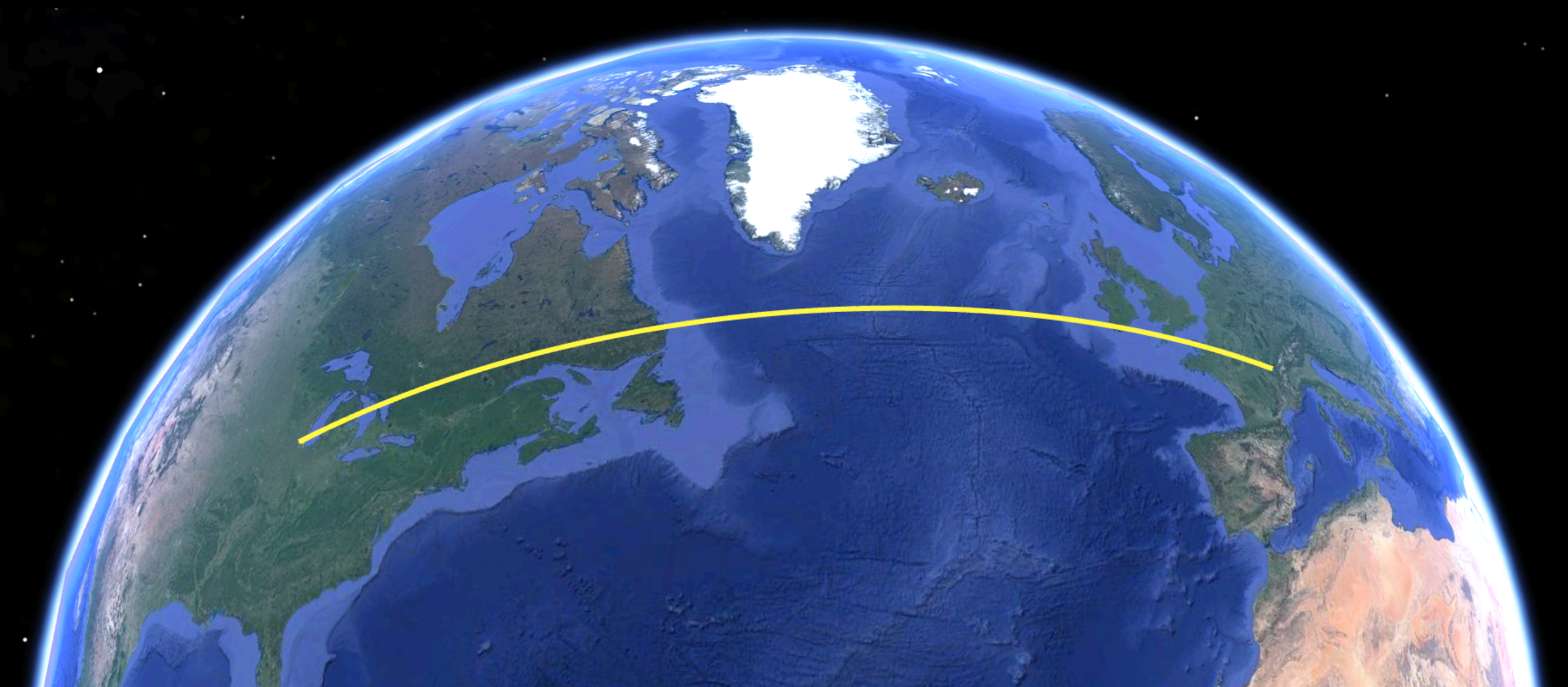
The LHC Physics Center

Dan Green's pioneering vision for global scientific collaboration

Fermilab

Enable CMS collaborators who live 10 000 000 meters and O(10) time zones away to have the same impact in harvesting the scientific bounty of the LHC as those local to the host lab



…circa 1999

Concept of Virtual Control Room and
Physics Analysis Center
first proposed by Dan Green…

…circa 1999

In the words of Dan…

…circa 2003

In the words of Dan…

How to do US CMS Physics?

DOE2000 Collaboratory Pilot Projects

In order to demonstrate the benefits of collaboratories and to test the collaboratory tools, two pilot projects have been started:

- The Diesel Combustion Collaboratory

Science Area: Diesel engine emissions control
Partners: SNL, LBNL, LLNL, Univ. of Wisc.
Industrial Partners: Cummins Engine Co., Caterpillar Inc., Detroit Diesel

- The Materials MicroCharacterization Collaboratory

Science Area: Microstructure of technologically advanced materials, with focus on interface characterization for wide user community
Partners:ORNL, LBNL, ANL, NIST, Univ. of Illinois
Industrial Partners: Gatan, Inc.; R. J. Lee; EMiSPEC Systems, Inc., Philips Electronic Instruments; Hitachi Scientific Instruments; Japan Electron Optics Laboratories - USA

Additional Collaboratory Efforts

- Environmental Molecular Sciences Collaboratory
- Fusion Collaboratory

SPARC ? People Partner Institutions Campaigns Resources Search Outreach

SPARC is available 24 hours a day for real-time and archival data access and scientific collaboration.

Click here to access SPARC's web-based workshop environment (WorkTools)

Click here to jump directly to SPARC's real-time data monitoring page

Space Physics & Aeronomy Research Collaboratory

SPARC is a community resource for space physics and aeronomy. For more information, assistance using the system, or help integrating your data with the system, please send e-mail to sparc@umich.edu.

The funding agencies are already involved in "virtual" collaborations and laboratories. Our model is the "collaboratory". Medium ITR submitted to NSF on collaboratory tools.

US … pril 2003

12

Screenshot

…circa 2003

In the words of Dan…

Advantages of the Model

One of the most important aspects of collaboratories is the ability to share scientific instruments over the Internet. This sharing may involve many users from different sites using a single major scientific instrument, such as a synchrotron at a national laboratory, or it may involve using a network of instruments, such as environmental sensors in geographically separate parts of the globe.

Many of the tools developed in these and other pilot projects are now being used in other research collaborations.*

Among the benefits of collaboratories (Ross-Flanigan 1998) are that:

- Scientists can avoid going to scientific instruments in remote locations.
- Many more universities, scientists, and students can participate in or observe experiments.
- By connecting computation to experiments, scientists can better and more quickly integrate experiments and theory. Theorists and experimentalists can work together in real time, greatly reducing the time required to analyze experiments.
- Scientists can put together quick video conferences to discuss the data.
- Students can participate in experimentation much earlier in their careers than before.

On the other hand, virtual communication has been found to be less successful than face-to-face communication in building trust between researchers. In addition, as a result of greater outside participation in the research, good researchers have more distractions. The early collaboratories also found that Internet congestion, the lack of reliability of some of the tools, and software changes slowed research.

…circa 2003

In the words of Dan…

WBS 18 - LHC Physics in the US

WBS	Task Name
18.2	**Virtual Control Room**
18.3	**Physics Analysis Centers and Collaboratory**
18.3.1	FY02
18.3.2	**FY03**
18.3.2.1	M&S
18.3.2.2	Labor
18.3.3	PAC Prototype Ready - 5% Data Challenge
18.3.4	**FY04**
18.3.4.1	M&S
18.3.4.2	Labor
18.3.5	**FY05**
18.3.5.1	M&S
18.3.5.2	Labor
18.3.6	PAC Installed - WH11 - 20% MDC
18.3.7	PAC - Guest Appointments Start
18.3.8	**FY06**
18.3.8.1	M&S
18.3.8.2	Labor
18.3.9	PAC - Analysis of First Data Starts
18.3.10	**FY07**
18.3.10.1	M&S
18.3.10.2	Labor
18.3.11	**FY08**
18.3.11.1	M&S
18.3.11.2	Labor
18.3.12	**FY09**
18.3.12.1	M&S
18.3.12.2	Labor
18.3.13	**FY10**
18.3.13.1	M&S
18.3.13.2	Labor
18.3.14	**Tier 2/PAC (3 of) Support**
18.4	**Outreach and Education**
18.4.1	FY02
18.4.2	FY03
18.4.3	FY04
18.4.4	FY05
18.4.5	Call for New Proposals - US CMS Data

In US CMS, planning is in place for a "collaboratory" or virtual laboratory. Elements are Virtual Control Room (commissioning, shifts and US accelerator community) and Physics Analysis Centers (teleconf, analysis groups). VCR/PACwill save on travel funds and provide a nucleation point for a critical mass of physicists. This support will go directly and solely to US HEP physicists.

US Screenshot pril 2003 11

US CMS Screenshot 003

US Screenshot

…circa 2003

In the words of others…

…circa 1999-2003

In the words of others…

Jay Hauser – Fermilab could become a natural meeting point …. Fabulous if user groups had a way to plug in computing resources of their own into a high-speed network fabric at Fermilab

…circa 1999-2003

In the words of others…

Jay Hauser – Fermilab could become a natural meeting point …. Fabulous if user groups had a way to plug in computing resources of their own into a high-speed network fabric at Fermilab

Viv O'Dell – Having a critical mass of physicists local to one place is important for a successful analysis.

…circa 1999-2003

In the words of others…

Jay Hauser – Fermilab could become a natural meeting point …. Fabulous if user groups had a way to plug in computing resources of their own into a high-speed network fabric at Fermilab

Viv O'Dell – Having a critical mass of physicists local to one place is important for a successful analysis.

Jim Branson – I also don't have complete faith in videoconferencing for physics and would support space for visitors (including myself) at FNAL. ---- If we don't supply space we will never get the critical mass to form there. ---- The US program will lose tremendously if we can only do forefront physics by traveling to Europe.

…circa 1999-2003

In the words of others…

Jay Hauser – Fermilab could become a natural meeting point …. Fabulous if user groups had a way to plug in computing resources of their own into a high-speed network fabric at Fermilab

Viv O'Dell – Having a critical mass of physicists local to one place is important for a successful analysis.

Jim Branson – I also don't have complete faith in videoconferencing for physics and would support space for visitors (including myself) at FNAL. ---- If we don't supply space we will never get the critical mass to form there. ---- The US program will lose tremendously if we can only do forefront physics by traveling to Europe.

David Stickland – I hope this gets support. I believe it is a sound model.

…circa 1999-2003

In the words of others…

Jay Hauser – Fermilab could become a natural meeting point …. Fabulous if user groups had a way to plug in computing resources of their own into a high-speed network fabric at Fermilab

Viv O'Dell – Having a critical mass of physicists local to one place is important for a successful analysis.

Jim Branson – I also don't have complete faith in videoconferencing for physics and would support space for visitors (including myself) at FNAL. ---- If we don't supply space we will never get the critical mass to form there. ---- The US program will lose tremendously if we can only do forefront physics by traveling to Europe.

David Stickland – I hope this gets support. I believe it is a sound model.

Bob Clare – I would greatly prefer to be able to do physics in the US instead of having to travel to CERN. I see FNAL as the US CMS host lab and as the natural location for US based efforts.

…circa 1999-2003

In the words of others…

Jay Hauser – Fermilab could become a natural meeting point …. Fabulous if user groups had a way to plug in computing resources of their own into a high-speed network fabric at Fermilab

Viv O'Dell – Having a critical mass of physicists local to one place is important for a successful analysis.

Jim Branson – I also don't have complete faith in videoconferencing for physics and would support space for visitors (including myself) at FNAL. ---- If we don't supply space we will never get the critical mass to form there. ---- The US program will lose tremendously if we can only do forefront physics by traveling to Europe.

David Stickland – I hope this gets support. I believe it is a sound model.

Bob Clare – I would greatly prefer to be able to do physics in the US instead of having to travel to CERN. I see FNAL as the US CMS host lab and as the natural location for US based efforts.

Gena Mitselmakher – I like very much the concept of the virtual control rooms.

…circa 1999-2003

In the words of others…

Jay Hauser – Fermilab could become a natural meeting point …. Fabulous if user groups had a way to plug in computing resources of their own into a high-speed network fabric at Fermilab

Viv O'Dell – Having a critical mass of physicists local to one place is important for a successful analysis.

Jim Branson – I also don't have complete faith in videoconferencing for physics and would support space for visitors (including myself) at FNAL. ---- If we don't supply space we will never get the critical mass to form there. ---- The US program will lose tremendously if we can only do forefront physics by traveling to Europe.

David Stickland – I hope this gets support. I believe it is a sound model.

Bob Clare – I would greatly prefer to be able to do physics in the US instead of having to travel to CERN. I see FNAL as the US CMS host lab and as the natural location for US based efforts.

Gena Mitselmakher – I like very much the concept of the virtual control rooms.

John Hauptman – You have my support on this issue. I forsee a strong center at Fermilab where I can couple strongly.

…circa 1999-2003

In the words of others…

Jay Hauser – Fermilab could become a natural meeting point …. Fabulous if user groups had a way to plug in computing resources of their own into a high-speed network fabric at Fermilab

Viv O'Dell – Having a critical mass of physicists local to one place is important for a successful analysis.

Jim Branson – I also don't have complete faith in videoconferencing for physics and would support space for visitors (including myself) at FNAL. ---- If we don't supply space we will never get the critical mass to form there. ---- The US program will lose tremendously if we can only do forefront physics by traveling to Europe.

David Stickland – I hope this gets support. I believe it is a sound model.

Bob Clare – I would greatly prefer to be able to do physics in the US instead of having to travel to CERN. I see FNAL as the US CMS host lab and as the natural location for US based efforts.

Gena Mitselmakher – I like very much the concept of the virtual control rooms.

John Hauptman – You have my support on this issue. I forsee a strong center at Fermilab where I can couple strongly.

Sarah Eno – its great to have students and postdocs around to work with. It makes research more fun.

…circa 1999-2003

In the words of others…

Jay Hauser – Fermilab could become a natural meeting point …. Fabulous if user groups had a way to plug in computing resources of their own into a high-speed network fabric at Fermilab

Viv O'Dell – Having a critical mass of physicists local to one place is important for a successful analysis.

Jim Branson – I also don't have complete faith in videoconferencing for physics and would support space for visitors (including myself) at FNAL. ---- If we don't supply space we will never get the critical mass to form there. ---- The US program will lose tremendously if we can only do forefront physics by traveling to Europe.

David Stickland – I hope this gets support. I believe it is a sound model.

Bob Clare – I would greatly prefer to be able to do physics in the US instead of having to travel to CERN. I see FNAL as the US CMS host lab and as the natural location for US based efforts.

Gena Mitselmakher – I like very much the concept of the virtual control rooms.

John Hauptman – You have my support on this issue. I forsee a strong center at Fermilab where I can couple strongly.

Sarah Eno – its great to have students and postdocs around to work with. It makes research more fun.

Jim Rohlf - I strongly support the idea of CMS data analysis in the US. … I think you are acting on the issue at just the right time

…circa 1999-2003

In the words of others…

Jay Hauser – Fermilab could become a natural meeting point …. Fabulous if user groups had a way to plug in computing resources of their own into a high-speed network fabric at Fermilab

Viv O'Dell – Having a critical mass of physicists local to one place is important for a successful analysis.

Jim Branson – I also don't have complete faith in videoconferencing for physics and would support space for visitors (including myself) at FNAL. ---- If we don't supply space we will never get the critical mass to form there. ---- The US program will lose tremendously if we can only do forefront physics by traveling to Europe.

David Stickland – I hope this gets support. I believe it is a sound model.

Bob Clare – I would greatly prefer to be able to do physics in the US instead of having to travel to CERN. I see FNAL as the US CMS host lab and as the natural location for US based efforts.

Gena Mitselmakher – I like very much the concept of the virtual control rooms.

John Hauptman – You have my support on this issue. I forsee a strong center at Fermilab where I can couple strongly.

Sarah Eno – its great to have students and postdocs around to work with. It makes research more fun.

Jim Rohlf - I strongly support the idea of CMS data analysis in the US. … I think you are acting on the issue at just the right time

Chris Tully – if we really want to make this a world-wide effort on analysis, we need an more convenient center in the US. I would therefore think it would be good to have a similair station at Fermilab.. It would be important to have some leading physicists take extended stays at Fermilab.

…circa 1999-2003

PARTICLE PHYSICS DIVISION
MECHANICAL SUPPORT

COMPUTING

(VISITORS)

USCMS - FNAL GROUP

11TH FLOOR

US CMS - PHYSICS ANALYSIS CENTER
AND VIRTUAL CONTROL ROOM

Dr. Sarah Eno
Department of Physics
University of Maryland
College Park, Maryland 20742-4111
eno@physics.umd.edu
301.405.7179 TEL 301.699.9195 FAX

13 February 2004

Mike Witherell, Director
Fermi National Accelerator Laboratory
P.O. Box 500
Batavia, IL 60302

Dear Professor Witherell:

I am writing to you on behalf of a group of University professors who met on February 12, 2004 at FNAL to discuss how to organize an effort to prepare for data taking and physics analysis with the CMS detector at the LHC while at the same time fulfilling our ongoing commitments to experiments currently running in the US, such as BaBar, CDF, and DØ. We invited Dan Green, Avi Yagil, John Womersley, and Lothar Bauerdick to our meeting, to help us understand whether our interests/needs coincide with the lab's plans for an LHC physics center (LPC). The purpose of this letter is to inform you of our thoughts on this subject, and also of the ways we hope the lab can help us on what we think is an effort which could very well determine the health of our field in the United States, both during the LHC era and afterwards.

