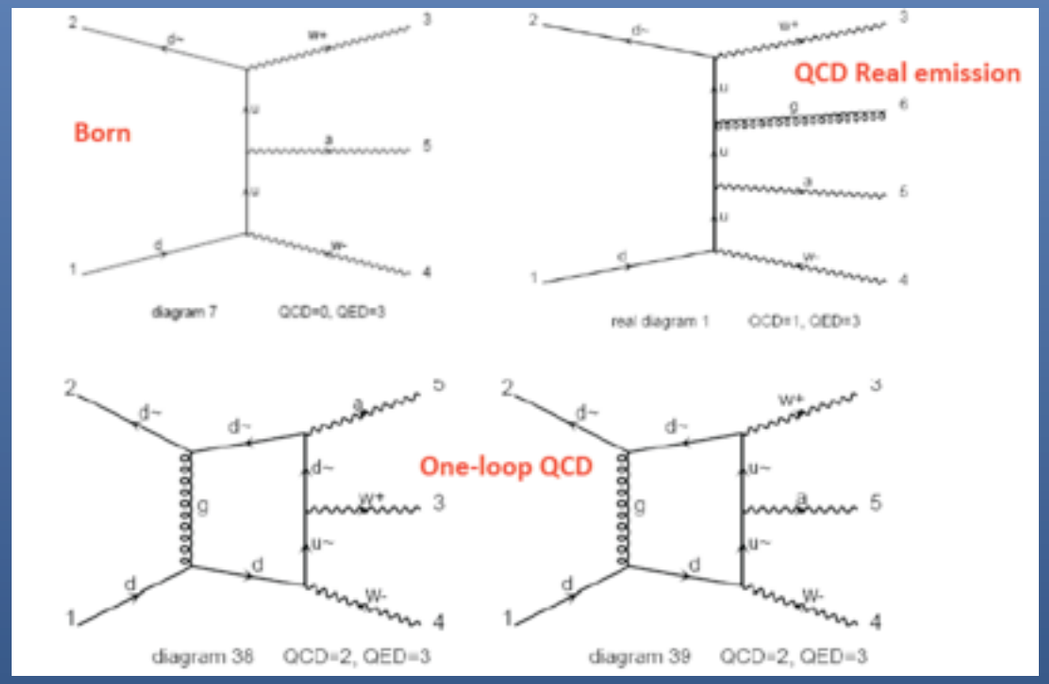
LPC Workshop on Gauge Boson Couplings



Meenakshi Narain, Richard Cavanaugh, Boaz Klima
LHC Physics Center Coordinators

LPC GBC workshop
Fermilab, 19-20 August, 2013

Overview of LPC...

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- The LPC is an established regional center for CMS physics analysis & detector upgrades.

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Fermilab

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- The LPC is the local (US) center of excellence for CMS physics.
  - Proximity to a broad range of object expertise under one roof
  - Access to outstanding computing resources and software support
  - A vibrant intellectual community

