



OCEVU STEERING COMMITTEE MEETING

Marseille, 12 December 2014

Particle Physics Working Group Report

Coordinators: Lorenzo Feligioni, Laurent Lellouch



- Particle Physics Working Group Ongoing projects:
 - New physics through direct production (**energy frontier**)
 - Probing the nature of Electroweak Symmetry Breaking at the LHC with the ATLAS detector
 - New Physics from a natural Electroweak symmetry breaking
 - New physics in indirect searches (**intensity frontier**)
 - B decays into tau lepton pairs and related rare processes
 - Rare dileptonic B decays
 - The muon anomalous magnetic moment and the search for new physics in the LHC era
 - Dark matter interface w/ astro. & cosmo. (**cosmic frontier**)
 - Lattice QCD enlightens dark matter
- Foreseen actions in 2015

- **Energy Frontier:** Is the resonance discovered in July 2012 at CERN really “the” Higgs and can we reveal new fundamental physics by direct production at run 2 of LHC?
 - Probing the nature of Electroweak Symmetry Breaking at the LHC with the ATLAS detector:
 - Interface theoretical and experimental physics between ATLAS CPPM Group (C. Diaconu, L. Feligioni, S. Muanza) , L2C & LUPM phenomenology group (J.-L. Kneur, G. Moultaka)
 - OCEVU funded **1** PD: **S. Diglio (Jan 2014)**, **2** PhD: **V. Ellayosula (Oct 2014)**, **(+ 1 2015)** **3** FV: **Y. Liu (USTC)**, **X. Zhuang (IHEP)**, **S. Davidson (IPNL)**
 - New Physics from a natural Electroweak symmetry breaking
 - Collaboration between L2C & LUPM group (M. Frigerio, J.-L. Kneur) and CPT (M. Knecht)
 - OCEVU funded **1** PhD: **N. Bizot (Oct 2013)**

- **Intensity Frontier:** Can we reveal new fundamental physics, including new sources of CP violation, indirectly, in flavour physics and other lower-energy experiments (e.g. anomalous magnetic moment of the muon)?
 - The muon anomalous magnetic moment and the search for new physics in the LHC era
 - Interface between different theory groups L2C+LUPM [new physics] and CPT+L2C+LUPM [Various approaches to standard model computations, large-Nc modeling, sumrules, including large scale numerical simulations].
 - OCEVU funds **1 PD: (will start 2015)**
 - B decays into tau lepton pairs and related rare processes and Rare dileptonic B decays
 - Interface the experimental group LHCb CPPM (G. Mancinelli, J. Cogan, J. Serrano) and the theory CPT group (J. Charles)
 - OCEVU funds **1 PD: A. Tayduganov (Nov 2014), 1 PhD: A. Mordà (Oct 2012).**
- **Cosmic frontier:** Is dark matter an elementary particle yet to be discovered?
 - Lattice QCD enlightens dark matter
 - Interface particle experiment & theory & astroparticles & cosmology
 - OCEVU funds: **1 PD: Torrero (Nov 2013), 1 PhD: P. Mollitor (2015)**

- Coordinators: Lorenzo Feligioni & Laurent Lellouch [LL until end 2014]
- Board: C. Hugonie, JL Kneur, R. Legac, L. Lellouch, G. Moultaqa, E. Nezri, L. Vacavant (, P. Jean)
- Frequent organized meetings (not counting OCEVU workshops!)
- Organization of conferences in Marseille & Montpellier, often involving many OCEVU labs and sometimes many working groups: DIS 2013, SFP 2013, News from the dark 2013, FPCP 2014, QCD 2014, FFP 2014
 - Conference participation & subsequent reporting to OCEVU members