We unanimously agreed that the only way in the short term we could both prepare for CMS data taking and continue our vital work on running experiments is to find a way to make it effective for postdocs and students to work on both efforts at the same time, and the only way to do this is to cluster them in a place like the proposed LPC. We were also all hopeful that, if started now, such a center could become our preferred place for clustering even after the start of CMS data taking, so that we travel to CERN only approximately 4 times per year, and travel regularly instead to FNAL to interact with our students and postdocs. Whether this works or not depends crucially on the LPC becoming a power research center well before the LHC data taking starts in 2007.

Most of the current indirect evidence for the scale of new physics hints that the LHC may be able to make a major discovery shortly after turn on. The discovery will go to the collaborations and physicists that are best prepared at the start of data taking. CMS takes this possibility very seriously, and has established the "Physics Reconstruction and Selection" (PRS) groups to make sure the collaboration is prepared. Over the next two years, this preparatory work will take the form of the writing of a "Physics TDR". If US CMS wants to play a leading role in these discoveries, we need to lead in the preparation of this TDR through participation in the PRS groups. We also need to do the kind of activities that are going on now within CMS that will enable us to have an intimate understanding of the detector, especially participating in test beams, but also understanding calibration systems, and the development of robust analysis tools. To be successful, we decided we need the following:

- In the next 6 months: establish a physical place at FNAL in the Hirise with first class computing and video conferencing for a core team of about six researchers working full time on CMS who will collectively develop expertise in all areas of the CMS reconstruction code and prepare to support and help the postdocs who will join them, working part-time on CMS.
- Within the next year: have an additional 10 University postdocs and some number of students working part-time on CMS and part time on a running experiment join the core team. These part-time postdocs and students would need desks in the same physical location as the 6 core researchers.
- In the following years: increase the number of University postdocs shared between CMS and a running experiment to 20 by the end of 2005 and 35 by the end of 2006, and start to have students who will do an LHC thesis working at the center.

Dear Colleagues:

I am writing to respond to your letter concerning the LHC Physics Center at Fermilab. In that letter you expressed interest in the development of such a center and stated how important it would be for U.S. university groups to take full part in research with the CMS data sample.

Both Fermilab and the leadership of the US-CMS research program have also expressed support for the LHC Physics Center (LPC) . One goal of the center is the one you articulated, that is, to make it possible for U.S. physicists working on CMS to be innovative leaders in LHC physics. The other is that Fermilab remain an intellectual center for collider physics in the LHC era. I think that both of these goals serve the larger purpose of advancing particle physics in the U.S.

A broad group of the involved parties recognizes the need of a transition period in which physicists will share effort between CDF or D0 and one of the LHC experiments. This sharing will make it possible to sustain the needed effort to operate CDF and D0 effectively, at the same time that it brings a lot of experience from the Tevatron program to the LHC. At our Annual Program Review, both CDF and D0 said that they are moving to make it easier for scientists to be an active member of their collaborations while sharing time with CMS or ATLAS. P.K. Williams expressed to me his encouragement of the LHC Physics Center here as an effective way of sharing university physicists between CDF or D0 and CMS.

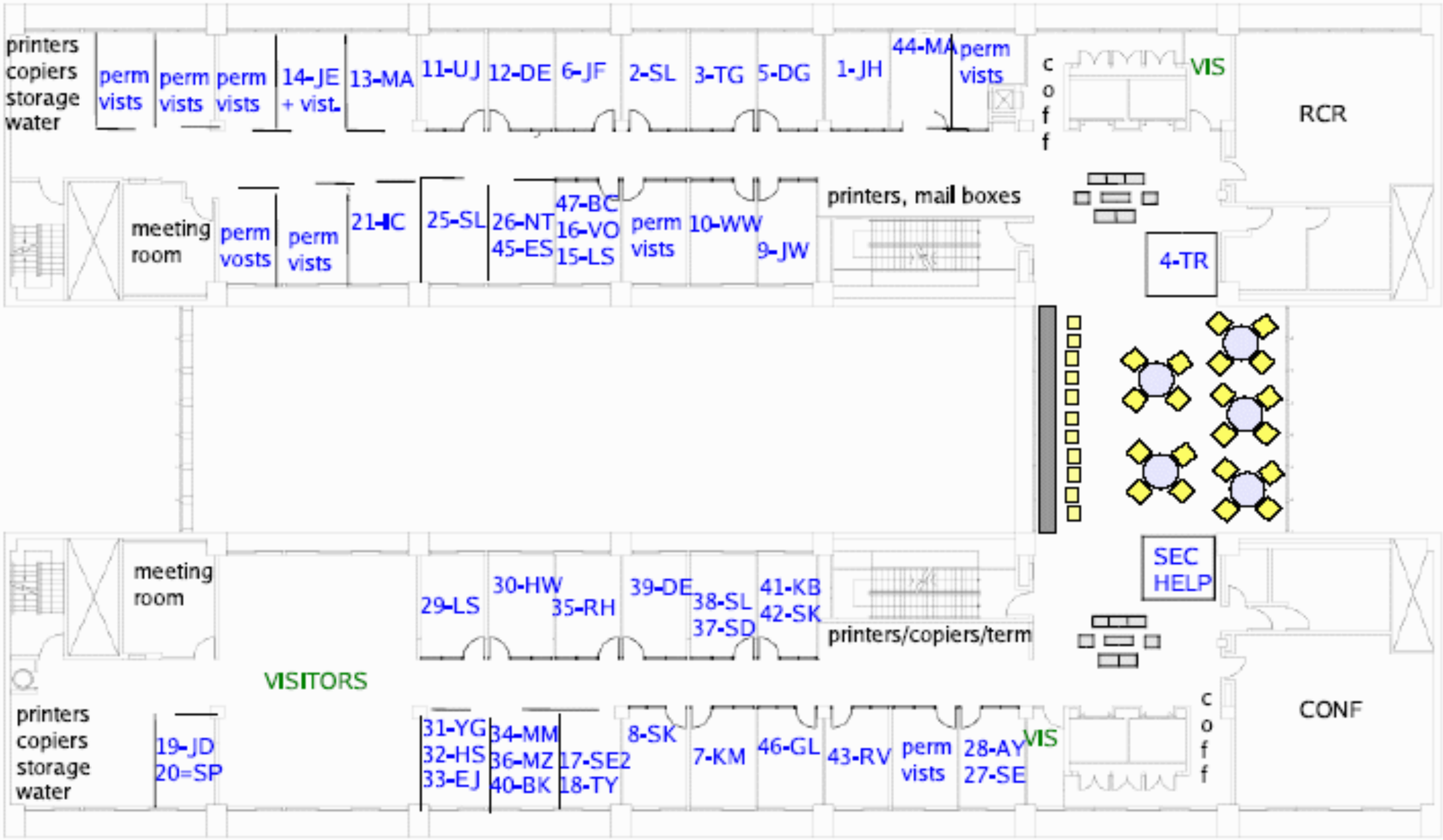
I want to make the LHC Physics Center into one of the leading centers in the world for producing particle physics results, and am ready to commit resources to that end. In planning this startup we will work closely with you and with leadership of the US-CMS research program to make sure that we are establishing an institution that serves all of the interested parties well.

We plan to increase Fermilab staffing for CMS computing and analysis. We will work to provide the appropriate level of support from computer professionals. We would also like to attract a few Research Associates with primary assignment to CMS over the course of the next year. In addition, we should be able to attract a Wilson fellow to CMS, a position that is at the level of an Assistant Professor. Finally, we are emphasizing the importance of this effort by having Avi Yagil invest a large part of his time in making it work. We have encouraged him to attract additional help from Fermilab scientific staff on CDF and D0.

We hope that this initiative will help Fermilab to take a role in CMS and LHC physics that is larger than remote laboratories have been able to do on previous experiments. The benefits of doing so will be large for Fermilab and for the U.S. physicists working on CMS.

Sincerely,

Michael Witherell


printers
copiers
storage
water
perm vists
perm vists
perm vists
14-JE + vist.
13-MA
11-UJ
12-DE
6-JF
2-SL
3-TG
5-DG
1-JH
44-MA
perm vists
c o f f
VIS
RCR
meeting room
perm vosts
perm vists
21-IC
25-SL
26-NT
45-ES
47-BC
16-VO
15-LS
perm vists
10-WW
9-JW
printers, mail boxes
4-TR
meeting room
29-LS
30-HW
35-RH
39-DE
38-SL
37-SD
41-KB
42-SK
printers/copiers/term
SEC HELP
VISITORS
printers
copiers
storage
water
19-JD
20=SP
31-YG
32-HS
33-EJ
34-MM
36-MZ
40-BK
17-SE2
18-TY
8-SK
7-KM
46-GL
43-RV
perm vists
28-AY
27-SE
VIS
c o f f
CONF


CONTI

Sarah Eno…

…circa 2006

Sarah Eno…

LPC Founded Feb 2004

Located on the 11th floor of the FNAL high rise, the purpose of the LPC is to ensure the US gives the strongest possible assistance to international CMS in software preparations for Day 1 and to enable physics analysis from within the U.S.

- a critical mass (clustering) of young people who are actively working on software (reconstruction, particle identification, physics analysis) in a single location (11th floor of the high rise),
- a resource for University-based US CMS collaborators; a place to find expertise in their time zone, a place to visit with their software and analysis questions,
- a brick-and-mortar location for US-based physics analysis, with such physical infrastructure as large meeting rooms, video conferencing, large scale computing, and a "water cooler" for informal discussions of physics.

…circa 2006

Sarah Eno…

CMS101 Agenda

CMS101

[last update:
Friday 08 July 2005]

Date/Time: Friday 08 July 2005 from 09:30 to 12:00
Location: FNAL: Wilson Hall 11 NE
Chairperson: S. Eno
Description: *This meeting will take place at 9:30 AM FNAL time on the 11th floor of the high rise, NE conference room.*
Video conferencing will also be available via VRVS.

Friday 08 July 2005

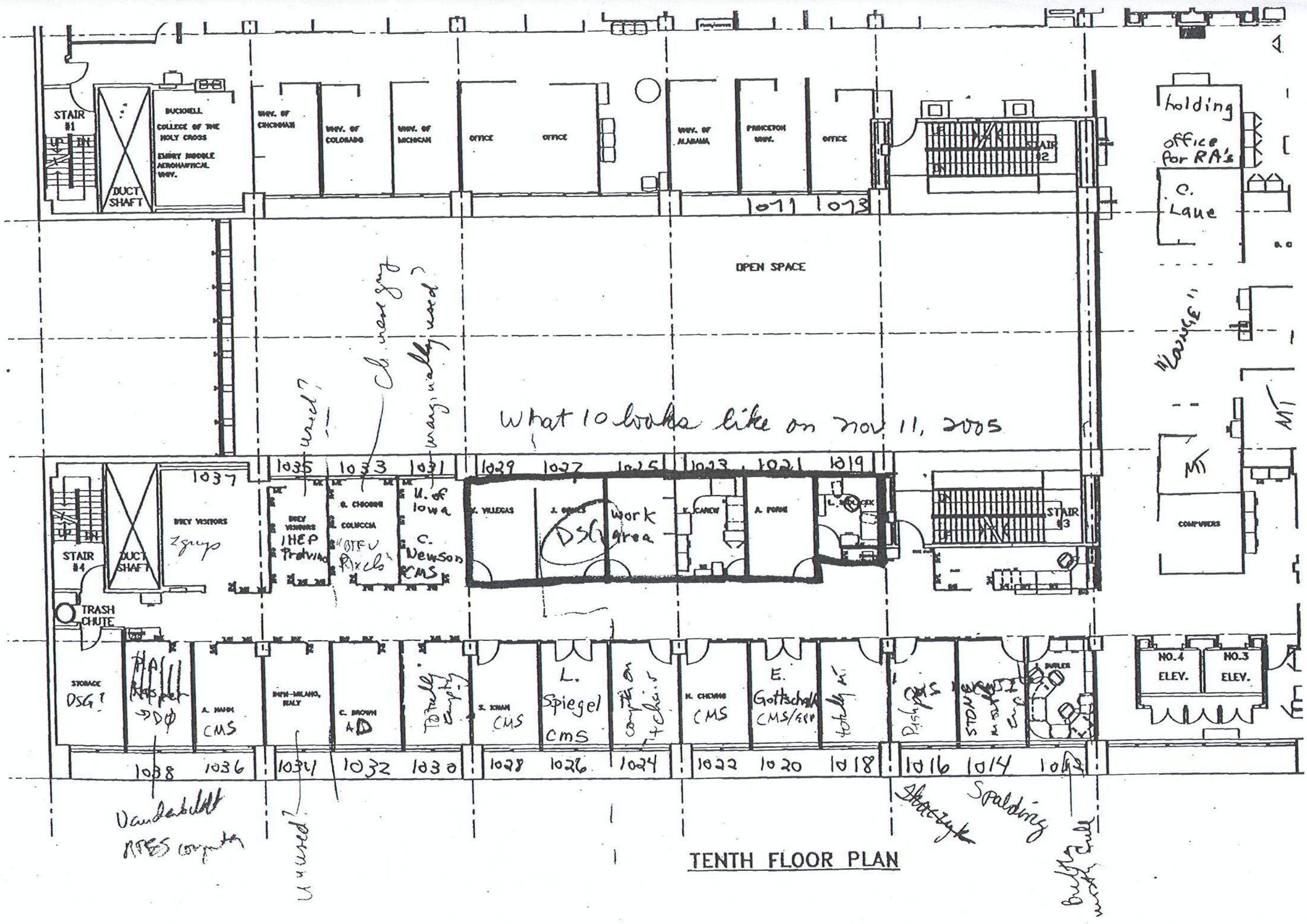
09:30	**Introduction to CMS** (30') (more information)	Eno, S *(UMD)*
10:00	**Introduction to the Detector** (25') (more information)	Freeman, J.
10:25	**Introduction to the Trigger** (15') (more information)	Chumney, P. *(University of Wisconsin)*
10:40	Coffee Break	
10:55	**Introduction to the Software** (25') (more information)	Gershtein, Y.
11:20	**Introduction to the FNAL UAF** (15') (more information)	Wenzel, H
11:35	**The LPC** (15') (more information)	Sarah Eno

…circa 2006

Over 50 University-based physicists visit LPC for > 2 weeks

…circa 2005

LPC bursting at the seams… …expand to the 10th floor



Fast forward 14 years...

Fast forward 14 years...

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

Fast forward 14 years...

- The LPC is an established regional center for CMS physics analysis & detector upgrades
- 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
  - Access to great software support
  - A vibrant intellectual community

Fast forward 14 years...

- The LPC is an established regional center for CMS physics analysis & detector upgrades
- 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
  - Access to great software support
  - A vibrant intellectual community
- The LPC is a way for smaller groups to attain critical mass
  - Many strong CMS physics results and publications from the LPC

Fast forward 14 years...

- The LPC is an established regional center for CMS physics analysis & detector upgrades
- 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
  - Access to great software support
  - A vibrant intellectual community
- The LPC is a way for smaller groups to attain critical mass
  - Many strong CMS physics results and publications from the LPC
- The LPC provides office space for post docs & students

Fast forward 14 years...

- The LPC is an established regional center for CMS physics analysis & detector upgrades
- 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
  - Access to great software support
  - A vibrant intellectual community
- The LPC is a way for smaller groups to attain critical mass
  - Many strong CMS physics results and publications from the LPC
- The LPC provides office space for post docs & students
- The LPC has (distinguished) visiting scientists & weekly seminars

Fast forward 14 years...

- The LPC is an established regional center for CMS physics analysis & detector upgrades
- 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
  - Access to great software support
  - A vibrant intellectual community
- The LPC is a way for smaller groups to attain critical mass
  - Many strong CMS physics results and publications from the LPC
- The LPC provides office space for post docs & students
- The LPC has (distinguished) visiting scientists & weekly seminars
- The LPC hosts schools & topic focused meetings on site

Fast forward 14 years...

- The LPC is an established regional center for CMS physics analysis & detector upgrades
- 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
  - Access to great software support
  - A vibrant intellectual community
- The LPC is a way for smaller groups to attain critical mass
  - Many strong CMS physics results and publications from the LPC
- The LPC provides office space for post docs & students
- The LPC has (distinguished) visiting scientists & weekly seminars
- The LPC hosts schools & topic focused meetings on site
- The LPC is championed by CMS!

Fast forward 14 years...

- The LPC is an established regional center for CMS physics analysis & detector upgrades
- 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
  - Access to great software support
  - A vibrant intellectual community
- The LPC is a way for smaller groups to attain critical mass
  - Many strong CMS physics results and publications from the LPC
- The LPC provides office space for post docs & students
- The LPC has (distinguished) visiting scientists & weekly seminars
- The LPC hosts schools & topic focused meetings on site
- The LPC is championed by CMS!
- The LPC is duplicated by others! Intensity Frontier, etc

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
Wei Zou	China (Peking)

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.

Duration 2 weeks- 3 months
Students, post docs, faculty
Stipend from home institute
Local support (housing etc,) from LPC

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 dates including 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
Wei Zou	China (Peking)

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.