LPC Users

Fermilab

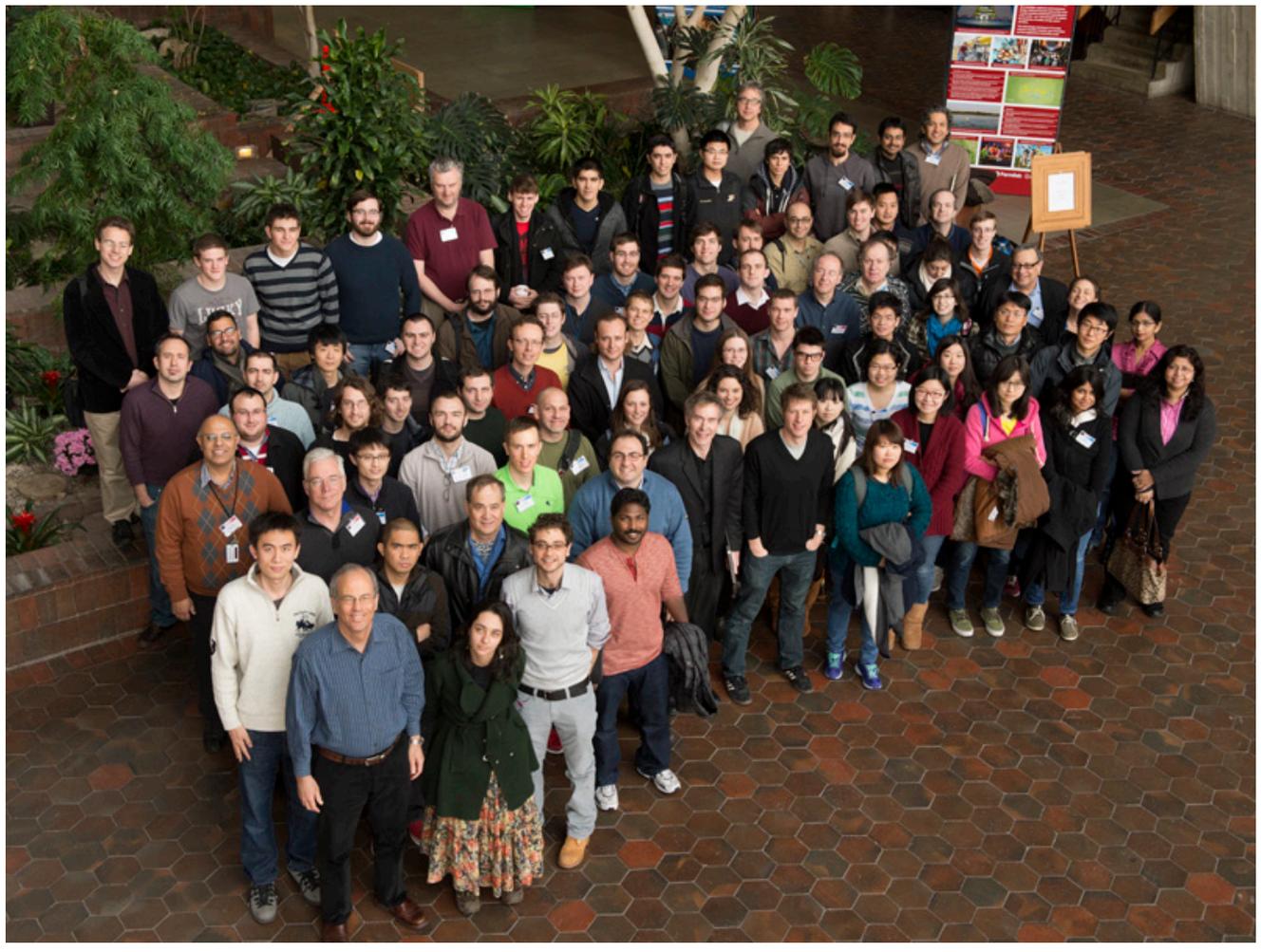
- **Serves as a resource and physics analysis hub for several hundred physicists at US institutions in the CMS collaboration**

In 2012 there were about 370 users

Roughly 270 from universities (residents & visitors)

About 100 Fermilab staff

In 2012, the Tier3 computing, LPC CAF, provided support to around 676 active users (out of a total of 1959+ accounts)



LPC GUEST AND VISITOR PROGRAM

The LHC Physics Center (LPC) is pleased to announce a call for proposals for short stays at the LPC starting in June 2013.

A modest amount of funding is available to support short one to three month stays at the LPC during the period 1 June 2013 to 31 September 2013. Proposals are due by Friday 15 March, and should be submitted to Terry Grozis (tgrozis@fnal.gov), in PDF format.

The goal of the LPC Short Stay Guest Program is to promote all research activity on CMS, including analysis of data and work on detector upgrades. The LPC is active in several CMS physics analysis areas, including: Higgs properties, SUSY, Exotica, B2G; physics objects groups, and participation in upgrade hardware and software projects. The LPC has significant resources: a large scale computing facility, CMS software support, and a strong intellectual community with CMS leadership in detector development, physics object reconstruction, and data analysis.

Faculty, post docs and graduate students are eligible. Proposals should be no more than one page, describing the research and deliverables, as well as the rationale for conducting the work at the LPC. Clearly state the proposed start and end date and funding amount requested. Proposals to support graduate students should be submitted by the major professor, proposals to support post docs should be submitted by the mentor/supervisor. A review of the proposals will be conducted shortly after the deadline with results communicated to the proponents expeditiously.

