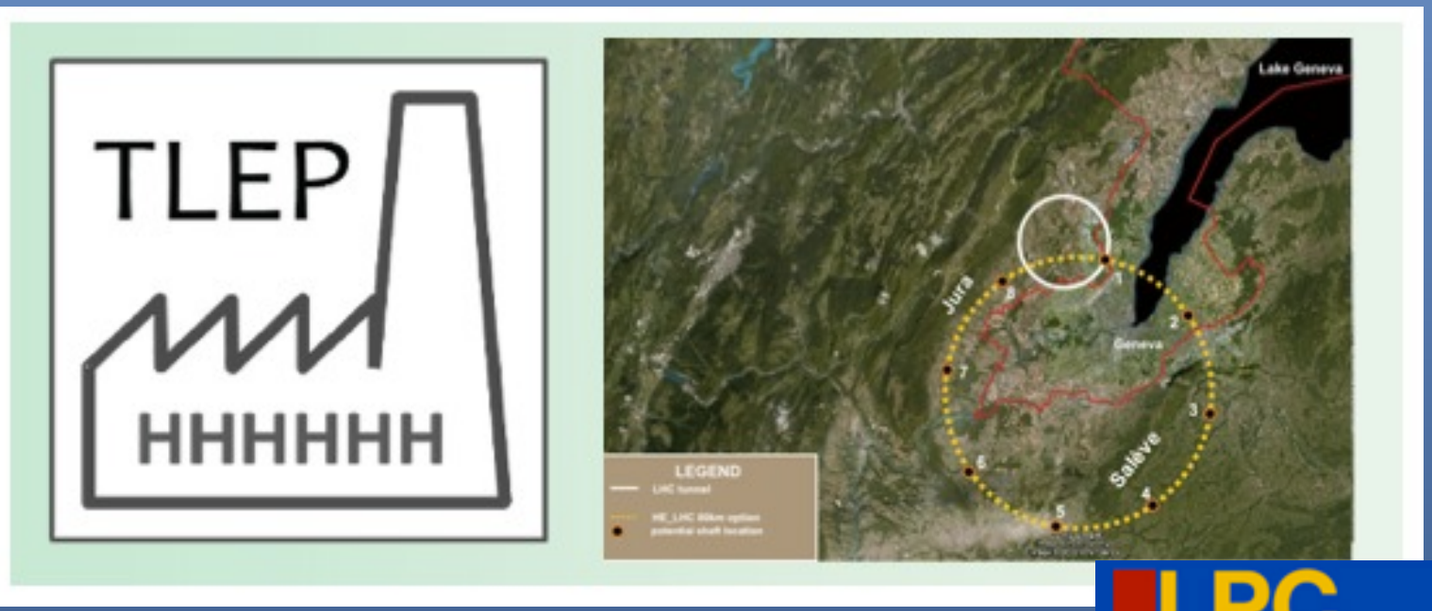
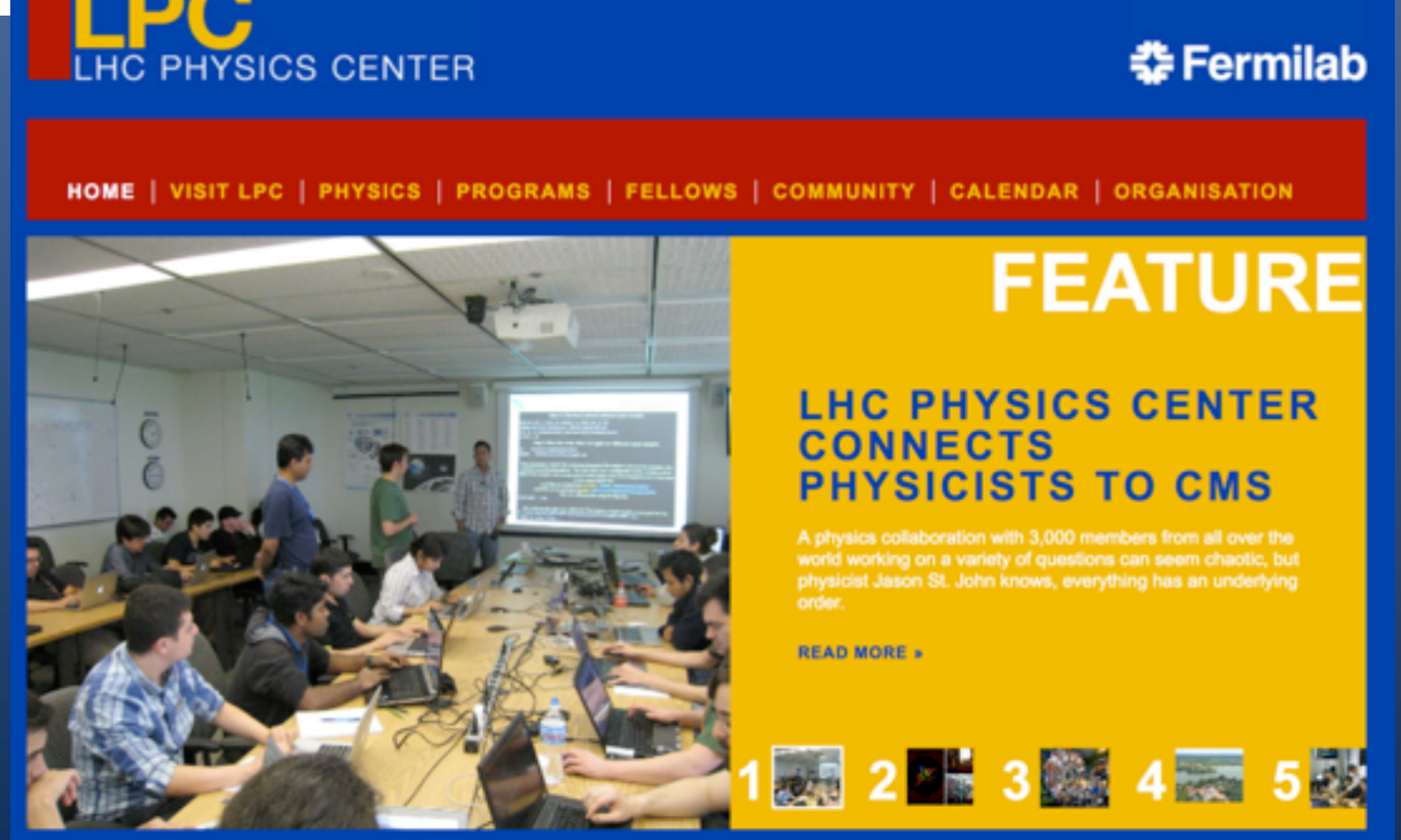
Welcome: 5th TLEP Workshop (TLEP13)