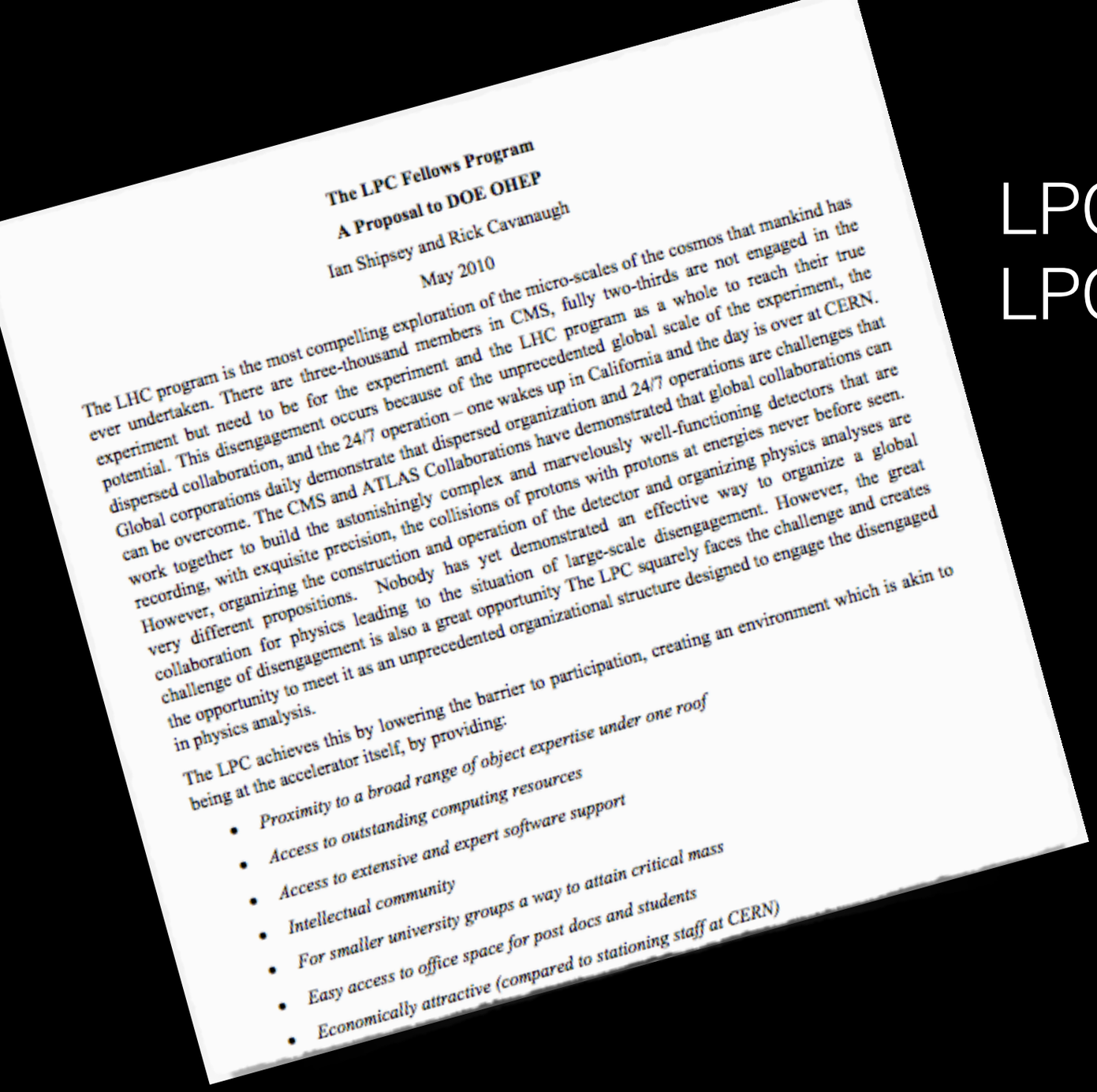
The goal of the LPC Short Stay Guest Program is to promote all research activity on CMS, including analysis of data and work on detector upgrades. The LPC is active in several CMS physics analysis areas, including: Higgs properties, SUSY, Exotica, B2G; physics objects groups, and participation in upgrade 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 dates, including 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.

Duration 2 weeks- 3 months
Students, post docs, faculty
Stipend from home institute
Local support (housing etc,) from LPC

Hundres of participants in the Guest & Visitor Program since its inception

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
[illegible] Marotta	Texas A&M
Anthony Moe	Iowa
[illegible]ohyo	[illegible] A&M
John Neuhaus	Iowa
[illegible] Ogul	[illegible]
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
Wei Zou	China (Peking)



The LPC Fellows Program

A Proposal to DOE OHEP

Ian Shipsey and Rick Cavanaugh

May 2010

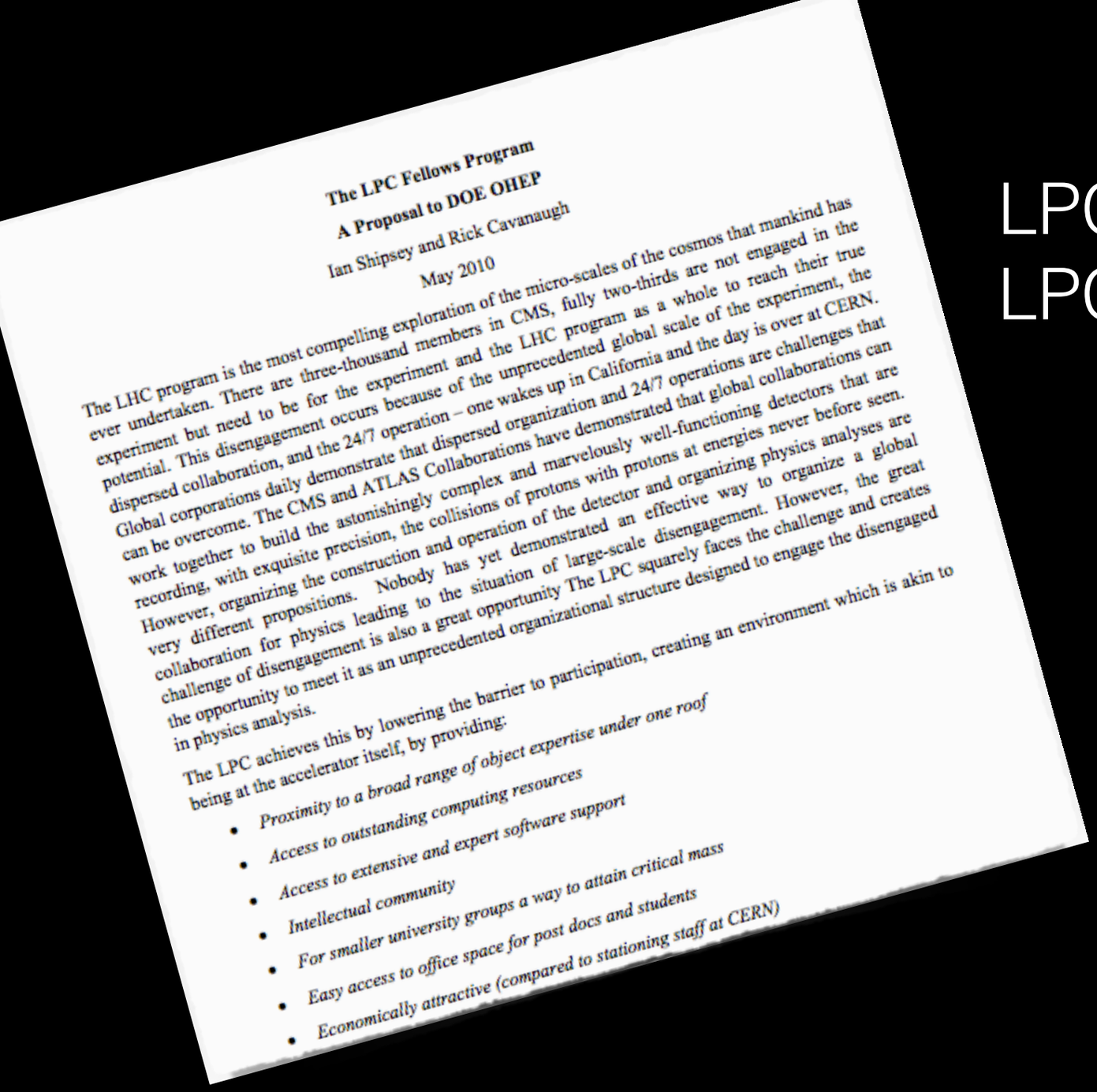
The LHC program is the most compelling exploration of the micro-scales of the cosmos that mankind has ever undertaken. There are three-thousand members in CMS, fully two-thirds are not engaged in the experiment but need to be for the experiment and the LHC program as a whole to reach their true potential. This disengagement occurs because of the unprecedented global scale of the experiment, the dispersed collaboration, and the 24/7 operation – one wakes up in California and the day is over at CERN. Global corporations daily demonstrate that dispersed organization and 24/7 operations are challenges that can be overcome. The CMS and ATLAS Collaborations have demonstrated that global collaborations can work together to build the astonishingly complex and marvelously well-functioning detectors that are recording, with exquisite precision, the collisions of protons with protons at energies never before seen. However, organizing the construction and operation of the detector and organizing physics analyses are very different propositions. Nobody has yet demonstrated an effective way to organize a global collaboration for physics leading to the situation of large-scale disengagement. However, the great challenge of disengagement is also a great opportunity The LPC squarely faces the challenge and creates the opportunity to meet it as an unprecedented organizational structure designed to engage the disengaged in physics analysis.

The LPC achieves this by lowering the barrier to participation, creating an environment which is akin to being at the accelerator itself, by providing:

- *Proximity to a broad range of object expertise under one roof*
- *Access to outstanding computing resources*
- *Access to extensive and expert software support*
- *Intellectual community*
- *For smaller university groups a way to attain critical mass*
- *Easy access to office space for post docs and students*
- *Economically attractive (compared to stationing staff at CERN)*

LPC Fellows Program, aka LPC Distinguished Researchers

…circa 2011



The LPC Fellows Program

A Proposal to DOE OHEP

Ian Shipsey and Rick Cavanaugh

May 2010

The LHC program is the most compelling exploration of the micro-scales of the cosmos that mankind has ever undertaken. There are three-thousand members in CMS, fully two-thirds are not engaged in the experiment but need to be for the experiment and the LHC program as a whole to reach their true potential. This disengagement occurs because of the unprecedented global scale of the experiment, the dispersed collaboration, and the 24/7 operation – one wakes up in California and the day is over at CERN. Global corporations daily demonstrate that dispersed organization and 24/7 operations are challenges that can be overcome. The CMS and ATLAS Collaborations have demonstrated that global collaborations can work together to build the astonishingly complex and marvelously well-functioning detectors that are recording, with exquisite precision, the collisions of protons with protons at energies never before seen. However, organizing the construction and operation of the detector and organizing physics analyses are very different propositions. Nobody has yet demonstrated an effective way to organize a global collaboration for physics leading to the situation of large-scale disengagement. However, the great challenge of disengagement is also a great opportunity The LPC squarely faces the challenge and creates the opportunity to meet it as an unprecedented organizational structure designed to engage the disengaged in physics analysis.

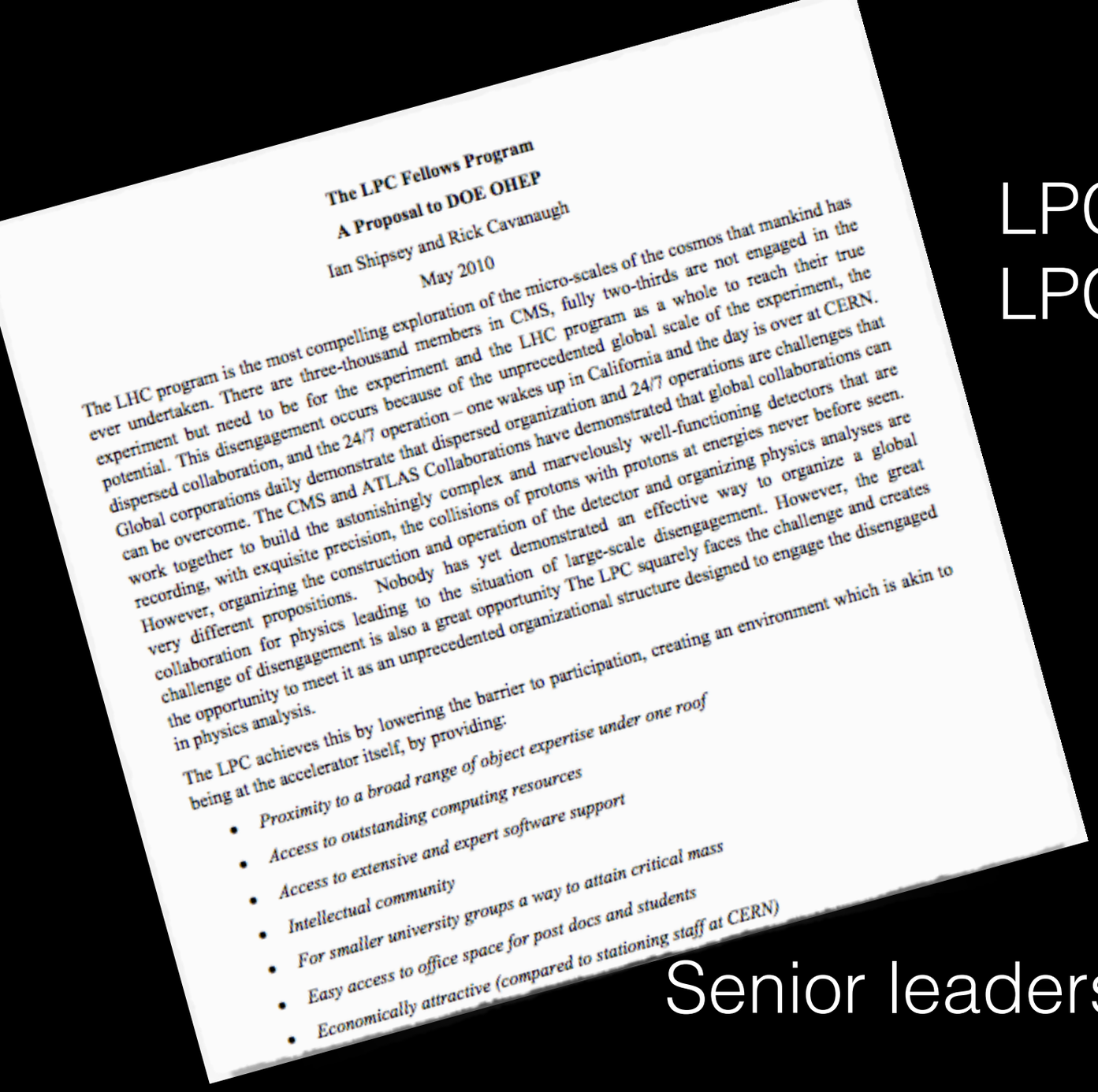
The LPC achieves this by lowering the barrier to participation, creating an environment which is akin to being at the accelerator itself, by providing:

- *Proximity to a broad range of object expertise under one roof*
- *Access to outstanding computing resources*
- *Access to extensive and expert software support*
- *Intellectual community*
- *For smaller university groups a way to attain critical mass*
- *Easy access to office space for post docs and students*
- *Economically attractive (compared to stationing staff at CERN)*

LPC Fellows Program, aka
LPC Distinguished Researchers

Very competitive!

…circa 2011



The LPC Fellows Program

A Proposal to DOE OHEP

Ian Shipsey and Rick Cavanaugh

May 2010

The LHC program is the most compelling exploration of the micro-scales of the cosmos that mankind has ever undertaken. There are three-thousand members in CMS, fully two-thirds are not engaged in the experiment but need to be for the experiment and the LHC program as a whole to reach their true potential. This disengagement occurs because of the unprecedented global scale of the experiment, the dispersed collaboration, and the 24/7 operation – one wakes up in California and the day is over at CERN. Global corporations daily demonstrate that dispersed organization and 24/7 operations are challenges that can be overcome. The CMS and ATLAS Collaborations have demonstrated that global collaborations can work together to build the astonishingly complex and marvelously well-functioning detectors that are recording, with exquisite precision, the collisions of protons with protons at energies never before seen. However, organizing the construction and operation of the detector and organizing physics analyses are very different propositions. Nobody has yet demonstrated an effective way to organize a global collaboration for physics leading to the situation of large-scale disengagement. However, the great challenge of disengagement is also a great opportunity The LPC squarely faces the challenge and creates the opportunity to meet it as an unprecedented organizational structure designed to engage the disengaged in physics analysis.

