observables in channels which are affected by the existence of additional charged and neutral (W’ and Z’) gauge bosons. In the first part of our analysis, we describe general features of the signals for G(221) models at the LHC and how they compare to the other extensions of the Standard Model containing W’- and Z’-bosons. In the second part, we show how to distinguish between models within the G(221) class of SM extensions.

Primary author: Dr JEZO, tomas (LPSC)
Presenter: Dr JEZO, tomas (LPSC)

Track Classification: Higgs and New Physics
Higgs search in the Higgs to bb channel

The decay of the Standard Model-like Higgs boson into bb is the dominant decay process in the region of low Higgs boson masses. The Higgs search in this channel requires an associated heavy object, allowing for strong discrimination from the dominant multi-jet background processes. We present the status of the Higgs searches in the H→bb channel based on the ATLAS data collected so far in 2011.

Primary author: Dr CONDE-MUNO, Patrizia (LIP)
Presenter: Dr CONDE-MUNO, Patrizia (LIP)
Track Classification: Higgs and New Physics
EPS HEPP Prize award and talks by recipients

Monday, 25 July 2011 09:20 (35 minutes)

Session Classification: Plenary
Gribov Medal, Young Physicist Prize and Outreach Prize awards

Monday, 25 July 2011 10:20 (10 minutes)

Session Classification: Plenary
The status and performance of the LHCb detector during the physics LHC physics run is described. The detector has a number of notable features including: 13 micron resolution in the transverse plane on 25 track primary vertices, pion and kaon separation from 1 to 100 GeV, and 1 MHz full readout of all sub-systems. The detector is being operating above its design luminosity. The detector is comprised of a silicon vertex detector (vertex locator - VELO), silicon and straw-tube tracking systems (inner and outer trackers), ring imaging cherekov particle identification systems (RICH), electromagnetic and hadronic calorimetry, and muons systems. Hardware and software based trigger levels are utilised to efficiently select leptonically and hadronically decay beauty and charm hadrons. The alignment, tracking and particle identification performance will be discussed.

Primary author:  Ms LANFRANCHI, Gaia (INFN)
Presenter: Dr VAN BEUZEKOM, Martin (Nikhef)
Session Classification: Detector R & D and Data Handling
Track Classification: Detector R & D and data handling
The LHCb Upgrade Detector

The Letter of Intent of the LHCb upgrade has recently been submitted. Flavour physics probes beyond the energy frontier (a few TeV at the LHC), since it is sensitive to the effects of virtual quantum loop diagrams associated with particles that can be far heavier than those which can be produced directly. To exploit fully the flavour-physics potential of the LHC will require an LHCb upgrade. This will allow LHCb to operate the detector at higher luminosity and to collect 50 fb$^{-1}$ of data integrated over around ten years of operation. A key feature of the upgrade will be to equip LHCb with 40MHz readout of all sub-detectors and a fully flexible software trigger. This will allow the selection of hadronic, as well as leptonic, final states in B and D decays at high luminosity and provide the flexibility for LHCb to serve as a general-purpose detector in the forward region. Detector upgrades such as a 50x50um pixel based vertex detector system, and a fibre tracking system and augmenting the RICH particle identification with a time-of-flight system are being considered. The relevant experience for the upgrade recently gained by operating the current detector at high luminosity will also be discussed.

Primary author: Ms LANFRANCHI, Gaia (INFN)

Presenter: SCHMIDT, Burkhard

Session Classification: Detector R & D and Data Handling

Track Classification: Detector R & D and data handling
Analyses of test beam data using the CALICE calorimeter

Friday, 22 July 2011 16:45 (15 minutes)

The CALICE collaboration has developed highly granular calorimeter prototypes to evaluate technologies for experiments at a future lepton collider, and evaluated their performance in test beams. One important use of these data is the validation of the physics models in GEANT4, especially those related to hadronic showers. This validation is crucial if Monte Carlo simulations are to be used to optimise the design of detectors for ILC or CLIC.