Elif Albayrak	Iowa
Sunanda Banerjee	Kolkata
Burak Bilki	Iowa
Mehmet Deliomeroglu	Turkey (Cukurova)
Kamuran Dilsiz	Iowa
Alejandro Gomez	Boston/Ecuador
Yifei Guo	Peking
Maksat Haymuradov	Iowa
Shilpi Jain	India (Delhi & Kolkata)
Kittikul Kovanggoon	Texas Tech
Nick Kypreos	Florida
Terence Libeiro	Texas Tech
Jia Fu Low	Florida
Michael Luk	Brown
Mikhail Makouski	Kansas State
Yurii Maravin	Kansas
Angela Marotta	Texas A&M
Anthony Moeller	Iowa
Roy Montalvo	Texas A&M
John Neuhaus	Iowa
Hasan Ogul	Iowa
Neeti Parashar	Purdue-Calumet
Myeonghun Park	Florida
Doug Rank	Florida
Valdas Rapsevicius	Florida
Ernest Roncheck	Kansas State
Aurore Savoy-Navaro	CNRS-IN2P3 Paris 6
Michael Segala	Brown
Shruti Shrestha	Kansas
Anil Singh	Panjab
Jason St. John	Boston
Suharyo Sumovidagdo	UC Riverside
Irakli Svintradze	Kansas
Andre Sznajder	Brazil (UERJ)
David Tersengo	Brown
Emrah Tiras	Iowa
Mehmet Virgili	Turkey (Cukurova)
James Wetzel	Iowa
Zhoulin Xie	Brown
Taylan Yetkin	Iowa
Kai Yi	Iowa
Mohammed Zakaria	Florida
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Duration 2 weeks- 3 months
Students, post docs, faculty

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CMS LPC Fellows Program

Fermilab

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- Flagship of the LPC -- International competition
  - identifies and brings to the LPC, jointly with the university community, exceptional young CMS scientists

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22 Fellows in 2013

LPC Activities

- With the 1st long shutdown of the LHC, develop projects centered around a couple of key activities
  - Participation in the upgrade – phase1 and 2
  - Participation in the future analyses groups
  - Participation in Snowmass-related studies: Higgs, QCD, Top, New Particles, Instrumentation, computing
  - Participation in ECFA studies for CMS
  - Planning for 2015 Run (physics analyses, triggers, software infrastructure, …)
  - etc.
- Opportunities to get involved with hardware, software and physics analysis (can only happen at a large and diverse center like the LPC)

LPC: A meeting point

Fermilab

Events

- bi-weekly “Physics Forum”
  - “chalk-talk” physics issues of high interest
- Coffee-Chat
  - monthly discussion on issues of community interest
- “CMS Data Analysis Schools”
  - For newcomers to learn about CMS, once a year
- HATS@LPC (Hands-on Advanced Tutorial Sessions)
  - A forum to share experiences with tools used in successful analyses of 2012 data and preparation for the run 2015.
    - 6 session during this summer, more planned
- Topic of the Week “Seminars”

OPIC OF THE WEEK

ichael Peskin

ebruary 22nd and 23rd

Scientist's visit

- Next guest
- Schedule

Talk links & video

- LPC Topic of the Week Links
- LPC Physics Forum

Archive

Day	Speaker	Topic	Where
Wednesday, Feb 22nd at 2pm	Michael Peskin (SLAC)	Light Composite Higgs: The Third Way to Electroweak Symmetry Breaking - Part 1	WH11 NE (Sunrise)
Thursday, Feb 23rd at 3:30pm	Michael Peskin (SLAC)	Light Composite Higgs: The Third Way to Electroweak Symmetry Breaking - Part 2	WH11 NE (Sunrise)

LPC Topic of the Week in 2012

Fermilab

TOPIC OF THE WEEK

Liantao Wang

March 27th and 28th

Scientist's visit

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Mar 27th at 3pm	Liantao Wang (UChicago)	Searching for light dark matter at colliders	WH11 NE (Sunrise)
Mar 28th at 2pm	Liantao Wang (UChicago)	Higgs signal and new physics implications	WH11 NE (Sunrise)

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April 18th and 20th

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Archive

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Apr 18th at 2pm	Can Kilic (UTexas)	The Collider Phenomenology of Vectorlike Confinement	WH11 NE (Sunrise)
Apr 20th at 1pm	Can Kilic (UTexas)	Two topics that connect Dark Matter and the LHC: Flavored Dark Matter and the Consequences of Grand Unification	WH11 NE (Sunrise)

LPC Topic of the Week in 2012

Fermilab

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TOPIC OF THE WEEK

Marcus Hohlmann

July 25th and 26th

Scientist's visit

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- Schedule

Talk links & video

- LPC Topic of the Week Links
- LPC Physics Forum

Archive

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Jun 25th	Marcus Hohlmann (Florida Institute of Technology)	GEM Detectors for a CMS Muon Endcap Upgrade & Other Uses	WH11 NE (Sunrise)
Jun 26th	Marcus Hohlmann (Florida Institute of Technology)	GEM Detectors for a CMS Muon Endcap Upgrade & Other Uses	WH11 NE (Sunrise)