The LPC achieves this by lowering the barrier to participation, creating an environment which is akin to being at the accelerator itself, by providing:

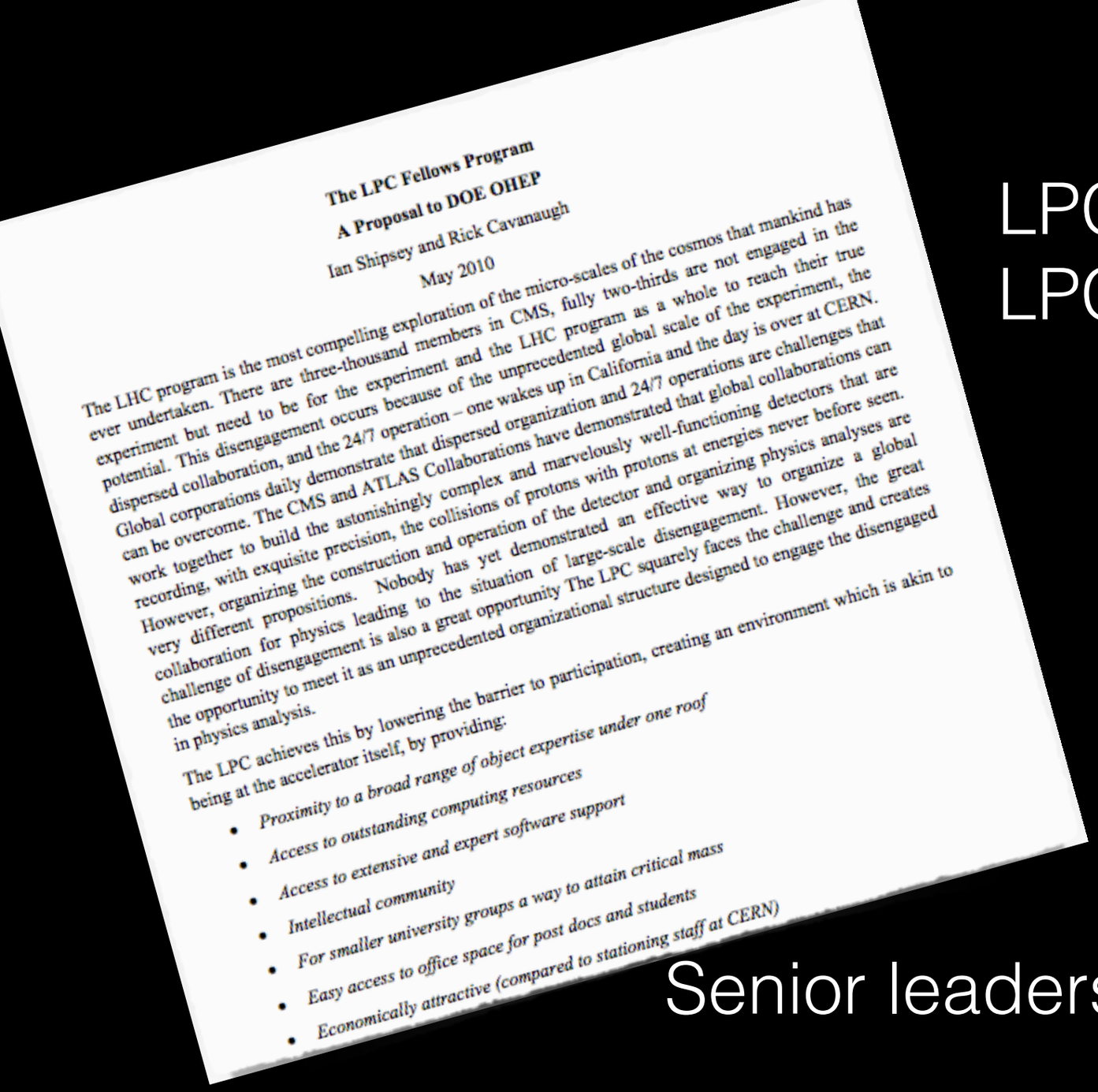
- *Proximity to a broad range of object expertise under one roof*
- *Access to outstanding computing resources*
- *Access to extensive and expert software support*
- *Intellectual community*
- *For smaller university groups a way to attain critical mass*
- *Easy access to office space for post docs and students*
- *Economically attractive (compared to stationing staff at CERN)*

LPC Fellows Program, aka
LPC Distinguished Researchers

Very competitive!

Senior leaders resident at LPC for 1 Year

…circa 2011



The LPC Fellows Program

A Proposal to DOE OHEP

Ian Shipsey and Rick Cavanaugh

May 2010

The LHC program is the most compelling exploration of the micro-scales of the cosmos that mankind has ever undertaken. There are three-thousand members in CMS, fully two-thirds are not engaged in the experiment but need to be for the experiment and the LHC program as a whole to reach their true potential. This disengagement occurs because of the unprecedented global scale of the experiment, the dispersed collaboration, and the 24/7 operation – one wakes up in California and the day is over at CERN. Global corporations daily demonstrate that dispersed organization and 24/7 operations are challenges that can be overcome. The CMS and ATLAS Collaborations have demonstrated that global collaborations can work together to build the astonishingly complex and marvelously well-functioning detectors that are recording, with exquisite precision, the collisions of protons with protons at energies never before seen. However, organizing the construction and operation of the detector and organizing physics analyses are very different propositions. Nobody has yet demonstrated an effective way to organize a global collaboration for physics leading to the situation of large-scale disengagement. However, the great challenge of disengagement is also a great opportunity The LPC squarely faces the challenge and creates the opportunity to meet it as an unprecedented organizational structure designed to engage the disengaged in physics analysis.

The LPC achieves this by lowering the barrier to participation, creating an environment which is akin to being at the accelerator itself, by providing:

- *Proximity to a broad range of object expertise under one roof*
- *Access to outstanding computing resources*
- *Access to extensive and expert software support*
- *Intellectual community*
- *For smaller university groups a way to attain critical mass*
- *Easy access to office space for post docs and students*
- *Economically attractive (compared to stationing staff at CERN)*

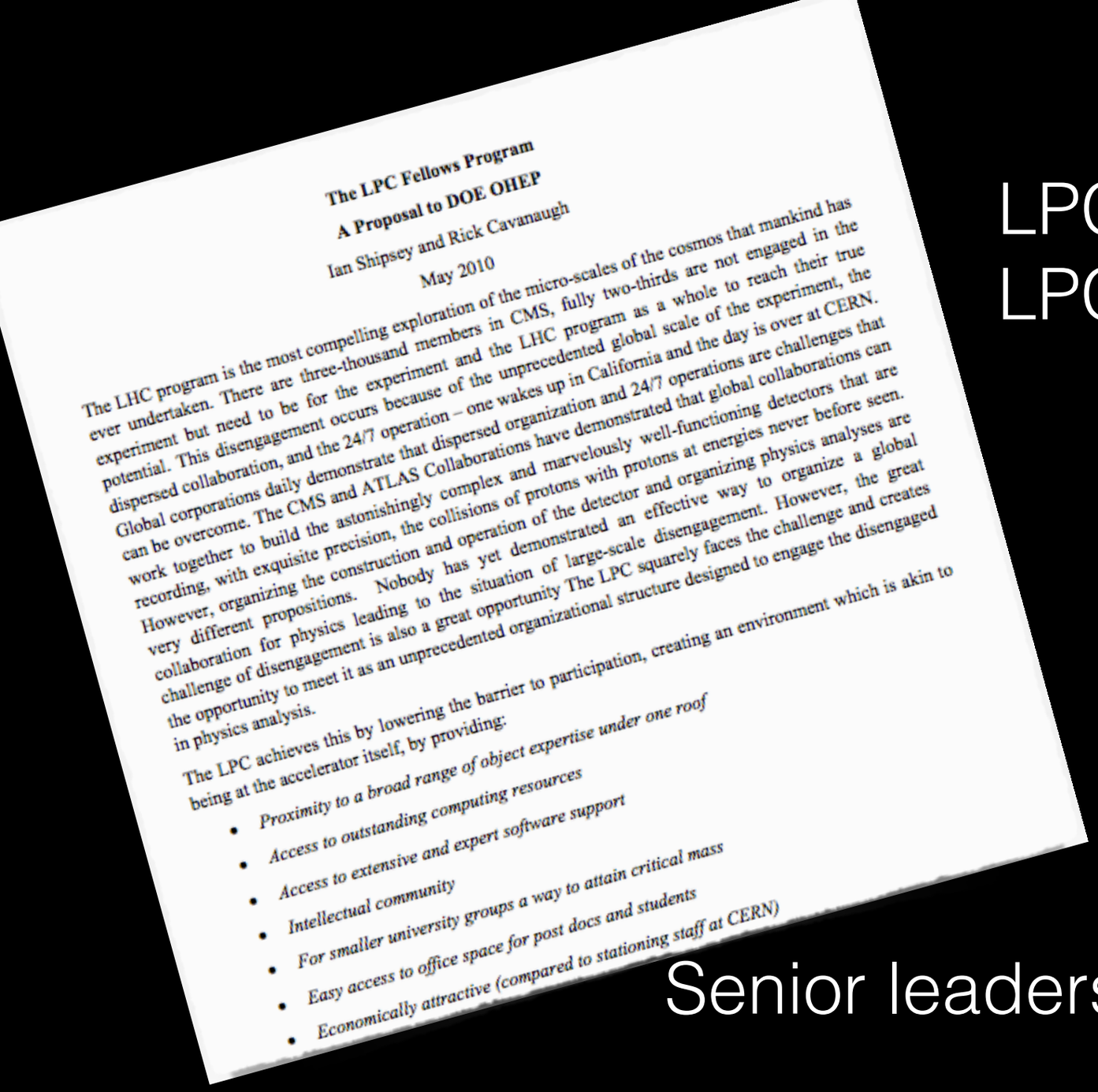
LPC Fellows Program, aka
LPC Distinguished Researchers

Very competitive!

Senior leaders resident at LPC for 1 Year

Junior scientists distinguish themselves, establish independent research program

…circa 2011



The LPC Fellows Program

A Proposal to DOE OHEP

Ian Shipsey and Rick Cavanaugh

May 2010

The LHC program is the most compelling exploration of the micro-scales of the cosmos that mankind has ever undertaken. There are three-thousand members in CMS, fully two-thirds are not engaged in the experiment but need to be for the experiment and the LHC program as a whole to reach their true potential. This disengagement occurs because of the unprecedented global scale of the experiment, the dispersed collaboration, and the 24/7 operation – one wakes up in California and the day is over at CERN. Global corporations daily demonstrate that dispersed organization and 24/7 operations are challenges that can be overcome. The CMS and ATLAS Collaborations have demonstrated that global collaborations can work together to build the astonishingly complex and marvelously well-functioning detectors that are recording, with exquisite precision, the collisions of protons with protons at energies never before seen. However, organizing the construction and operation of the detector and organizing physics analyses are very different propositions. Nobody has yet demonstrated an effective way to organize a global collaboration for physics leading to the situation of large-scale disengagement. However, the great challenge of disengagement is also a great opportunity The LPC squarely faces the challenge and creates the opportunity to meet it as an unprecedented organizational structure designed to engage the disengaged in physics analysis.

The LPC achieves this by lowering the barrier to participation, creating an environment which is akin to being at the accelerator itself, by providing:

- *Proximity to a broad range of object expertise under one roof*
- *Access to outstanding computing resources*
- *Access to extensive and expert software support*
- *Intellectual community*
- *For smaller university groups a way to attain critical mass*
- *Easy access to office space for post docs and students*
- *Economically attractive (compared to stationing staff at CERN)*

LPC Fellows Program, aka
LPC Distinguished Researchers

Very competitive!

Senior leaders resident at LPC for 1 Year

Junior scientists distinguish themselves, establish independent research program

Model duplicated by ATLAS, Belle, and Intensity Frontier

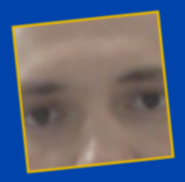
…circa 2011

14 Fellows in 2011

MICHELE DE Gruttola

...Higgs search, which will be a topic of great interest in 2011, when LHC integrated luminosity will start...

ALEXEY Drozdetskiy



...to continue working on ZZ, H->ZZ in particular in 4 and 2 lepton modes. This includes many aspect of the analyses...

ADAM Everett

...the opportunity to continue the study of muon object selection. This research is an especially important cross-group project...

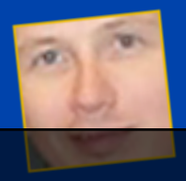
CECILIA Gerber

...extend my studies of events containing muons + MET + jets + b-jets in the final state to obtain a well understood top quark pair sample...

KRISTIAN Hahn

...focus on search for physics beyond the standard model. I am specifically interested in final states that include substantial missing...

ANDREW Ivanov



...My goal is to study data samples dominant by QCD for a search of possible anomalous production of new physics...

JACOBO Konigsberg

...working on Higgs searches at CMS. Specifically on channels that include associated production of vector-bosons and the Higgs decaying to pairs of b-quarks...

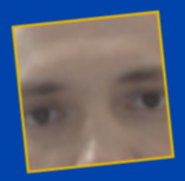
GENA Kukartsev

...searches for exotic phenomena beyond the standard model with particular interest in di-lepton and quasi-two-body topologies...

14 Fellows in 2011

MICHELE DE Gruttola

...Higgs search, which will be a topic of great interest in 2011, when LHC integrated luminosity will start...



ALEXEY Drozdetskiy

...to continue working on ZZ, H->ZZ in particular in 4 and 2 lepton modes. This includes many aspect of the analyses...

ADAM Everett

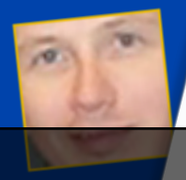
...the opportunity to continue the study of muon object selection. This research is an especially important cross-group project...

CECILIA Gerber

...extend my studies of events containing muons + MET + jets + b-jets in the final state to obtain a well understood top quark pair sample...

KRISTIAN Hahn

...focus on searches for physics beyond the standard model. I am specifically interested in final states that include substantial missing...



ANDREW Ivanov

...My goal is to study data samples dominant by ... possible ... new phys...

JACOBO Konigsberg

...working on Higgs searches at CMS. Specifically on channels that include associated production of vector-bosons and the Higgs decaying to pairs of b-quarks...

GENA Kukartsev

...searches for exotic phenomena beyond the standard model with particular interest in di-lepton and quasi-two-body topologies...

CHRISTOS Leonidopoulos

...the 2010 search for a new heavy charged boson with pp collisions at 7 TeV (arXiv:1103.0030)...

DAVID LOPES Pegna

...working on the search for a low mass Standard Model Higgs decaying to bbar and produced in association with a vector boson (W,Z)...

EVA Haikladakis

...plans to perform searches for new physics ... with jets ... detector...

JIM Olsen

...continuing my search for the Higgs boson in its decay to two b quarks. This channel has been known to be one of the most challenging for the Higgs search at the LHC...

PETER Wittich

...working on new physics searches with jets and understanding the trigger performance in the new high-pileup regime we expect in 2011/2012...

JOHN PAUL Chou

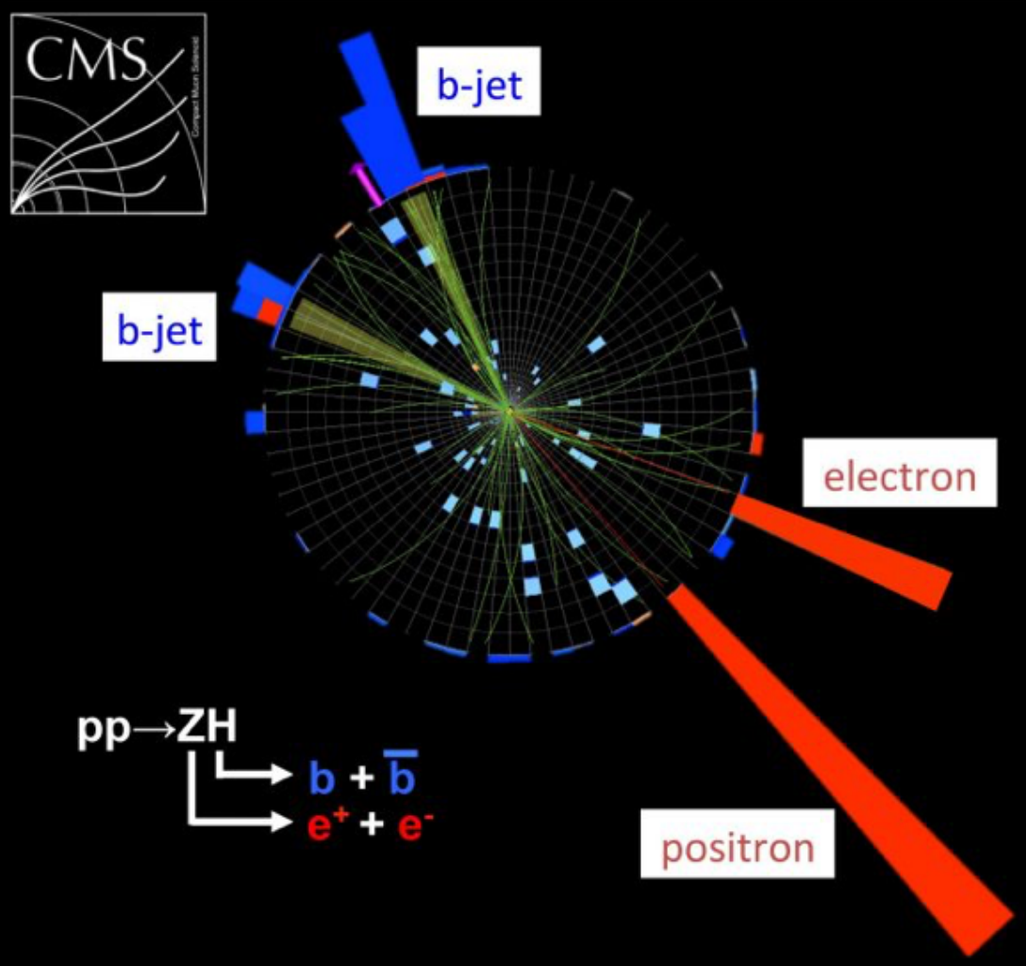
...working on a search for b-jet resonances. This interesting signature has not been studied directly at a hadron collider...