In this talk we discuss several features of hadronic showers recorded in the CALICE Si-W ECAL and scintillator-tile HCAL. The high spatial resolution of the calorimeters permits the investigation of shower shapes in unprecedented detail. For example, the start point of the shower can be identified with high precision, and the longitudinal development of the shower after this point permits some discrimination between the various components of the shower (nuclear spallation, electromagnetic components, MIP-like hadrons etc.). Detailed substructure within the shower, such as track segments, can also be identified. Many of these features present new challenges to the simulation models. We also report on recent tests of the time-structure of hadronic showers in a tungsten calorimeter - a topic of especial interest for a CLIC detector where accurate time stamping is required.

The calorimeters being built and tested by the CALICE collaboration are intended to be optimised for particle flow (PFA) reconstruction of jets at a future linear collider. This places an emphasis on measuring showers with a high spatial granularity, in order that nearby showers can be disentangled. The calorimeters are generally non-compensating, in other words they do not give the same response to photons as charged hadrons. However, the high level of detail recorded within the showers can be exploited in the form of "software compensation". A variety of techniques can be used to discriminate between the different components within showers and hence to weight them differently so as to improve the energy resolution. This approach is also found to improve the linearity of the response. We report on several studies along these lines.

The CALICE data on single pion showers can also be exploited to validate the particle flow concept. By superimposing the data from two separate showers, removing the incoming particle track from one of them, we can emulate a neutral hadron shower in the neighbourhood of a charged particle, at various separation. By offering these hybrid events to the standard PandoraPFA algorithm we can evaluate its ability to reconstruct neutral energy in a difficult environment. We show the results of this procedure, in comparison with the Monte Carlo models usually used for the testing of PFA codes.

Primary author: Mr DANILOV, Mikhail (ITEP-Moscow)

Presenter: Mr DANILOV, Mikhail (ITEP-Moscow)
**Session Classification:** Detector R & D and Data Handling

**Track Classification:** Detector R & D and data handling
CALICE Prototype Calorimeters for Linear Collider detectors

Friday, 22 July 2011 17:00 (15 minutes)

For several years, CALICE has been testing highly granular calorimeter prototypes using analogue readout. These devices are envisaged for particle flow application in a future linear collider detector. A novel alternative, especially interesting for the hadron calorimeter, is to use digital readout, with a very small cell size. In the past year the first large scale (1m$^3$) digital HCAL has been operated by CALICE in test beams at Fermilab. This detector uses glass RPCs for readout within an iron absorber structure. The RPCs are read out through 1x1 cm$^2$ pads with a single threshold, providing a digital image of the shower with high spatial resolution. Including a similarly equipped tail catcher, the system contains almost 500,000 readout channels. We report on the technical performance of this calorimeter, and show first physics results on shower reconstruction.

A related approach is to use RPCs with two-bit readout, providing three threshold values, referred to as a "semi-digital" HCAL. This approach is being pursued under the aegis of EUDET. Already in 2010 a full 1m$^2$ plane was tested in a beam, and a full 1m$^3$ is being tested at CERN in 2011. The current status is reported. In addition, tests in 2010 demonstrated the performance of these RPCs in a 3T magnetic field, and also showed that there was no degradation of performance when the electronics was "power pulsed", a technique which is envisaged to reduce power dissipation in an ILC detector. Alternative technologies for a digital HCAL are also being studied, both Micromegas, for which 1m$^2$ planes have already been tested in beams, and GEMs for which 30x30 cm$^2$ units are currently being tested.

Second generation analogue devices are also under construction, and we report progress here. The focus of this work is to develop technical solutions which could be scaled up to a full-sized detector.

The development of a highly segmented electromagnetic calorimeter based on silicon sensors with 5x5 mm$^2$ segmentation will be described, covering developments in sensor design, readout electronics and the mechanical and thermal issues of detector integration. The plan is to test one full-length module along with a fully instrumented 18x18 cm$^2$ tower. Modules are also being constructed using an alternative technology based on scintillator-strip sensors.

