

WP : physics@colliders



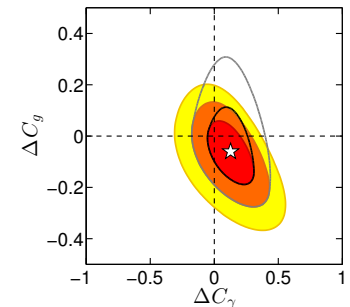
Goal 2014-2016:

Preparing for Run2 @13TeV and physics analyses

Also : detectors, preparing upgrades or post-LHC

The Higgs

- Is the 125 GeV Higgs the SM Higgs?
 - measurement of standard decay channels (LAPP - 2photon)
 - Precise measurement of Higgs mass in two-photon
 - LAPP , Enigmass PhD - to start in 2014 +Enigmass Postdoc?
 - Global fits (LPSC, LAPTh)
 - soon public code (B. Dumont, J. Bernon)
 - Interpretation in the framework of NP models
 - LAPTh/LPSC + Enigmass PhD J. Bernon
 - Composite Higgs ?
 - C. Delaunay (LAPTh)
 - Exotic decay channels (e.g. $H \rightarrow cc$ and new physics)
 - C. Delaunay
 - CP properties (pure scalar or not) : Wh, ttH/A
 - C. Delaunay, K. Mohan, R. Godbole + LAPTh



- Other channels
 - Cross section measurement SM diphoton+jets, and 2photons+bb (QCD background for future measurement of Higgs self-coupling)
 - Enigmass PhD: Suzanna Barnovska
 - interest for NP
- Searches for other scalars
 - Charged Higgs (2 thesis ‘co-tutelle’ Stockholm - LPSC)
 - Signatures at LHC - ‘Inert doublet’ (LPSC) + extensions (LAPTh)
- Long term : Higgs self-couplings

Beyond Standard model

- No sign of NP @LHC7/8TeV
- Hierarchy problem and dark matter --> BSM
- Supersymmetry, Xtra-Dimensions, extended scalar sector, composites -> Global view of new physics models
- ATLAS and CMS searches in a variety of channels - coherent interpretation difficult/time consuming - simplified model spectra
- New automatized tool, SModelS allow to apply SMS results in variety of models
 - LPSC/Vienna+ Enigmass visitor (U.Laa)
- Development of tool based on MadAnalysis5 : reinterpretation of SUSY limits in theoretically well-motivated models
 - LPSC/LAPTh +DMAstroLHC+ Postdoc Enigmass?
 - PhD LPSC/LAPTh - to start in fall 2014

- LHC limits on composite partners of light quarks
 - C. Delaunay (LAPTh)
- Automatisation of NLO-QCD corrections in BSM (eg SUSY and vector-like quarks) + prospective for 100 TeV collider
 - Enigmass PhD, J. Proudhom (LPSC)
- Monophotons - interpretation SUSY, XtraDim + link DM
 - PhD thesis with M.-H. Genest (LPSC)
- Diphotons at large mass (RS or ADD)
 - PostDoc ANR - LPSC (F. Malek, J. Stark +Postdoc Enigmass?)
- Model Independent Search for NP in di-electron channel (e.g. Z')
 - LPSC (Ledroit, Stark), LAPP (T. Berger)+Postdoc Enigmass?

Top

- Heaviest particle of SM - order one coupling to Higgs -link to mass generation mechanism
- Large group at LPSC
 - Single top : measurement of cross section in s-channel (A. Lucotte, A.Lleres + PhD)
 - measurement of Wt cross-section (C. Gabaldon)
- New physics searches in same sign top events
 - Thesis proposal (A. Lleres + C. Smith)
- M_{T2} -based strategy to measure top polarization and $t\bar{t}$ spin correlations + NP search
 - LAPTh-D. Guadagnoli +Postdoc Enigmass?
- Using top polarisation to increase reach in new particle searches and extract properties of SUSY particles
 - R. Godbole, LAPTh, LPSC-Th

W's

- Strong connection with EWSB, dynamics of weak vector bosons probes mass generation
- EWSB and NP
 - Measurement of WZ/WW final states
 - Probing EWSB through multi-boson processes
 - Searches for NP
 - Studies of spin correlations in multi-boson (E. Sauvan +Postdoc Enigmass ?)



ENIGMASS