14 Fellows in 2011

Fast forward 7 years…

Fast forward 7 years…

Discovery of Higgs to bb

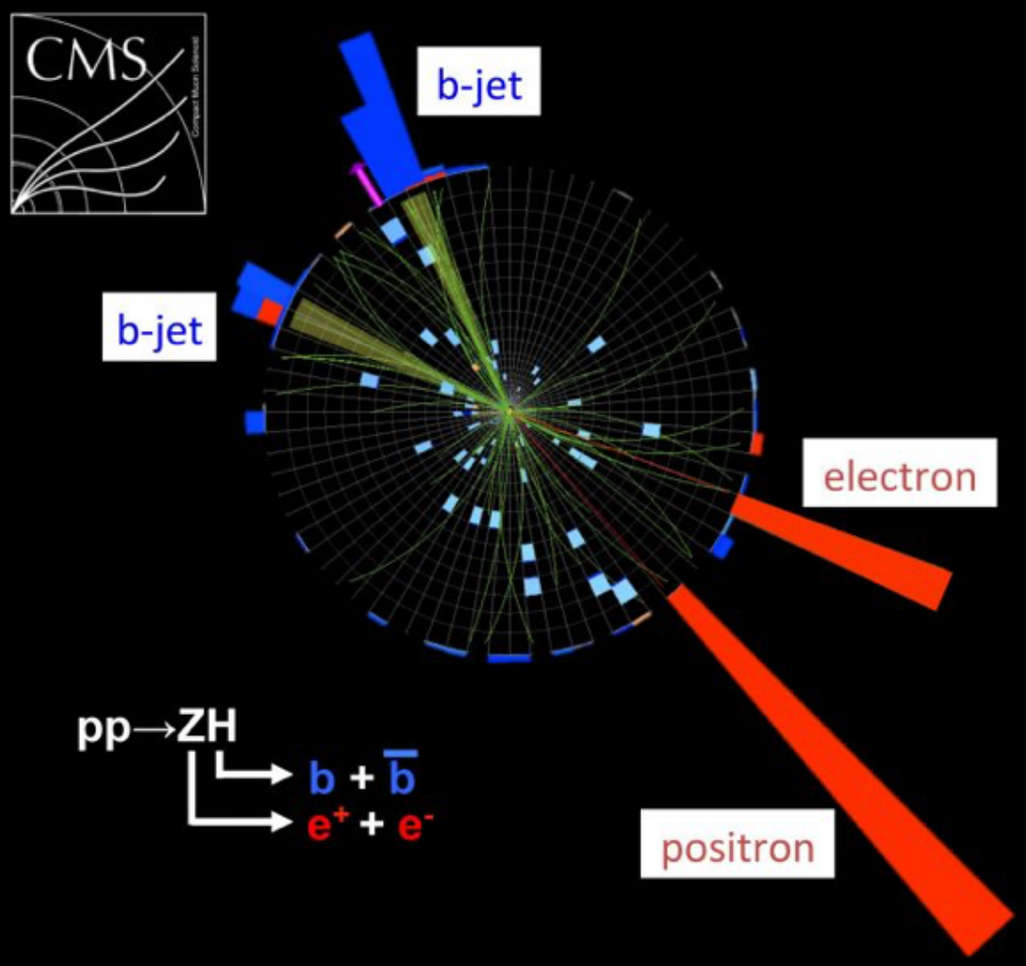


Fast forward 7 years…

Discovery of Higgs to bb

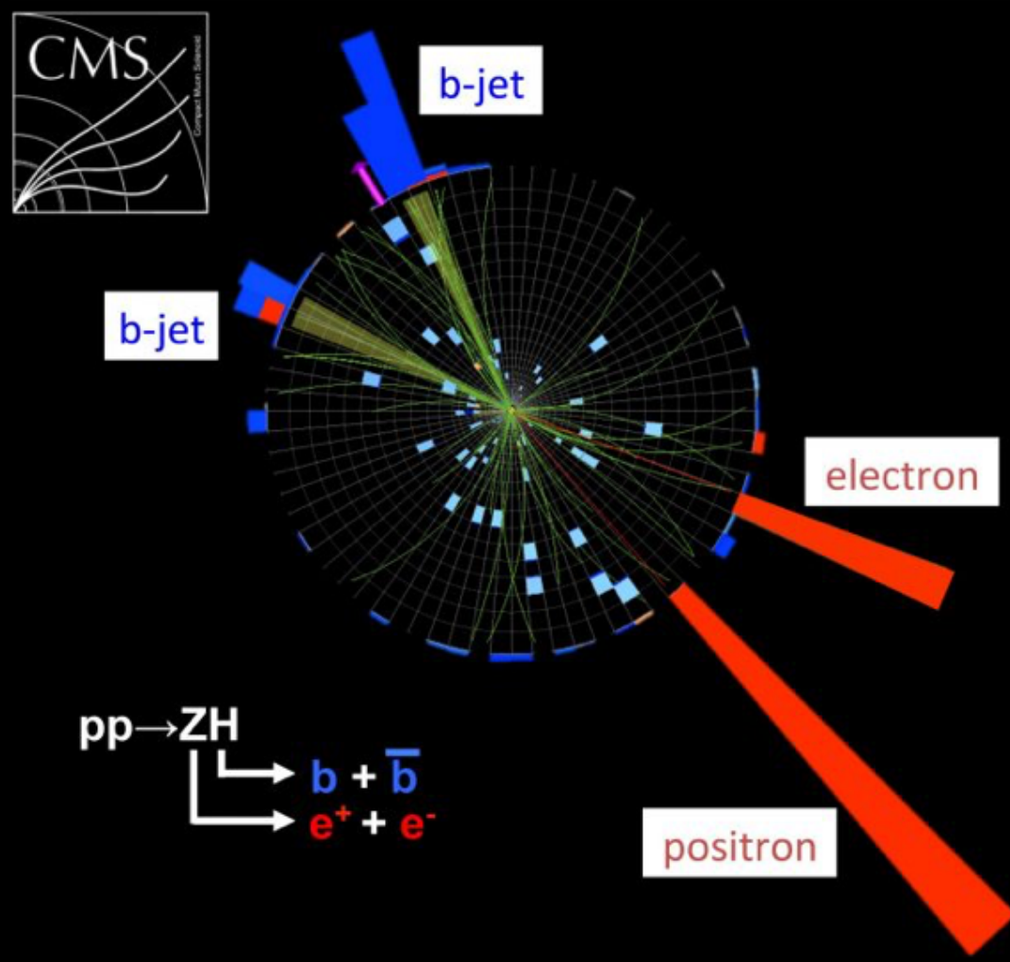
It is a highly satisfying accomplishment, and now it's a very popular endeavor. It happens like that in particle physics: When you establish the existence of a new process, it quickly becomes a whole new area of research. It's very exciting.

— Jacobo Konigsberg (University of Florida), former LPC distinguished researcher, former convener of the Higgs-to-bb group



Fast forward 7 years…

Discovery of Higgs to bb



It is a highly satisfying accomplishment, and now it's a very popular endeavor. It happens like that in particle physics: When you establish the existence of a new process, it quickly becomes a whole new area of research. It's very exciting.

— Jacobo Konigsberg (University of Florida), former LPC distinguished researcher, former convener of the Higgs-to-bb group

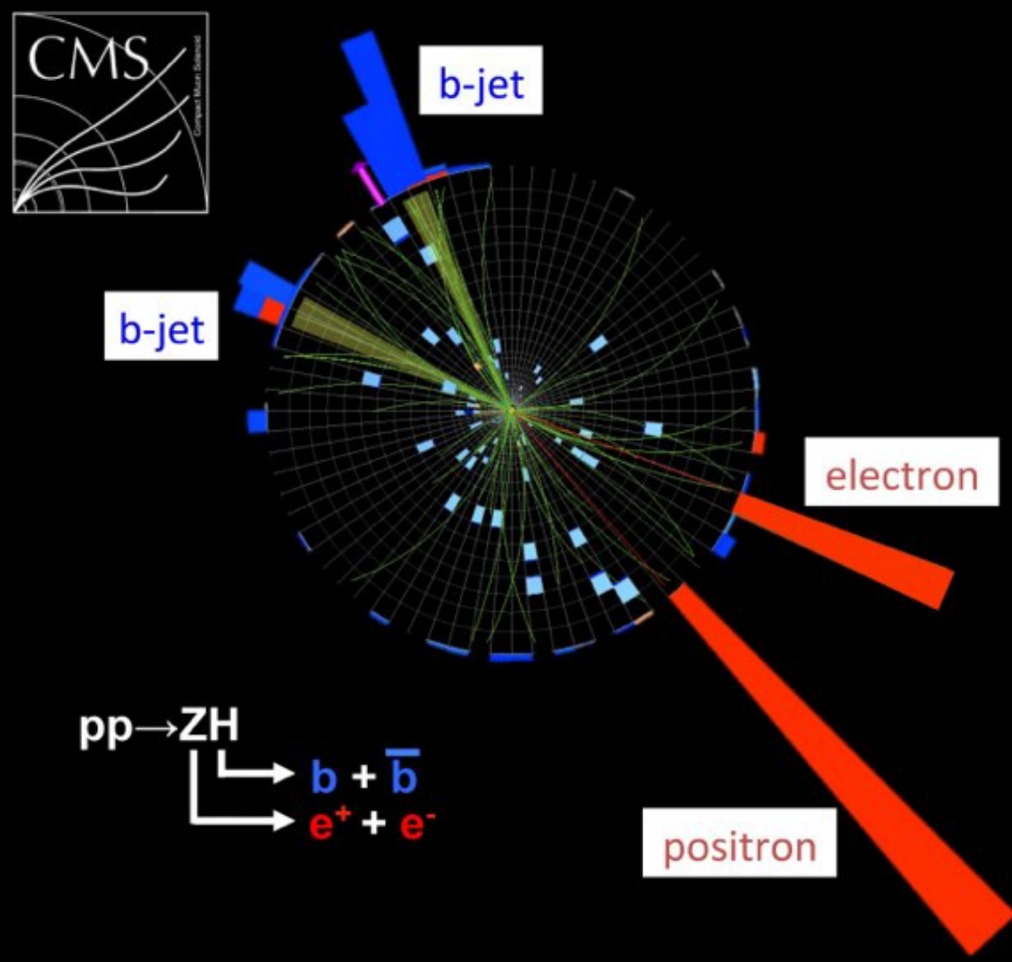
This is pretty satisfying. I became involved in the search for the Higgs-to-bb decay in 2008, after reading a paper that proposed an idea to search for this channel in a new way that had not been previously emphasized at the LHC. The effort in CMS started to ramp up in early 2011, when we still didn't have enough data to even begin. I started to travel to Fermilab to visit the LPC and collaborate with the University of Florida group, and in that process, our two Higgs-to-bb groups started to solidify our efforts. We basically decided we were going to go for a first result with this little data we had to get us on the board, and we built the effort from there.

That was exciting to finally see it, after a decade of hard work. We had this collaboration that came out of the LPC, and having that venue, that incubator of ideas, where we could sit there and brainstorm together — we got a lot of mileage out of it.

— James Olsen (Princeton University), former LPC distinguished researcher, former CMS Higgs convener

Fast forward 7 years…

Discovery of Higgs to bb



It is a highly satisfying accomplishment, and now it's a very popular endeavor. It happens like that in particle physics: When you establish the existence of a new process, it quickly becomes a whole new area of research. It's very exciting.

— Jacobo Konigsberg (University of Florida), former LPC distinguished researcher, former convener of the Higgs-to-bb group

This is pretty satisfying. I became involved in the search for the Higgs-to-bb decay in 2008, after reading a paper that proposed an idea to search for this channel in a new way that had not been previously emphasized at the LHC. The effort in CMS started to ramp up in early 2011, when we still didn't have enough data to even begin. I started to travel to Fermilab to visit the LPC and collaborate with the University of Florida group, and in that process, our two Higgs-to-bb groups started to solidify our efforts. We basically decided we were going to go for a first result with this little data we had to get us on the board, and we built the effort from there.

That was exciting to finally see it, after a decade of hard work. We had this collaboration that came out of the LPC, and having that venue, that incubator of ideas, where we could sit there and brainstorm together — we got a lot of mileage out of it.

— James Olsen (Princeton University), former LPC distinguished researcher, former CMS Higgs convener

I'm super happy about this result. Yesterday [Aug. 28] we made the announcement, and I'm still smiling. My interest in this topic started in 2009 when I was a summer student at Fermilab, when I didn't know anything about physics. I eventually moved to CMS as a grad student in 2012, around the time of the Higgs discovery. We realized that the Higgs decay into two bottom quarks was the largest branching fraction. It's extremely challenging to identify. It suffered from the largest background: seven orders of magnitude greater than the signal. But I was excited to study it.

I've been working on different aspects of this complex result over the years, learned from and collaborated with many talented physicists. Now we've got it, and I was part of the team — in fact responsible for the CMS Higgs-to-bb group — that found it.

And it's not the end of the story. We can exploit this Higgs boson decaying to *bb* as a tool, probing new physics processes.

— Caterina Vernieri (Fermilab), LPC distinguished researcher, convener of the Higgs-to-bb group

LPC Distinguished Researcher Class of 2018

J-Term: Intro to CMS at the LPC

Attended by over 70 1st and 2nd year grad students!

…circa 2006

Principle engagement program of the LPC

Address http://www.uscms.org/LPC/workshops.htm

Google Search 292 blocked Check AutoLink AutoFill Options

J-Term at the LPC

Want to learn more about the physics potential of the LHC? Want to learn everything there is to know about the CMS detector? Want a detailed introduction to the new software framework, CMSSW? Come to J-Term at the LPC. The list of registered attendees can be found here.

Jan 10, 2006 Jan 11, 2006 Jan 12 2006. Jan 13, 2006

The theory session is on the afternoon of Jan 11. Chris Quigg has recommended reading for students attending this session

- E. Eichten, I. Hinchliffe, K. Lane, and C. Quigg, Supercollider physics, Rev. Mod. Phys. 56, 579 (1984).
- C. Quigg, Nature's Greatest Puzzles, http://arxiv.org/abs/hep-ph/0502070.
- F. Gianotti and M. Mangano, LHC physics: the first one--two years, http://arxiv.org/abs/hep-ph/0504221.
- K. Wilson, Some Experiments on Multiple Production, CLNS-131 (1970) http://lutece.fnal.gov/Papers/KenWilson.pdf

On the afternoon Jan 12, 2006, there will be a tutorial on CMSSW, run by Jeremy Mans. To participate in this tutorial, to be held in the LPC transient area, you will need a UAF account (http://www.uscms.org/SoftwareComputing/UserComputing/GetAccountFermilab.html) We prefer you use your own lap top, but there are a limited number of public terminals available. Contact Jeremy Mansif you would like to reserve one of these (jmmans@fnal.gov)

Principle engagement program of the LPC

Address http://www.uscms.org/LPC/workshops.htm

Google Search 292 blocked Check AutoLink AutoFill Options

J-Term at the LPC

Want to learn more about the physics potential of the LHC? Want to learn everything there is to know about the CMS detector? Want a detailed introduction to the new software framework, CMSSW? Come to J-Term at the LPC. The list of registered attendees can be found here.

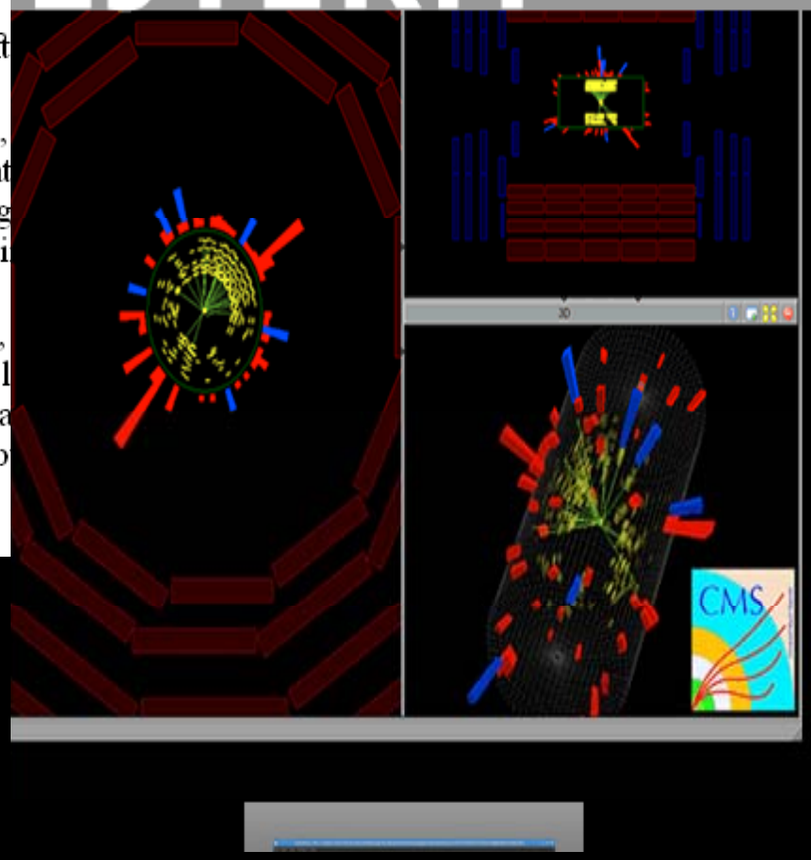
Jan 10, 2006 Jan 11, 2006 Jan

The theory session is on the aft

- E. Eichten, I. Hinchliffe,
- C. Quigg, Nature's Great
- F. Gianotti and M. Mang
- K. Wilson, Some Experi

On the afternoon Jan 12, 2006, the LPC transient area, you wil (http://www.uscms.org/Softwa there are a limited number of p (jmmans@fnal.gov)

EJTERM https://www.physics.purdue.edu/particle/ejterm/



EJTERM Jan 5-9 2010 at LPC, FNAL

COMMISSIONING AND ANALYSIS OF EARLY DATA WITH CMS

(Due to the LHC turn on this webpage is still under construction)

Registration for EJTERM and the agenda are at:
http://indico.cern.ch/conferenceDisplay.py?confId=69600
(Please note: to register a CERN e-mail (NICE) account is required.)