The second generation analogue HCAL is based on scintillating tiles that are individually read out by silicon photomultipliers. The prototype will contain about 2500 detector channels, corresponding to one calorimeter layer and aims at demonstrating the feasibility of building a detector with fully integrated front-end electronics.

Primary author: Mr XIA, Lei (Argonne)

Presenter: Mr XIA, Lei (Argonne)
**Session Classification:** Detector R & D and Data Handling

**Track Classification:** Detector R & D and data handling
Welcome and introduction to the joint session

Saturday, 23 July 2011 14:30 (10 minutes)

Presenter: Prof. ZWIRNER, Fabio (Univ. and INFN, Padova)

Session Classification: JOINT ECFA-EPS SESSION
Introduction to the European Strategy and its update

Saturday, 23 July 2011 14:40 (15 minutes)

Presenter: STAPNES, Steinar (CERN)
Session Classification: JOINT ECFA-EPS SESSION
Regional Flavour Factories followed by ECFA

Saturday, 23 July 2011 14:55 (10 minutes)

Presenter: NAKADA, Tatsuya (EPFL Lausanne)

Session Classification: JOINT ECFA-EPS SESSION
Recent developments on the INFN SuperB project

Saturday, 23 July 2011 15:05 (10 minutes)

**Presenter:** GIORGI, Marcello (Univ. di Pisa & INFN Pisa)

**Session Classification:** JOINT ECFA-EPS SESSION
Particle theory: recent progress and medium-term prospects

Saturday, 23 July 2011 15:25 (20 minutes)

Presenter: ALTARELLI, Guido (Roma Tre Univ.)
Session Classification: JOINT ECFA-EPS SESSION
High-energy accelerators: recent progress and future directions

Saturday, 23 July 2011 16:05 (20 minutes)

Presenter: MYERS, Steve (CERN)

Session Classification: JOINT ECFA-EPS SESSION
Experiments at the high energy frontier: achievements and future challenges

Saturday, 23 July 2011 17:15 (20 minutes)

Presenter: WELLS, Pippa (CERN)

Session Classification: JOINT ECFA-EPS SESSION
Neutrino physics: achievements and future challenges

Saturday, 23 July 2011 17:55 (20 minutes)

Presenter: WARK, David (Rutherford Appleton Laboratory)
Session Classification: JOINT ECFA-EPS SESSION
ECFA neutrino report

Saturday, 23 July 2011 18:15 (15 minutes)

Presenter: HALZEN, Francis (Univ. Wisconsin–Madison)
Session Classification: JOINT ECFA-EPS SESSION
General discussion and concluding remarks

Saturday, 23 July 2011 18:40 (20 minutes)

Session Classification: JOINT ECFA-EPS SESSION
Questions

Saturday, 23 July 2011 15:15 (10 minutes)

Session Classification: JOINT ECFA-EPS SESSION
Discussion on the talk

Saturday, 23 July 2011 15:45 (20 minutes)

Session Classification: JOINT ECFA-EPS SESSION
Discussion on the talk

Saturday, 23 July 2011 16:25 (20 minutes)

Session Classification: JOINT ECFA-EPS SESSION
Discussion on the talk

Saturday, 23 July 2011 17:35 (20 minutes)

Session Classification: JOINT ECFA-EPS SESSION
Discussion on the talks

Saturday, 23 July 2011 18:30 (10 minutes)

Session Classification: JOINT ECFA-EPS SESSION
Search for heavy resonances decaying into ZZ at CDF

Thursday, 21 July 2011 12:50 (10 minutes)

We report on a search for heavy resonances decaying into pairs of Z bosons using 6fb^-1 of ppbar collisions at sqrt(s)=2TeV collected by CDF.