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

TLEP Workshop
Fermilab, 25-26 July, 2013

Overview of LPC...

Fermilab

Overview of LPC...

Fermilab

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

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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

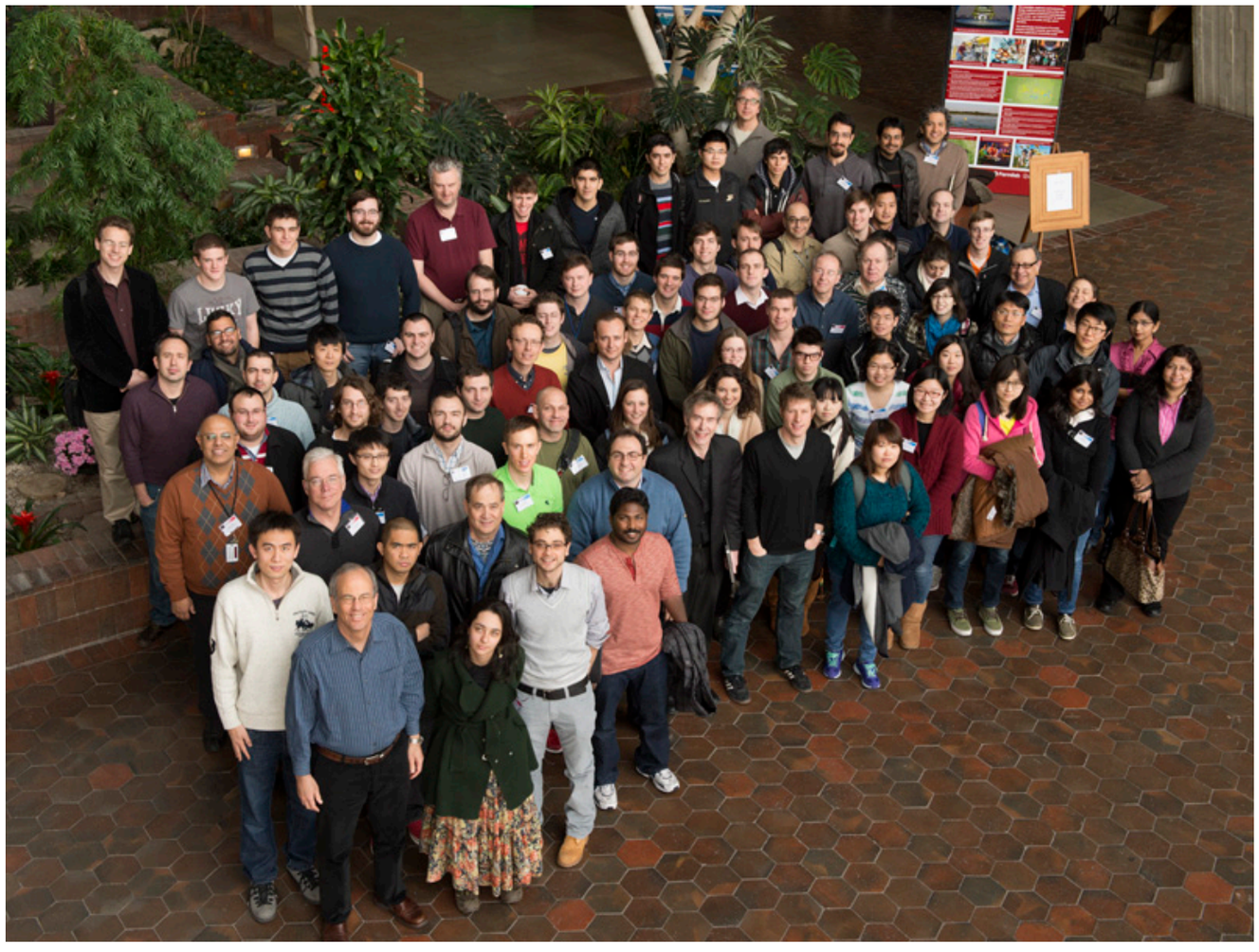
- **Serves as a resource and physics analysis hub for several hundred physicists at US institutions in the CMS collaboration**

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
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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
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Shruti Shrestha	Kansas
Anil Singh	Panjab
Jason St. John	Boston
Suharyo Sumovidagdo	UC Riverside
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Duration 2 weeks- 3 months
Students, post docs, faculty

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CMS LPC Fellows Program

Fermilab

CMS LPC Fellows Program

Fermilab

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

CMS LPC Fellows Program

Fermilab

national competition

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ANDREI
Gritsan
...study of the Higgs-like particle observed on LHC and more generally search for and study of the SM and exotic resonances...

ARAM
Avetisyan
...work is focused on searches for exotic particles the decays of which involve top quarks...

ARTUR
Apresyan
...interests are in understanding the origin of the electroweak symmetry breaking, and searches for direct experimental evidence of physics beyond the Standard Model...

BEN
Hooberman
...Search for the production of Higgs bosons, produced in the decays of the supersymmetric gauginos, and decaying to a pair of b-quarks...