Speakers for opening session

- Joe Lykken FNAL "The Really Big Picture"
- Eric Prebys FNAL "LHC in Context and Current Status"

"Tell me and I forget,
show me and I remember,
involve me and I understand."

CMSDAS is a Collaboration between the students and teachers

Photon Contamination in 900 GeV Data

JTerm 9 January 2010

Facilitators: Andrew Askew (FSU), Vanessa Gaultney (FIU), Yuri Gershtein (Rutgers), Tia Miceli (UCD)

Participants: Eric Appelt (Vanderbilt), Sushil Chauhan (DU Dehli), Irakli Chakaberia (KSU), Carley Kopecky (UCD), Duong Nguyen (Brown), Mani Tripathi (UCD)

Photon Contamination in 900 GeV Data

JTerm 9 January 2010

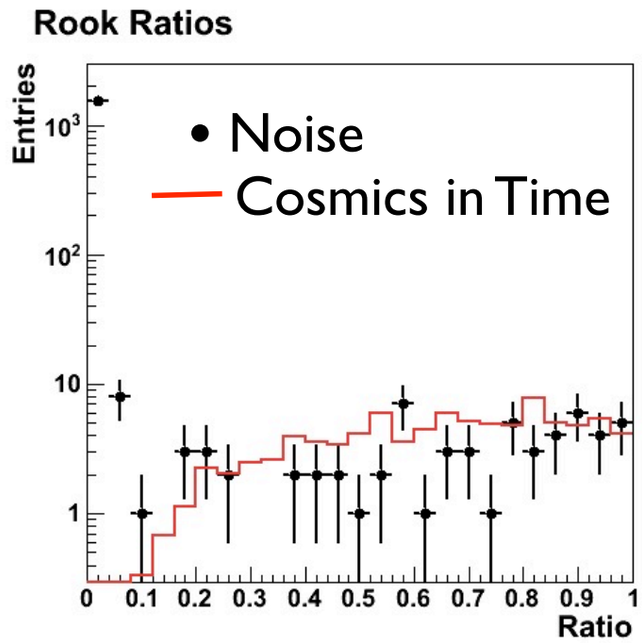
Facilitators: Andrew Ask
(FIU), Yuri Gershtein (Ru

Participants: Eric Appelt
(DU Dehli), Irakli Chaka
(UCD), Duong Nguyen (
(UCD)

Noise and The Rook Cut

Cosmics Cuts
- L1_SingleTriggerEG2==0
- hcaliso < 1.0E-5
- hadOverEm < 1.0E-5
- ntrksol == 0
- Δt(seed - neighbor) < 1

Noise Cuts
- L1_SingleTriggerEG2==0
- hcaliso < 1.0E-5
- hadOverEm < 1.0E-5
- ntrksol == 0
- nCosMu == 0
- nMuons == 0



Cosmics above R=0.1 can account for noise.
Cut on Cosmics, cut on R>0.1...

Carley Kopecky

Photon Contamination in 900 GeV Data

JTerm 9 January 2010

Facilitators: Andrew Ask
(FIU), Yuri Gershtein (Ru

Participants: Eric Appelt
(DU Dehli), Irakli Chaka
(UCD), Duong Nguyen (
(UCD)

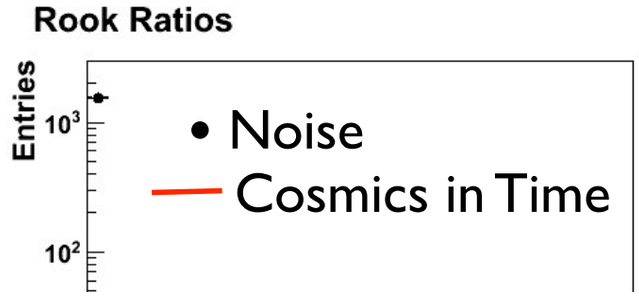
Carley Kopecky

Saturday, January 9, 2010

Noise and The Rook Cut

Cosmics Cuts
- L1_SingleTriggerEG2==0
- hcaliso < 1.0E-5
- hadOverEm < 1.0E-5
- ntrksol == 0
- Δt(seed - neighbor) < 1

Noise Cuts
- L1_SingleTriggerEG2==0
- hcaliso < 1.0E-5
- hadOverEm < 1.0E-5
- ntrksol == 0
- nCosMu == 0
- nMuons == 0



Conclusions

- Beam Halo contribution is small
- Rook effectively eliminates noise
- Cosmics and QCD account for our photon candidates... all of them. No strong candidates YET

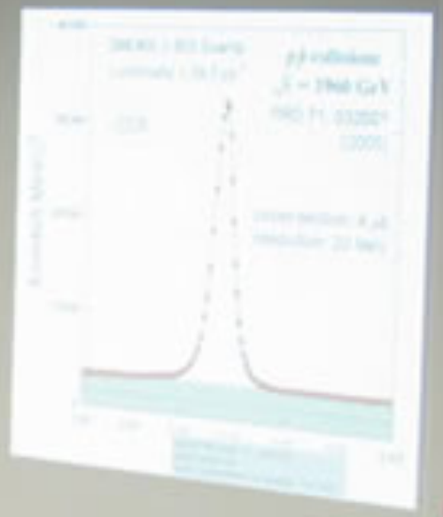
Looking Ahead

- Noise is unexpectedly high - something to study
- Study was limited: low energy, low stats, etc etc
- The exercise is completed once we publish the direct photon cross section.

Why dimuons?

a good probe

- J/ψ charming resonance
- Flat background
- Calibration




Gateway


DON´T PANIC

33. Has EJTERM enabled you to make new connections to CMS members or groups that you envisage will be helpful in your future analysis and other work for CMS?

Text Response
Indeed it has
Most definately.
No, I already knew the professors in my group and connected with them 2 years ago when I was sent to Fermilab. But I still work with them. Now I REALLY wish they had a JTerm at CERN. I've been sent to CERN now and I'm having trouble connecting with students/postdocs/professors. I still email the folks I met at Fermilab.
yes!
Yes
yes indeed, its great opportunity
Yes.
Yes, definitely! Thank you, organizers!
Yes
yes
Yes
Yes
yes, a lot, and in particular to jump-start with the analysis framework which was probably one of the

1. I am a:

#	Answer		Response	%
1	Graduate Student		20	69%
2	Post Doc		7	24%
3	Senior Scientist		1	3%
4	Faculty Member		1	3%
	Total		29	100%

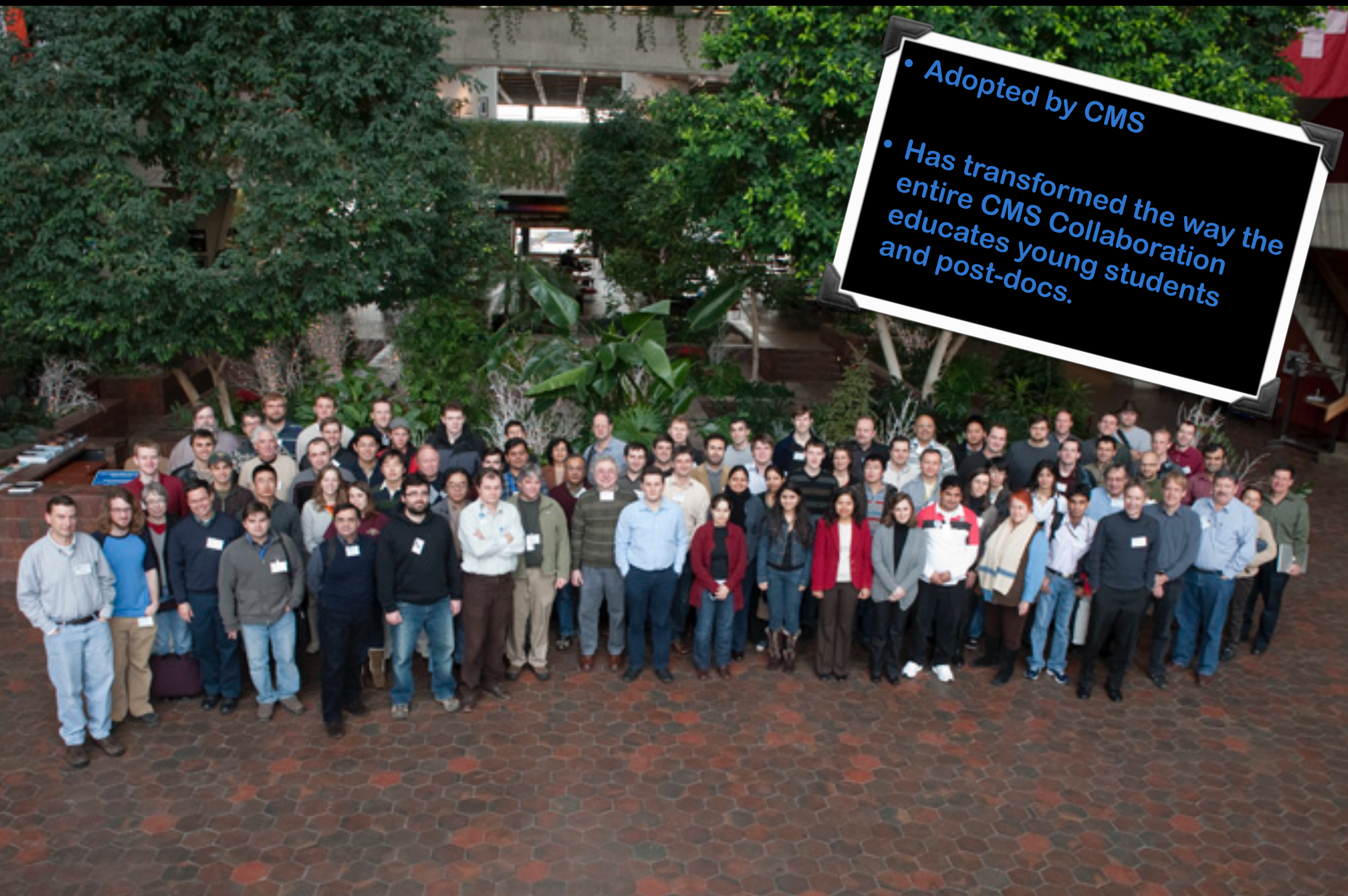
34. Has EJTERM been a valuable experience for you?

#	Answer		Response	%
1	Yes		28	100%
2	No		0	0%
	Total		28	100%


Mykhailo Deichenko

From J-Term to EJTerm to CMS Data Analysis School

From J-Term to EJTerm to CMS Data Analysis School



- Adopted by CMS
- Has transformed the way the entire CMS Collaboration educates young students and post-docs.

Some seminal contributions of the LPC to CMS

Led by Liz Sexton-Kennedy…

Event Data Model

• working with CMS EDM primary author, began review in early November, 2005

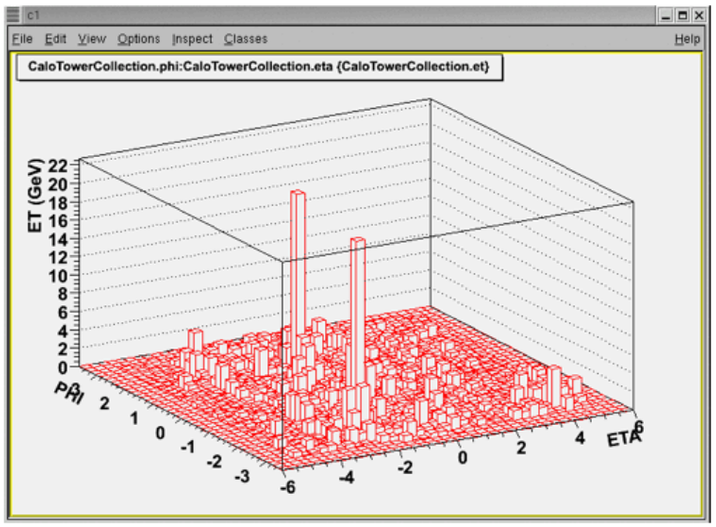
•presented to the collaboration in Jan 11, 2005

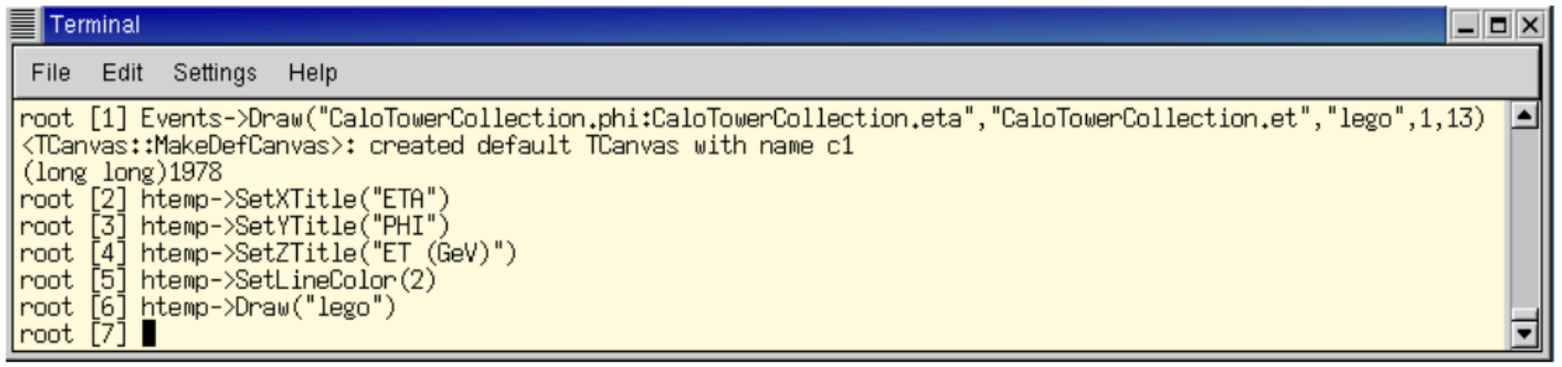
• approved in Feb 9, 2005

• early prototype work demonstrated during March 2005 CMS week

• first implementation delivered June 2005

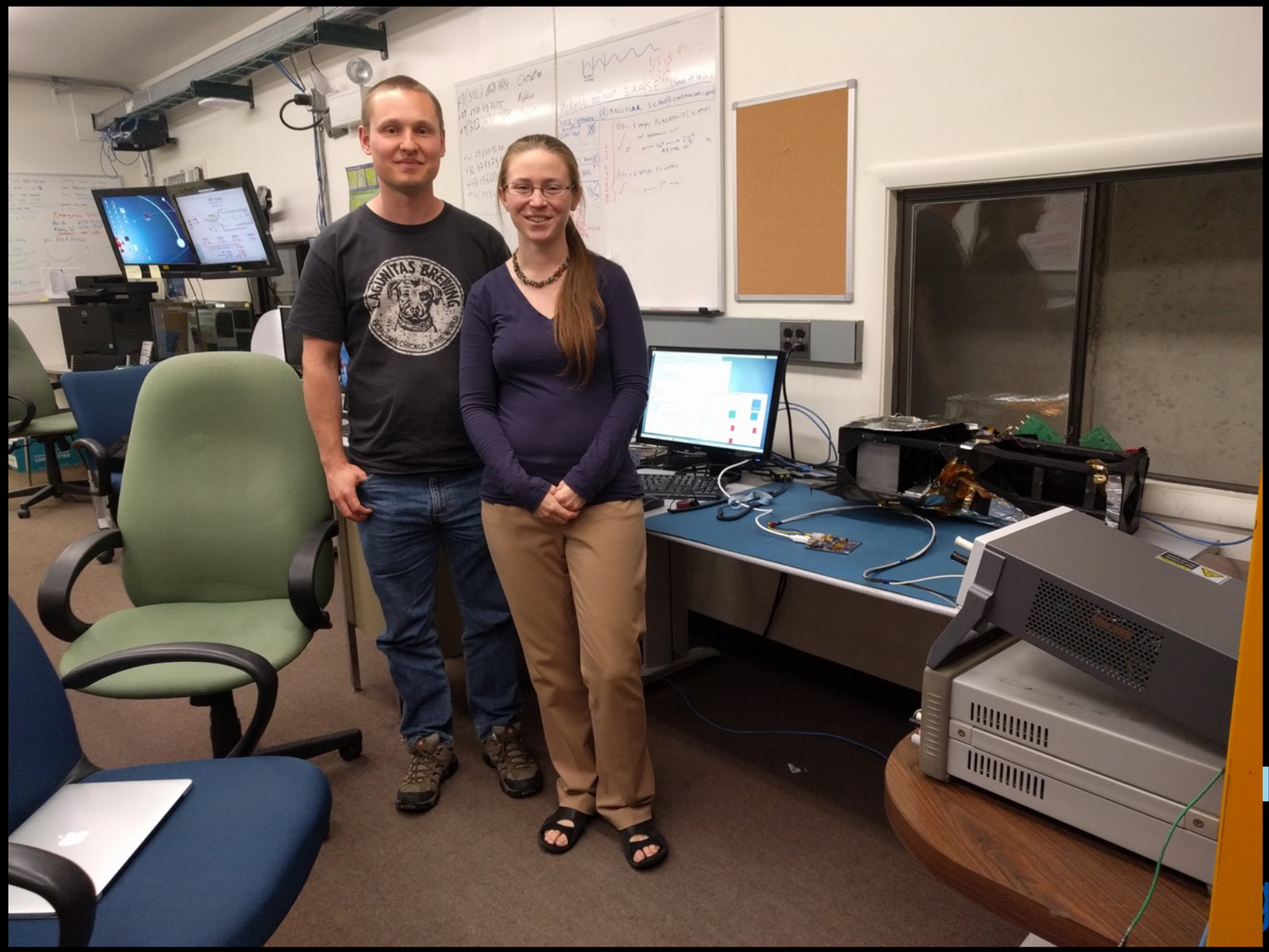
• beginning 2006: all major components of redesign are in place; now in incremental improvements/maintenance phase