The analysis explores three final states corresponding to decays of Z pairs into four charged leptons, two charged leptons plus neutrinos, and two charged leptons plus jets.

The results of the search are interpreted in the framework of theoretical models that predict heavy resonances decaying into ZZ, and for heavy resonance masses above 300GeV/c^2 we are sensitive to production cross-sections times branching ratio to ZZ below 0.2pb.

Primary author: Dr ROBSON, Aidan (Glasgow University)

Presenter: Dr ROBSON, Aidan (Glasgow University)

Session Classification: Higgs and New Physics

Track Classification: Higgs and New Physics
Crystal Based Double beta decay Experiments

Observation of $0^{\text{nbb}}$ would determine an absolute mass scale for neutrinos, prove that neutrinos are massive Majorana particles (indistinguishable from their own antiparticles), and constitute physics beyond the Standard Model. There are several experiments based on cryogenic crystals that try to find evidence on this reaction. A review of the current state of the field and the plans for the future will be presented.

**Primary author:** Dr GARFAGNINI, Alberto (Università di Padova e INFN)

**Presenter:** Dr GARFAGNINI, Alberto (Università di Padova e INFN)

**Session Classification:** Neutrino Physics

**Track Classification:** Neutrino Physics
Liquid Double Beta Decay Experiments

Observation of \( 0\nu\text{bb} \) would determine an absolute mass scale for neutrinos, prove that neutrinos are massive Majorana particles (indistinguishable from their own antiparticles), and constitute physics beyond the Standard Model. There are several experiments based on liquid detector technology that try to find evidence for this reaction. A review of the current state of the field and the plans for the future will be presented.

**Primary author:** Dr MARINO, Mike (TU Munich)

**Presenter:** Dr MARINO, Mike (TU Munich)

**Session Classification:** Neutrino Physics

**Track Classification:** Neutrino Physics
Updated search for Bd/Bs→μ+μ- decays at CDF

Friday, 22 July 2011 11:15 (15 minutes)

We report the latest results of a CDF search for B->mumu decays using 6.9/fb of data. Doubled statistics with respect to the previous iteration and several analysis improvement provide results that are the most sensitive from a single-experiment to date.

Primary author: Dr TONELLI, Diego (Scuola Normale Superiore, Pisa)
Presenter: KUHR, Thomas
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
Updated search for non-SM physics in 
$B \rightarrow K(\ast)\mu^+\mu^-$ decays at CDF

Friday, 22 July 2011 12:30 (15 minutes)

We present updated measurements of branching fractions, polarization, 
and muon forward-backward asymmetry in $B \rightarrow K(\ast)\mu \mu$ final states using 
6.7/fb of data collected by the CDF detector.
A search for $\Lambda_b \rightarrow \Lambda \mu \mu$ decays will also be shown.
The results are the most sensitive from a single experiment to date.

Primary author: Dr MIYAKE, Hideki (KEK, Tsukuba)
Presenter: Dr MIYAKE, Hideki (KEK, Tsukuba)
Session Classification: Flavour Physics and Fundamental Symmetries
Track Classification: Flavour Physics and Fundamental Symmetries
Updated measurements of hadronic B decays at CDF

Thursday, 21 July 2011 12:00 (15 minutes)

We present the updated analysis of \( B_d, B_s, \) and \( \Lambda_b \) decays into charmless two-body final states using 6/fb of data collected by the CDF experiment. We report the first evidence for the pure-annihilation decay \( B_s \rightarrow \pi^+\pi^- \) and improved limits on the \( B_d \rightarrow K^+K^- \) branching ratio. We also report the first measurement of branching fractions and CP-violating asymmetries of doubly-Cabibbo suppressed \( B^+ \rightarrow D^0 K \) decays in hadron collisions, using the approach proposed by Atwood, Dunietz, and Soni (ADS) to infer information on the CKM angle \( \gamma \) in 7.0 fb\(^{-1} \) of data. The relevant parameters are determined with accuracy competitive with best B factory measurements.

