

October 1, 2013

Upcoming events:

- [Photon HATS@LPC](#) (October 10-11, 2013)
- [SUSY at the Near Energy Frontier](#) (November 11-13, 2013)
- [CMS Data Analysis School](#) (January 7-11, 2014)

Full schedule of past and future events available at: lpc.fnal.gov/bulletin/LPCbulletin.shtml



Report on Electroweak SUSY

by Ben Hooberman

The discovery of a Higgs boson suggests novel search strategies for beyond-the-standard model (BSM) physics. In particular, the weakly-interacting supersymmetric (SUSY) neutralino (SUSY partner of the gauge and Higgs bosons) is expected to decay with a large branching fraction to Higgs bosons. In collaboration with LPC fellow Frank Golf and LPC resident Dave Mason, we have initiated a novel program using the Higgs boson as a probe in searches for the weakly-interacting SUSY particles.

As convener of the leptonic SUSY group, I organized a working group with contributions from US institutions, including Fermilab, UCSB, UCSD, Rutgers, UC Irvine, Colorado, and Cornell. We have produced a preliminary result using the WH+MET signature and the full 2012 data sample (CMS-PAS-SUS-13-017), which I presented at the SUSY13 conference. Our group is currently extending the searches to include additional signatures with $H \rightarrow \gamma\gamma$ decays, as well as exotic events with two Higgs bosons reconstructed in their decays to b quarks.

In addition to producing results with 8 TeV data, I am projecting the 5σ discovery reach in 14 TeV data for charginos and neutralinos up to 400-500 GeV. The results were recently approved to be included in the update to the Snowmass 2013 white paper.

Selection of fellow activities

Jake Anderson (Fermilab)

- Organizer for [LPC workshop on gauge boson couplings](#) (August 19-20)
- Instructor of HATS@LPC on multivariate and statistical analysis techniques ([June 12](#) and [June 26](#))
- Author and contributor of 3 Snowmass white papers ([arXiv:1309.0845](#), [arXiv:1307.8080](#), [arXiv:1309.1057](#))
- Semileptonic WW final state searches for anomalous couplings or new particles.

Patrizia Azzi (INFN – Padova and CERN)

- Organizer for [PPD/GED/upgrade workshop](#) (July)
- Organizer for [TLEP workshop](#) (July)
- Convener-elect of [CMS B2G group](#)
- GED development in collaboration with LPC residents

Ken Hatakeyama (Baylor University)

- Organized SUSY contributions to L1 trigger TDR: [CERN-LHCC-2013-011](#)
- MET performance in 8 TeV data, [CMS-PAS-JME-12-002](#)
- Search for new physics in the multijets and missing momentum final state in proton-proton collisions at 8 TeV, [CMS-PAS-SUS-13-012](#)
- Organized CMS SUSY contributions to Snowmass: [arXiv:1307.7135](#)
- Organized SUSY contributions for the ECFA workshop: CMS-PAS-FTR-13-014

Fellow activities continued

Jim Hirschauer (Fermilab)

- R-parity violating SUSY studies for Snowmass
- Contributions to Snowmass 2013 Energy Frontier working group
- New L3 manager for USCMS HB/HE front-end upgrade; Successful DOE CD-1 review (August)
- Selected as Fermilab Wilson fellow
- Investigating stealth SUSY at 8 TeV

Ben Hooberman (Fermilab)

- Organizer of [electroweak SUSY with Higgs meeting at the LPC](#) (June 10-14)
- Search for electroweak production of charginos and neutralinos in final states with a Higgs boson in pp collisions at 8 TeV, [CMS-PAS-SUS-13-017](#)

Sarah Malik (Rockefeller University)

- Ratios of W and Z cross sections at large boson p_T as a constraint on PDFs and background to new physics: [arXiv:1304.2424](#)
- Search for new physics in monojet events in pp collision at $\sqrt{s} = 8$ TeV: [CMS-PAS-EXO-12-048](#)
- Organizer of “Dark matter at LHC” workshop at [University of Chicago](#) (September 19-21)
- URA fellowship award
- [Public lecture in Pakistan](#) (August)
- Talks at [Pheno 2013](#) (May), [Brookhaven Forum](#) (May), and [Dark matter at LHC](#) (September)

Yurii Maravin (Kansas State University)

- Organizer for [LPC workshop on gauge boson couplings](#) (August 19-20)
- Organizer for [Anomalous quartic gauge couplings workshop in Dresden](#) (September 30 - October 2)
- Co-convenor of [CMS e- \$\gamma\$ physics object group](#)
- Working with LPC residents on electron reconstruction and developing FLUKA simulation for a future forward calorimeter.

Kalanand Mishra (Fermilab)

- Search for $WW\gamma$ and $WZ\gamma$ production in pp collisions at $\sqrt{s} = 8$ TeV, [CMS-PAS-SMP-13-009](#)
- Search for Standard Model-like Higgs boson decaying into $WW \rightarrow l\nu qq$ in pp collisions at $\sqrt{s} = 8$ TeV, [CMS-PAS-HIG-13-008](#)
- Led pileup study team for BOOST 2012 report on performance of jet grooming at high pileup

- Editor of “Electroweak corrections at high energies” portion of QCD white paper for Snowmass 2013.
- Talks at [WIN 2013](#) (September), [PIPS 2013](#) (May), [LHC electroweak precision measurements working group](#) (April)
- Organizer for [LPC workshop on gauge boson couplings](#) (August 19-20)
- Organizer for [Anomalous quartic gauge couplings workshop in Dresden](#) (September 30 - October 2)
- Co-organizer of LPC coffee hour
- Instructor of [HATS@LPC on jet substructure](#)

Manfred Paulini (Carnegie Mellon University)

- Organizer for [SUSY at the near energy frontier workshop](#) at the LPC (November 11-13)
- Member of CMS $B_s \rightarrow \mu^+ \mu^-$ review committee, [Phys. Rev. Lett. 111 \(2013\) 101804](#)
- Searching for SUSY with photons in the final state with sensitivity to electroweak production of supersymmetric particles.

Seema Sharma (Fermilab)

- Search for new physics in the multijets and missing momentum final state in proton-proton collisions at 8 TeV, [CMS-PAS-SUS-13-012](#)
- Organizer for [SUSY at the near energy frontier workshop](#) at the LPC (November 11-13)
- Plenary talk at [DIS 2013](#)

Kevin Stenson (University of Colorado)

- Angular analysis and branching fraction measurement of the decay $B^0 \rightarrow K^{*0} \mu^+ \mu^-$, [arXiv:1308.3409](#)
- Plenary talk at [FPCP 2013](#)
- L3 manager for USCMS FPIX pilot detector; Successful DOE CD-1 review (August)
- Improving track reconstruction for upgraded CMS detectors

Francisco Yumiceva (Florida Institute of Technology)

- CMSDAS instructor for b-tagging and top quark
- Testing and characterizing the QIE10 ASIC with engineers and scientists at Fermilab
- Measuring top pair production associated with photons