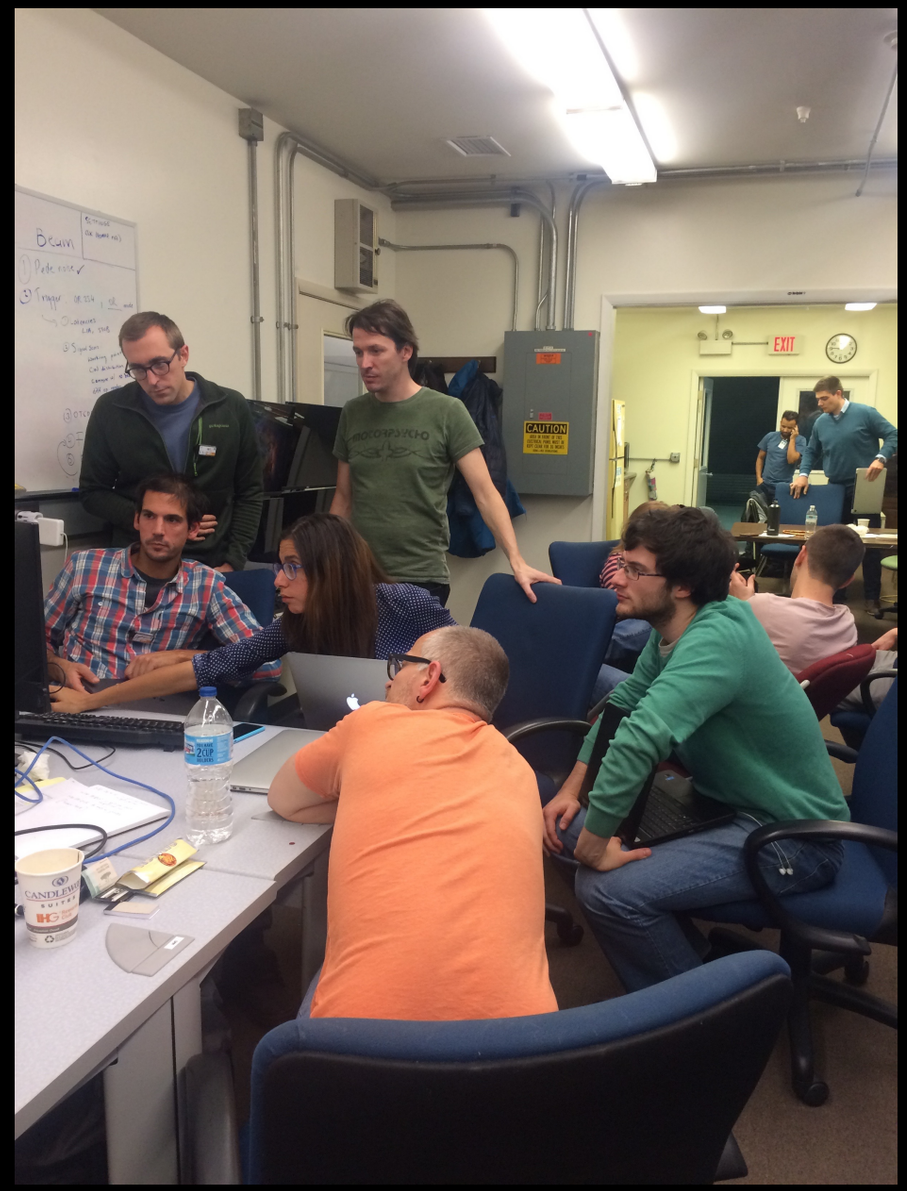


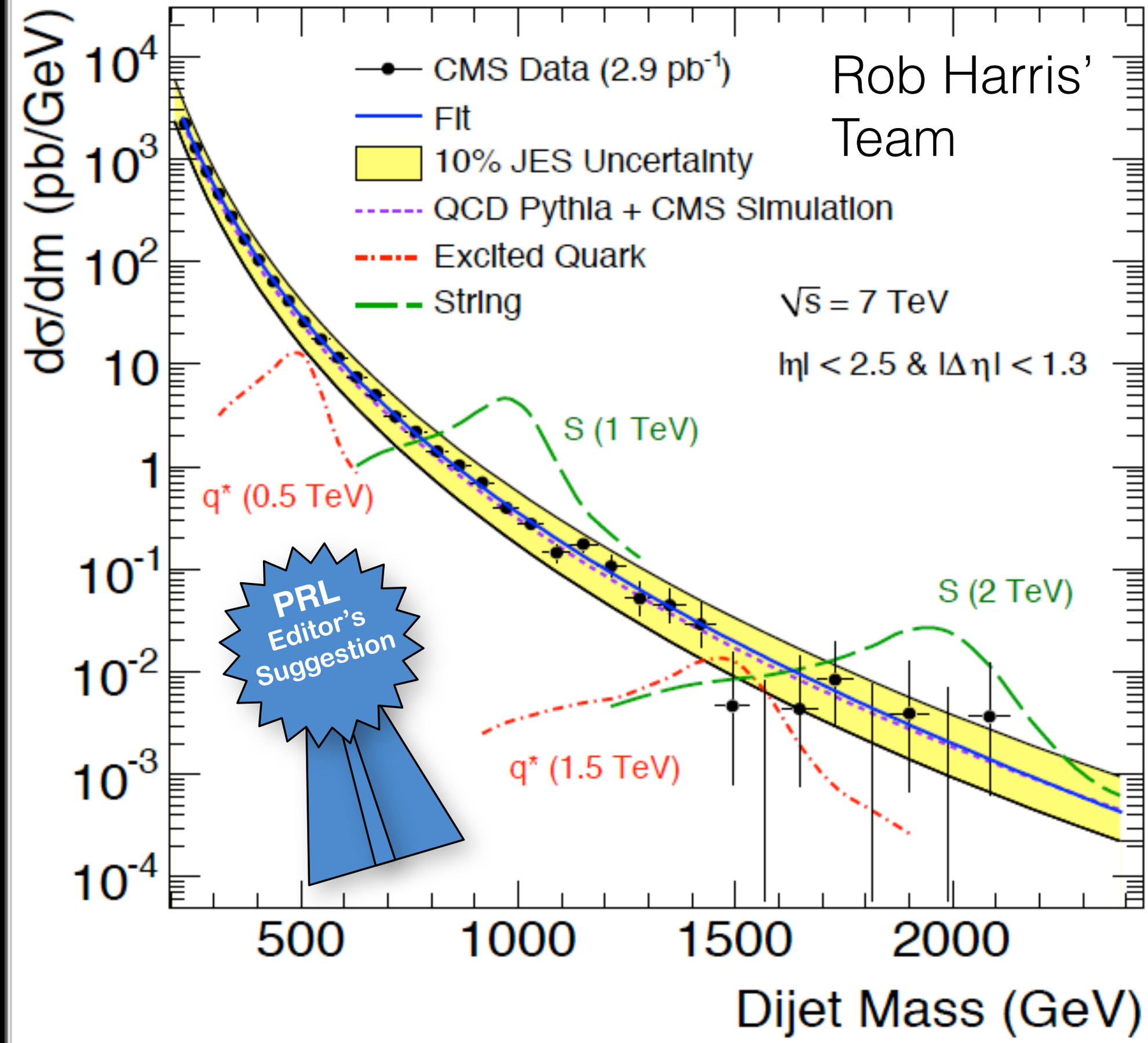


…circa 2006

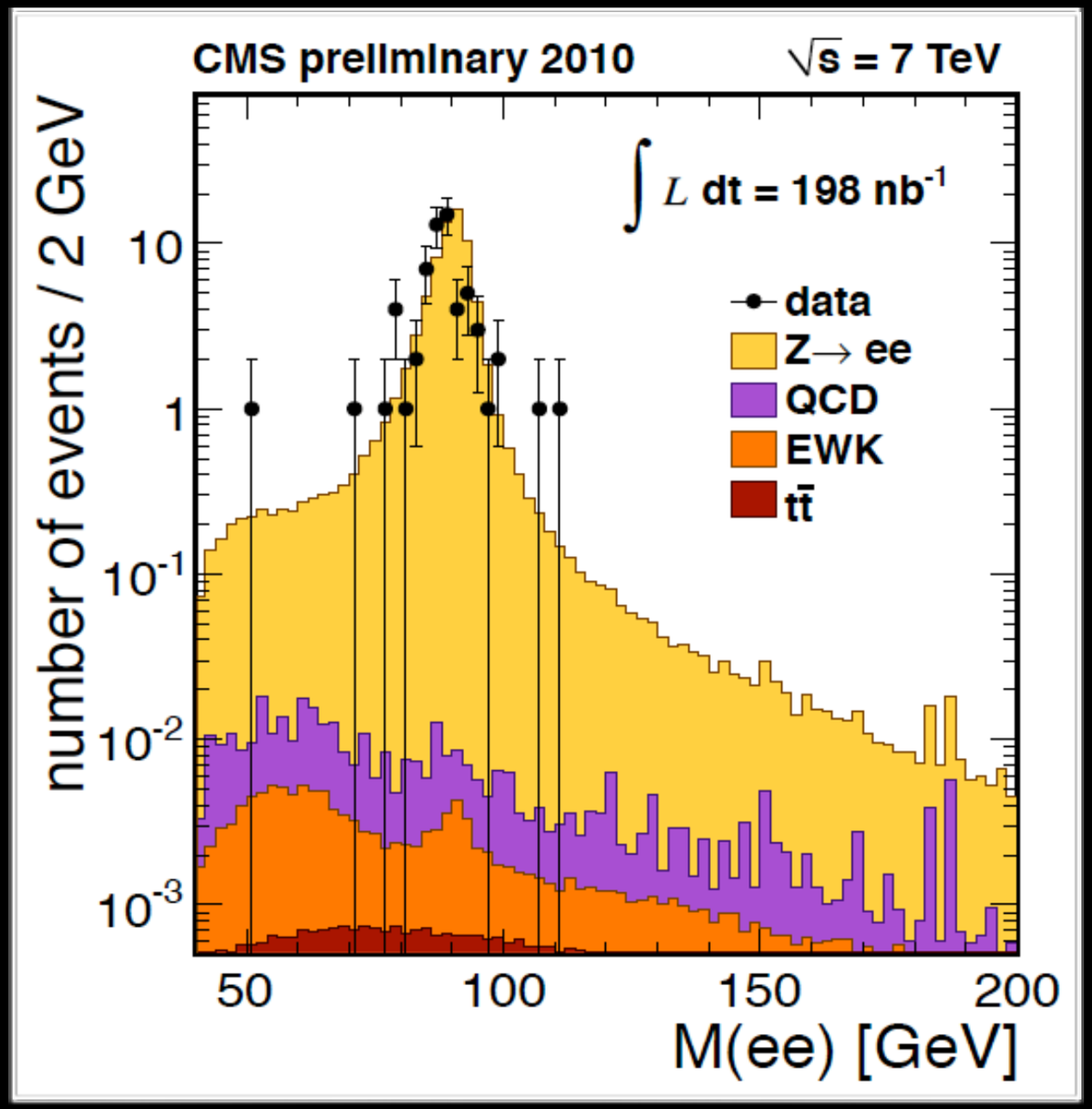
The Test Beam Facility has become a behive of activity Supporting CMS

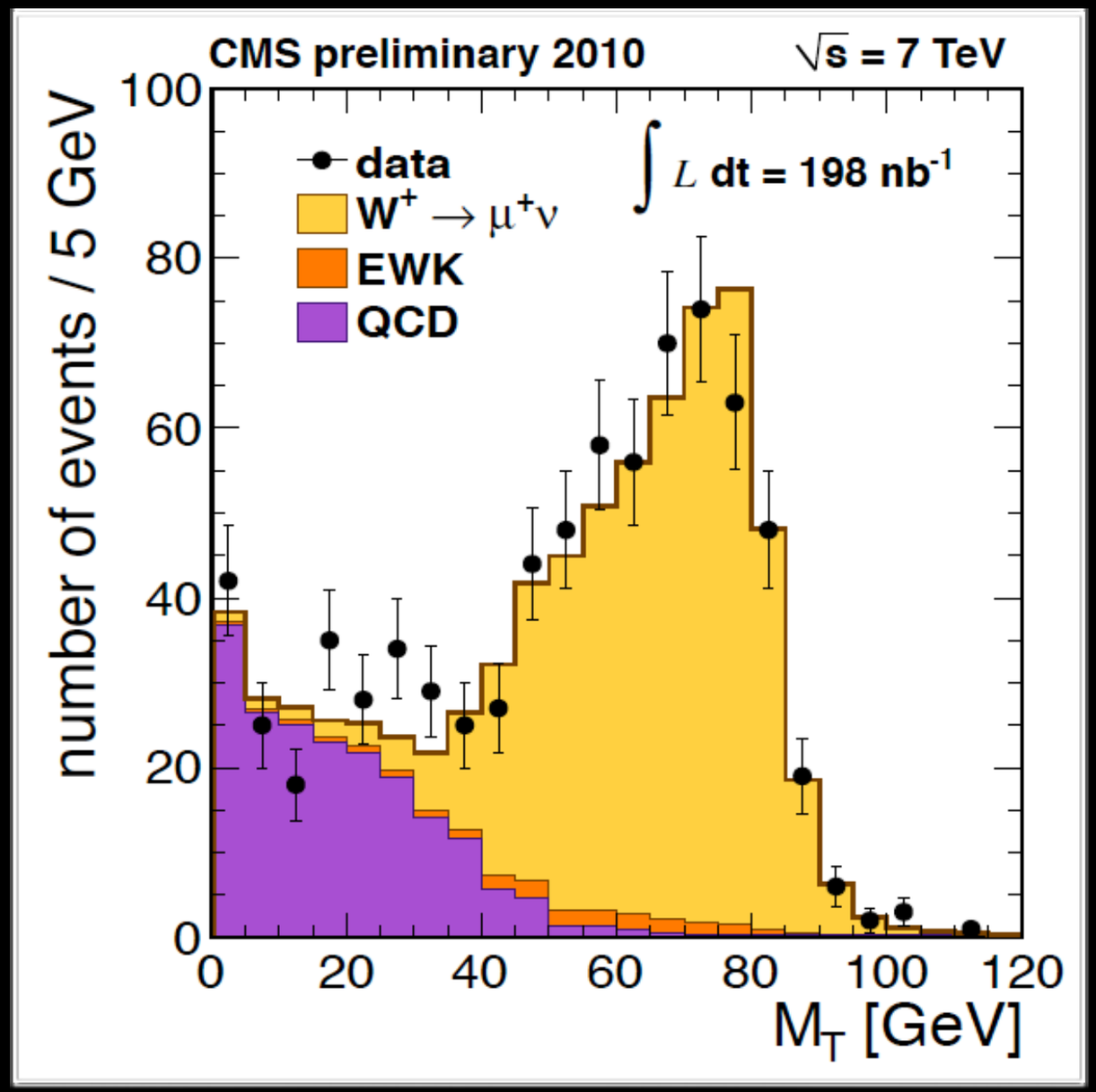


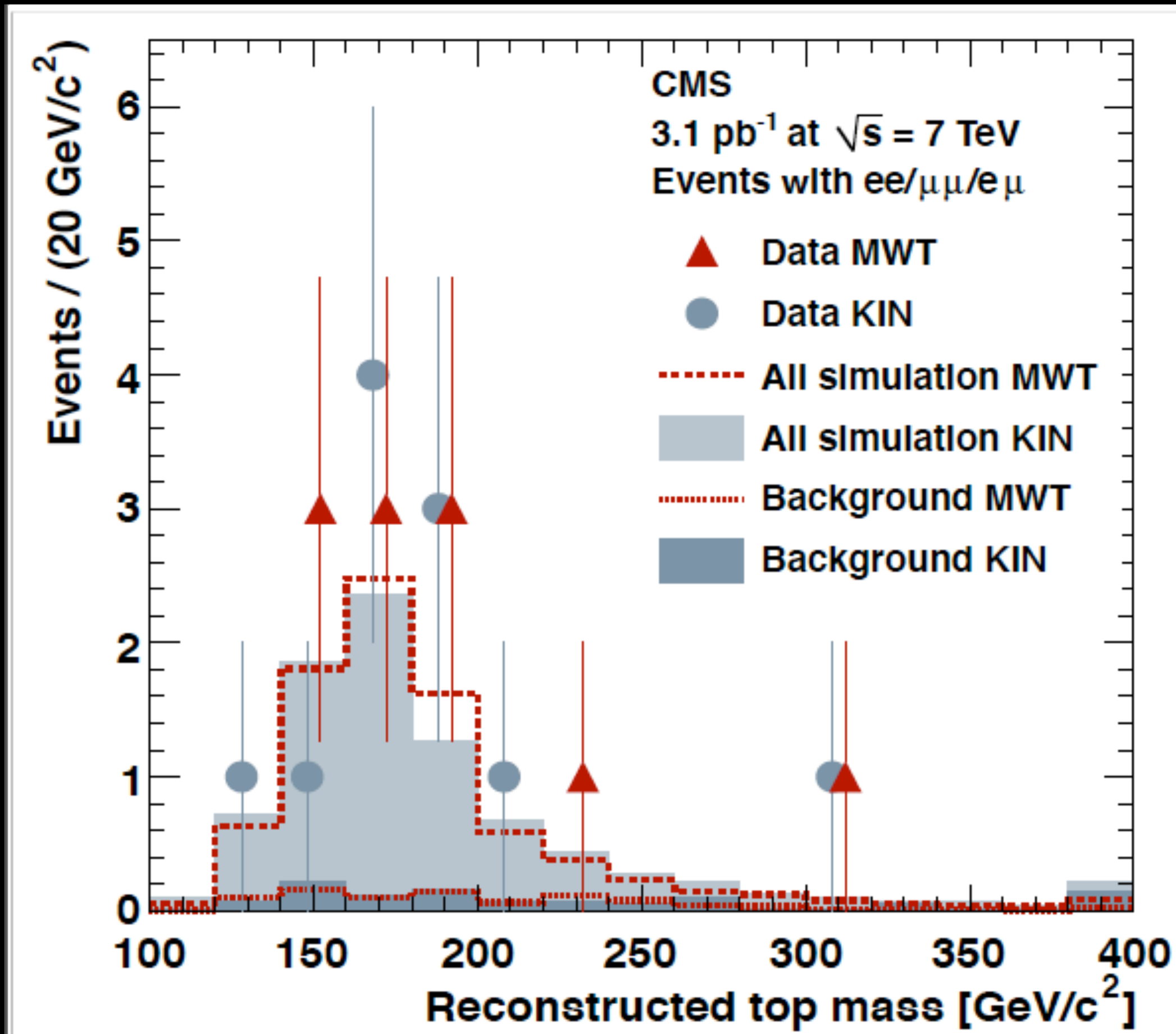



CMS Data (2.9 pb-1)
Fit
10% JES Uncertainty
QCD Pythia + CMS Simulation
Excited Quark
String
Rob Harris' Team
√s = 7 TeV
|η| < 2.5 & |Δη| < 1.3
S (1 TeV)
q* (0.5 TeV)
S (2 TeV)
q* (1.5 TeV)
PRL
Editor's
Suggestion
dσ/dm (pb/GeV)
Dijet Mass (GeV)
10^4
10^3
10^2
10
1
10^-1
10^-2
10^-3
10^-4
500
1000
1500
2000