FRANCISCO
Yumiceva
...search for new physics beyond the standard model using top quarks, and develop new trigger and reconstruction algorithms for the upgrade and operations of the CMS detector at high luminosity scenarios...

FRANK
Golf
...working on a search for new physics with a same-sign dilepton pair in the final state....

FREYA
Blekman
...perform searches for new physics in the top quark sector, focusing on top-like exotica and Standard Model measurements with a sensitivity to new physics...

JAKE
Anderson
...focusing on the upgrade of the CMS hadron calorimeter, improving simulation descriptions and reconstruction algorithms, studying electroweak symmetry breaking in the lepton + jets + missing energy final state ...

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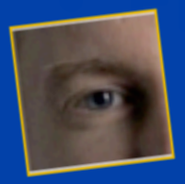

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Mishra

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Hatakeyama

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KEVIN
Stenson

...Studying rare b-decays, improving track reconstruction, and working on upgrades...

MANFRED
Paulini

...interested in final states with one or more photons which arise in gauge mediated models of supersymmetry...

SARAH ALAM
Malik

...focus on searching for dark matter at CMS...

MIKE
Hildreth

...working with the SUSY experts at the LPC on the search for new physics in final states involving photons and missing transverse energy...

PATRIZIA
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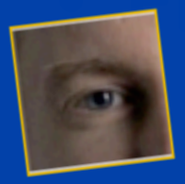

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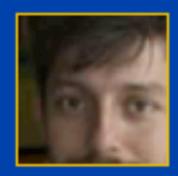

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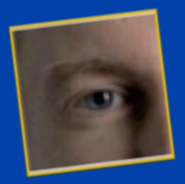

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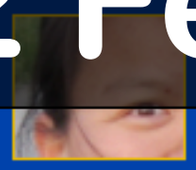

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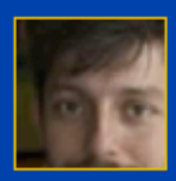

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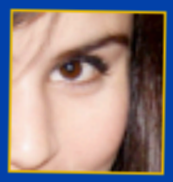

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22 Fellows in 2013

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”

LPC Topic of the Week in 2012

Fermilab

TOPIC OF THE WEEK

Michael Peskin

February 22nd and 23rd

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)

Scientist's visit

- Next guest
- Schedule

Talk links & video

- LPC Topic of the Week Links
- LPC Physics Forum

Archive

TOPIC OF THE WEEK

Liantao Wang
March 27th and 28th

Day	Speaker	Topic	Where
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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Talk links & video

- LPC Topic of the Week Links
- LPC Physics Forum

Archive

Day	Speaker	Topic	Where
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

TOPIC OF THE WEEK

Marcus Hohlmann

July 25th and 26th

Day	Speaker	Topic	Where
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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Fermilab

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)

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About one TOTW every two weeks

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- LPC Topic of the
- Links
- LPC Physics Fo

Archive

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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 25-26 2013)
    - SUSY workshop (October 14-16, 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 leading 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.
- TLEP is an interesting proposal:
  - precise measurements of Higgs properties and the future option of moving on to a higher energy pp collider at a later stage makes it highly appealing.

TLEP Workshop - Welcome

Fermilab

- As the Energy Frontier program at Fermilab, we are happy to provide the support from the LPC to bring this workshop to Fermilab and help realize the sentiments of the workshop organizers:

  - "TLEP and the future VHE-LHC will be and must be truly global projects, employing the skills, expertise and imagination of physicists and engineers from all around the world. The community at Fermilab and in the USA is especially invited to join this effort in its early stages by attending this workshop."

- Thank you and welcome to FNAL/ and TLEP workshop.

Backup

LPC support from USCMS & FNAL

Fermilab

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Fermilab

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

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  - scientists, computer professionals, programmers, engineers, technicians, managers

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  - scientists mechanical & electronics engineering, technicians, managers, office space, secretariat, admin support

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- 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