**Primary author:** Dr MORELLO, Michael (Scuola Normale Superiore)

**Presenter:** Dr MORELLO, Michael Joseph (INFN and University of Pisa)

**Session Classification:** Flavour Physics and Fundamental Symmetries

**Track Classification:** Flavour Physics and Fundamental Symmetries
Studies of bottom baryons at CDF

Friday, 22 July 2011 15:45 (15 minutes)

Using 4.2 $\text{fb}^{-1}$ of data collected by the displaced track trigger, we report the observation of the $\Xi_b^{-}$ baryon through its hadronic decay into a $\Xi_0 c \pi^{-}$ final state and a measurement of its mass. In addition, we report the results of a search for the $\Xi_b^{0}$ baryon.

Primary authors: Dr TONELLI, Diego (Scuola Normale Superiore, Pisa); Dr HARR, Robert (Wayne State University)

Presenter: Dr BUSSEY, Peter (University of Glasgow)

Session Classification: Flavour Physics and Fundamental Symmetries

Track Classification: Flavour Physics and Fundamental Symmetries
ATLAS studies of Soft QCD Processes at 7 TeV

Thursday, 21 July 2011 15:45 (15 minutes)

Using Minimum Bias data recorded in 2010, ATLAS has carried out several studies of the global properties of pp collisions at 7 TeV. A precise measurement of the total inelastic cross-section is presented in a well-defined fiducial volume, taking advantage of the precise knowledge of the luminosity available from van der Meer scans. First detailed studies of diffraction cross-sections are also reported, based on pseudo-rapidity gap distributions. The fraction of the inelastic cross-section arising from diffractive processes is studied, and the differential cross-section is measured as a function of gap size.

Primary author: Dr BARONCELLI, Toni (INFN Roma Tre)
Presenter: DEEPAK KAR, Dresden
Session Classification: QCD
Track Classification: QCD
Neutrino Telescope Mini-review

Thursday, 21 July 2011 09:00 (30 minutes)

Presenter:  KAPPES, Alexander (Humboldt-University Berlin / DESY)

Session Classification:  Astroparticle Physics
Gamma&Cosmic Rays Mini-review

Thursday, 21 July 2011 11:00 (30 minutes)

Presenter: RICO, Javier
Session Classification: Astroparticle Physics
Indirect Detection Dark Matter Searches Mini-review

Thursday, 21 July 2011 16:30 (30 minutes)

The self-annihilation, or decay, of dark matter particles could result in significant contributions to cosmic ray fluxes of various kinds, providing a unique opportunity to detect dark matter by means other than through its gravitational interaction. A wealth of observational data, both existing and upcoming, makes these indirect detection channels ever more interesting. I review the various messengers used in indirect dark matter searches and compare their respective advantages and disadvantages. I also briefly comment on the complementarity between indirect and direct detection methods, where one hopes to observe the recoil energy that dark matter particles would cause when interacting with a terrestrial detector.

Presenter: BRINGMANN, Torsten Bringmann (Hamburg University)

Session Classification: Astroparticle Physics
AMS-2 Status and Updates

Thursday, 21 July 2011 18:15 (15 minutes)

Presenter: BERTUCCI, Bruna
Session Classification: Astroparticle Physics
Direct Detection Dark Matter Searches Mini-review
Mini-review Direct Dark Matter Detection and recent XENON100 results

Thursday, 21 July 2011 14:30 (30 minutes)

Presenter: Dr MARRODÁN UNDAGOITIA, Teresa (Universität Zürich)
Session Classification: Astroparticle Physics
MEASUREMENT OF THE ZZ PRODUCTION CROSS SECTION IN PROTON-PROTON COLLISIONS AT $p_\text{s} = 7$ TeV WITH THE ATLAS DETECTOR

A measurement of ZZ production cross section in proton-proton collisions at $\sqrt{s} = 7$ TeV using $\sim 1$ fb$^{-1}$ of data collected by the ATLAS experiment at the LHC is presented. In this poster we discuss in detail the systematic uncertainties to the cross section measurement, and the data driven background estimate technique, which is also used in the measurement of the WZ production cross section. Limits on the anomalous triple gauge couplings (aTGCs) are also presented.