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August 1st at 2pm	Oliver Buchmueller (Imperial College of London)	Supersymmetry: post discovery of a new (Higgs?) boson.	WH10 NW (West Wing)
August 23rd at 2pm	Roger Wolf	Search for a neutral Higgs Boson in the SM and MSSM	WH11 NE (Sunrise)
Sep 10th	Tim Tait (UC Irvine)	TBD	WH11 NE (Sunrise)
Oct 4th at 2pm	Anton Poluektov(Warwick)	Latest results on CP violation and rare decay measurements at LHCb	WH11 NE (Sunrise)
Oct 23rd at 3pm	Ted Liu(Fermilab)	Overview of Trigger in HEP: the view from physics	WH11 NE (Sunrise)
Oct 24th at 2pm	Ted Liu(Fermilab)	Trigger Challenges at high luminosity LHC: the view from technology	WH11 NE (Sunrise)
Nov 5th at 2pm	Raman Sumdrum(University of Maryland)	CMS Workshop on Naturalness	WH11 NE (Sunrise)
Nov 7th at 2pm	Sanjay Padhi(UCSD)	CMS Workshop on Naturalness	WH11 NE (Sunrise)
Nov 14th at 3pm	Steven Lowette (UCSB)	Stop searching in CMS	WH11 NE (Sunrise)
Nov 15th at 2pm	Evan Friis (Wisconsin)	Tau reconstruction and identification at CMS	WH11 NE (Sunrise)
Nov 16th at 2pm	Evan Friis (Wisconsin)	Searches for Higgs bosons using taus at CMS	WH11 NE (Sunrise)
Nov 27th at 2pm	Sara Bolognesi(JHU)	Characterization of the newly discovered boson: is it the long-awaited SM Higgs?	WH11 NE (Sunrise)
Nov 28th at 2pm	Si Xie (CalTech)	The Present and Future of the Higgs Sector	WH11 NE (Sunrise)
Nov 30th at 2pm	Artur Apresyan (CalTech)	Searches for physics beyond the standard model in the third generation	WH11 NE (Sunrise)
Dec 4th at 3pm	Alexander Paramonov (Argonne)	Study of jets produced in association with a vector boson	WH11 NE (Sunrise)

LPC Topic of the Week in 2012

Fermilab

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About one TOTW every two weeks

LPC: A meeting point

Fermilab

- Engaging the larger community
- Establish a proactive partnership beyond CMS with the wider community
  - Snowmass study group meetings (QCD, Top)
  - venue for workshops and collaboration meetings (CTEQ etc…)
  - topical workshops on common issues:
    - Higgs/SUSY “ewkino topical gathering” (June 2013)
    - 5th TLEP workshop (July 25-26, 2013)
    - Gauge Boson Couplings (August 19-20, 2013)
    - Top partners workshop (September 26-27 2013)
    - SUSY workshop (November 11-13, 2013)
- +… more being planned

A Meeting Point: Snowmass

Fermilab

- The Snowmass meeting will shape the priorities for the US high energy physics program in the coming decade
- We must ensure that the case is made for a strong investment into the energy frontier, and maintaining a cutting edge EF program in the US.

- LPC contribution to Snowmass EF effort
  - Defining the tools for simulation
  - Leading effort to generate background MC for future hadron colliders
    - MC is available to the entire community
    - Also being used by CMS for ECFA studies.
- LPC Fellows/members conveners of several EF study groups

- With the discovery of the Higgs boson, we have entered a new era: we now have a theory that can be extrapolated to scales many orders of magnitude beyond those that we can currently directly probe.
  - Strong motivation to continue exploration for new physics at the TeV scale from the necessity of reconciling the highly constrained theoretical framework with the phenomena observed in nature.
- Renewed interest in understanding of EWSB, especially the triple and quadratic gauge boson couplings, which are directly sensitive to Higgs couplings.
- Many results from LHC constraining gauge and Higgs boson couplings will be delivered during this summer
- More precise measurements of quartic couplings and WW scattering will need 13/14 TeV data

LPC GBC Workshop

Fermilab

- One of the main focus of the LPC is to start discussions to plan studies for the 2015 run.

- We are happy to provide the support from the LPC and host this two day gathering to discuss the current status of GBC results and their implications for the next LHC run starting in 2015.

- Thank you and welcome to FNAL and GBC workshop.

LPC support from USCMS & FNAL

Fermilab

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Fermilab

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  - ~40 Senior Scientists, ~15 Research Associates
  - ~120 Fermilab Staff on CMS ; more than 50% working full time

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  - scientists mechanical & electronics engineering, technicians, managers, office space, secretariat, admin support
- Facilities provided to the LPC by USCMS and Fermilab
  - 3000 slot Tier-3 computing cluster, access to all Fermilab Tier-1 data stored on disk, personal storage of 2 TB/physicist, as well as group storage space
  - SiDet and other detector facilities, test-beam
  - Remote Operations Center