**Primary authors:** PETRIDIS, Andreas (ATLAS); SHAPIRO, Marjorie (LBL)

**Presenter:** PETRIDIS, Andreas (ATLAS)

**Track Classification:** Top and Electroweak Physics
Scalar diquark in $t\bar{t}$ production and constraints on Yukawa sector of grand unified theories

Saturday, 23 July 2011 12:10 (20 minutes)

The experimental results on the $t\bar{t}$ production cross section at the Tevatron are well described by the QCD contributions within the standard model, while the recent measurement of the forward-backward asymmetry cannot be accounted for within this framework. This discrepancy can be explained by an exchange of a colored weak singlet scalar in the $u$-channel. Such state $\Delta$ couples to up-quark pairs antisymmetrically in flavor space, independently of an underlying model, and appears naturally in some of the grand unified theories. We find that both the $t\bar{t}$ production cross section and the forward-backward asymmetry can be accommodated simultaneously if mass of $\Delta$ is around 400 GeV. The additional constraints on the relevant up-quark Yukawa couplings come from di-jet and single top production measurements at the Tevatron as well as from $D^0 - \bar{D}^0$ oscillations. In a particular $SU(5)$ GUT model, this scalar state stems from the 45-dimensional Higgs representation and is allowed to be lighter than 1 TeV without violating limits from proton decay lifetime. We demonstrate how the obtained information enables to constrain the Yukawa couplings of the up-quarks at the GUT scale. Additional constraints from processes involving down-quarks and leptons indicate that this $SU(5)$ scenario should be realized with very small vacuum expectation value for the 45-dimensional Higgs. We analyze experimental signatures and find that $\Delta$ associated top production could be probed in the $t\bar{t} + \text{jets}$ final states at Tevatron and the LHC.

References:
- arXiv:0912.0972
- arXiv:1007:2604
- arXiv:1107.5393

Presenter: KOSNIK, Nejc

Session Classification: Top and Electroweak Physics

Track Classification: Top and Electroweak Physics
Betabeams
Charged particle identification (PID) for SuperB

Charged particle identification (PID) is a key input for the physics program of the SuperB experiment. In the barrel region, the main detector for K/π separation will be the 'Focusing Detector of Internally Reflected Cherenkov light' (FDIRC), the successor of the successful BaBar DIRC, which camera has been completely re-designed. In addition, R&D is ongoing to add a detector on the forward side of SuperB to extend the PID coverage. This innovative time-of-flight detector will use new electronics accurate at the 10-ps level.

Primary author:  Mr ARNAUD, Nicolas (in2p3-LAL)
Presenter:  Mr ARNAUD, Nicolas (in2p3-LAL)
Track Classification:  Detector R & D and data handling
Searches for Double Parton Scattering at the LHC

Searches for the kinematic selection criteria for estimation of multiple parton interaction fraction in pp collisions at $\sqrt{s} = 14$ TeV are presented using the eikonalization of the cross section implemented in the HERWIG++ MC generator. $W^+$ boson pair production is studied in the muon decay channel. Four types of the main background processes are discussed and analyzed. These include $W^+W^+jj$, $W^+Z$, $ZZ$, and $tt$bar productions of the positively charged muon pairs. The double parton scattering contribution to the requested di-muon final state is found to be around 25 per cent with the production cross section of 0.94 fb.

**Primary author:** MYSKA, Miroslav (IP ASCR, Prague)

**Presenter:** MYSKA, Miroslav (IP ASCR, Prague)

**Track Classification:** Top and Electroweak Physics