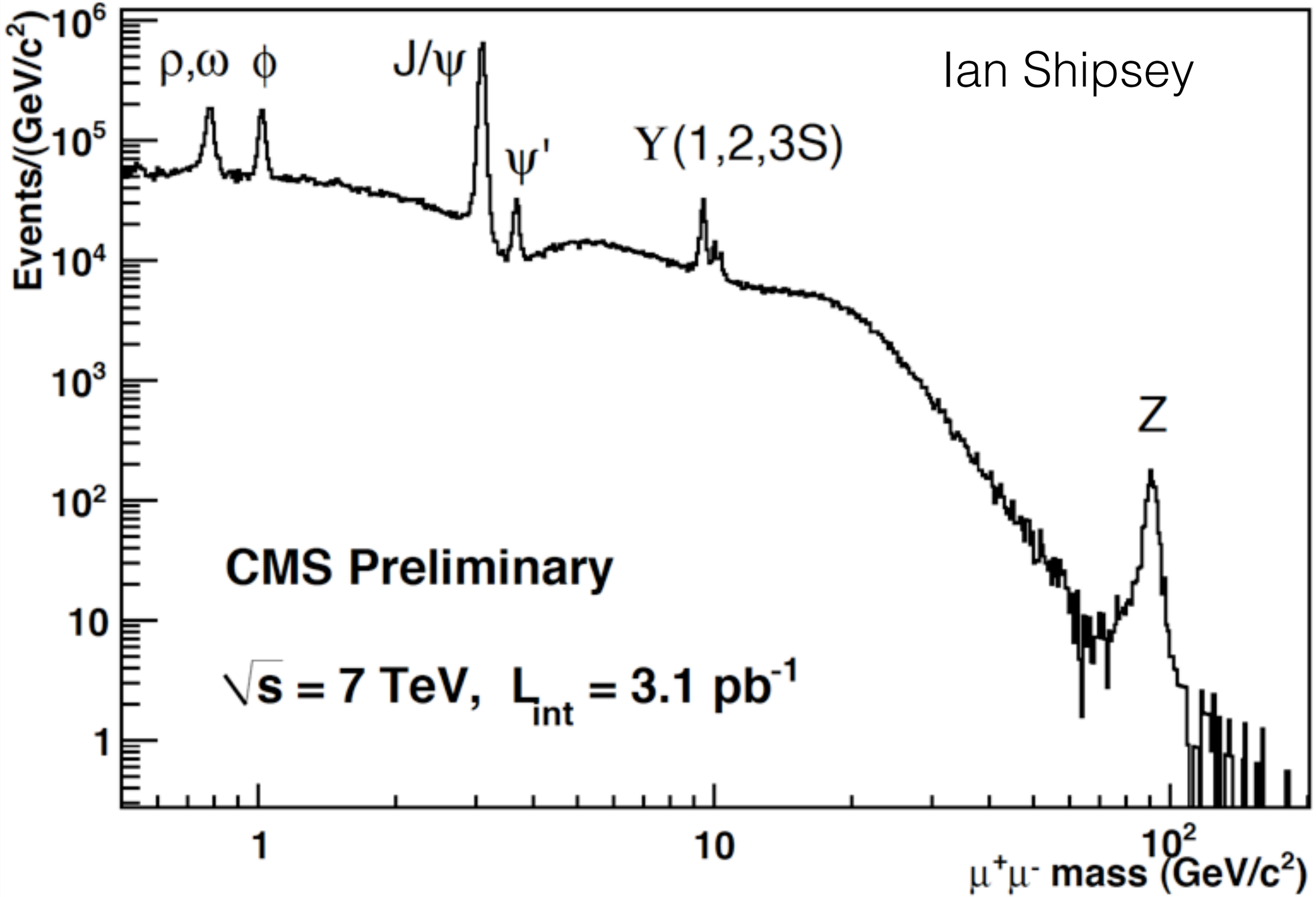
Jeff Berryhill and Dan Green's Team





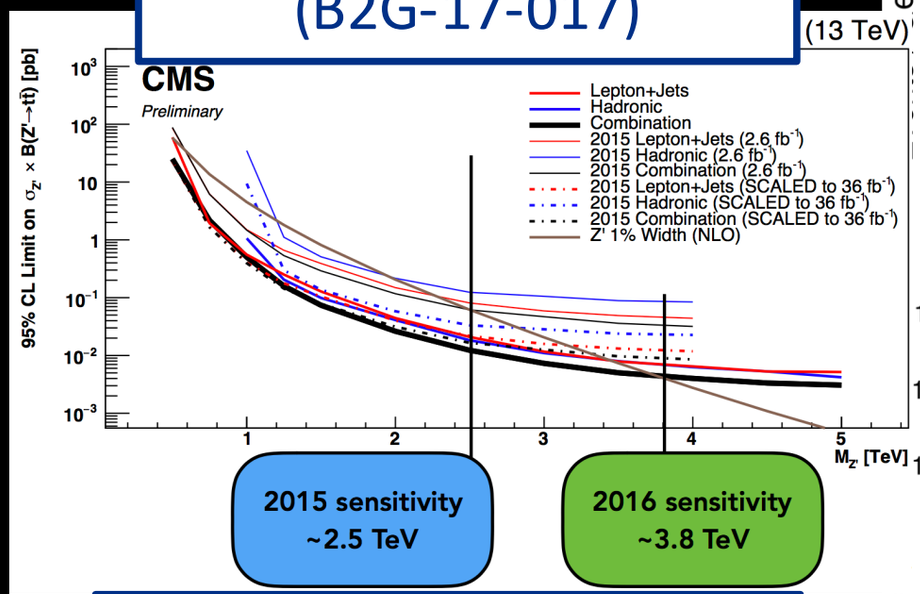

CMS
3.1 pb-1 at √s = 7 TeV
Events with ee/μμ/eμ
Data MWT
Data KIN
All simulation MWT
All simulation KIN
Background MWT
Background KIN
Events / (20 GeV/c2)
0
1
2
3
4
5
6
100
150
200
250
300
350
400
Reconstructed top mass [GeV/c2]

Ian Shipsey

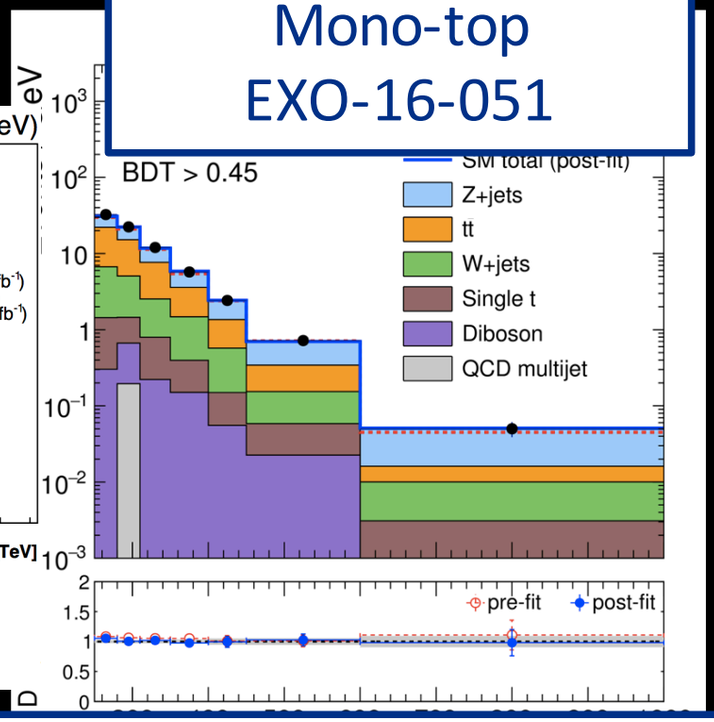

Events/(GeV/c²)
10⁶
10⁵
10⁴
10³
10²
10
1
ρ,ω
φ
J/ψ
ψ'
Υ(1,2,3S)
Z
CMS Preliminary
√s = 7 TeV, L_int = 3.1 pb⁻¹
1
10
10²
μ⁺μ⁻ mass (GeV/c²)

Myrid of recent results involving the LPC

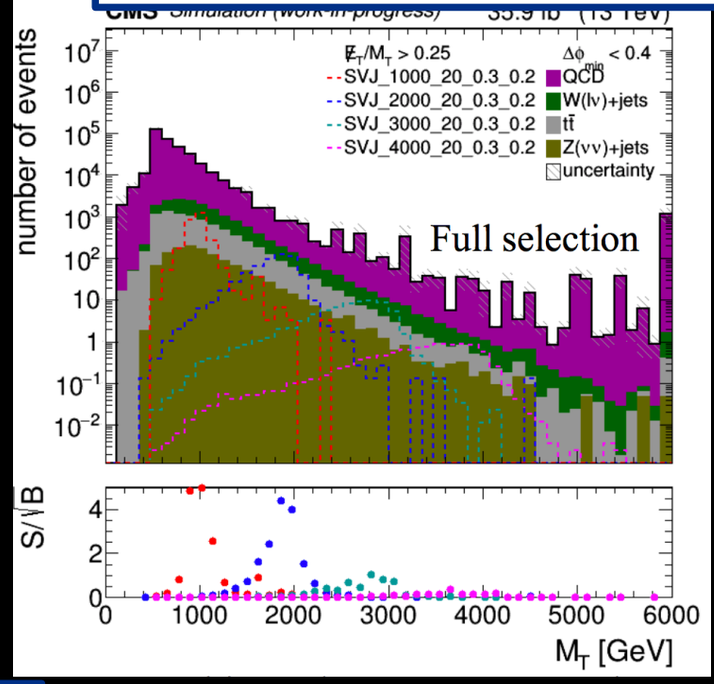
Z'→ ttbar combination (B2G-17-017)



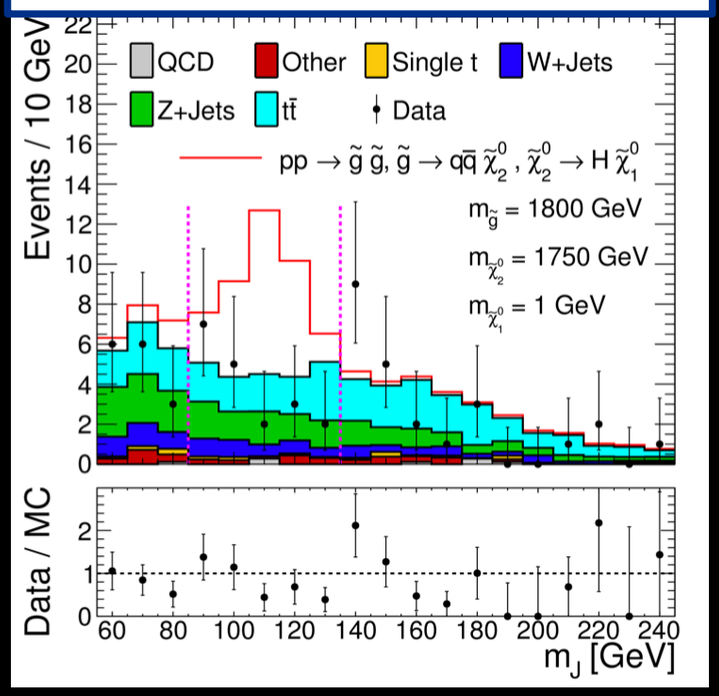
Mono-top EXO-16-051



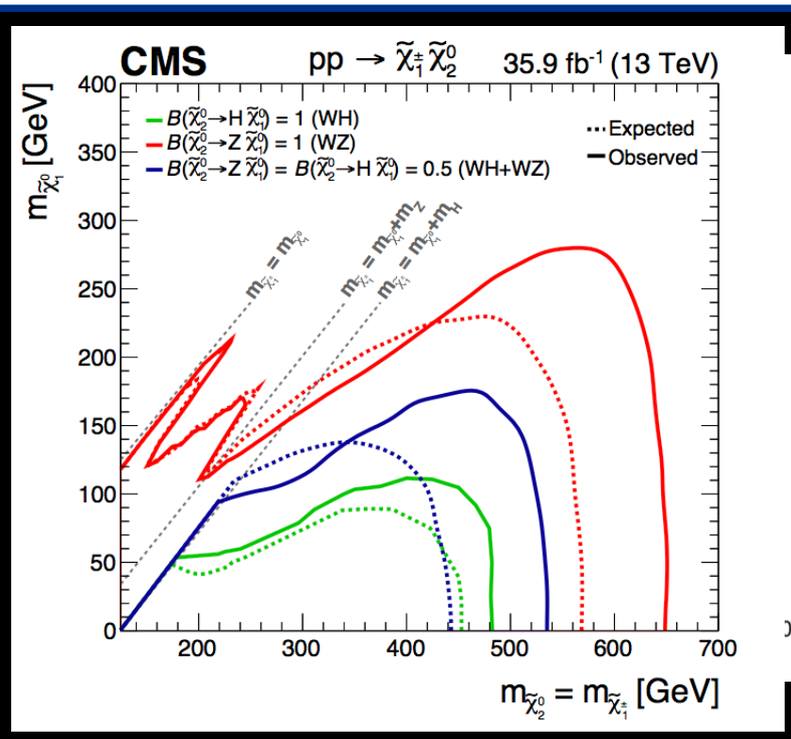
Semi-visible jets (EXO)



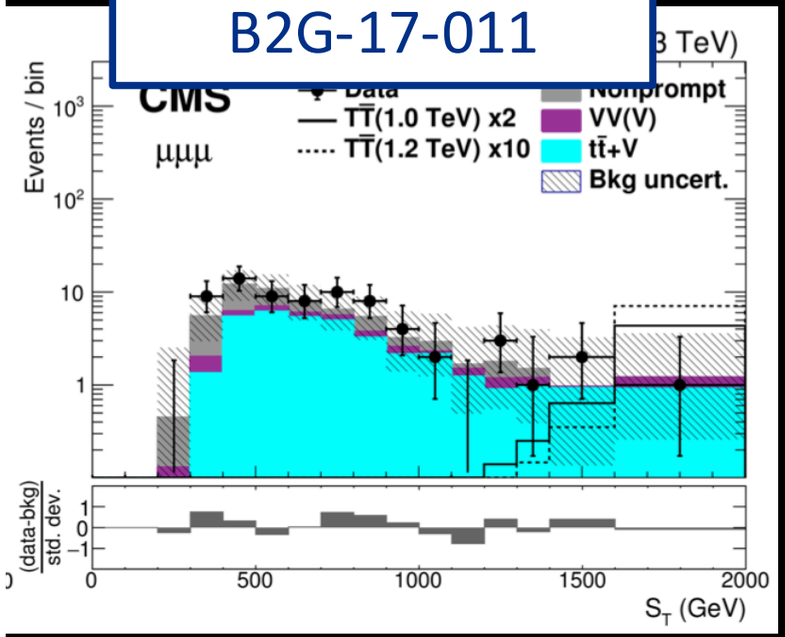
SUSY with boosted Higgs (SUS-17-006)



Electroweak SUSY (SUS-17-004)



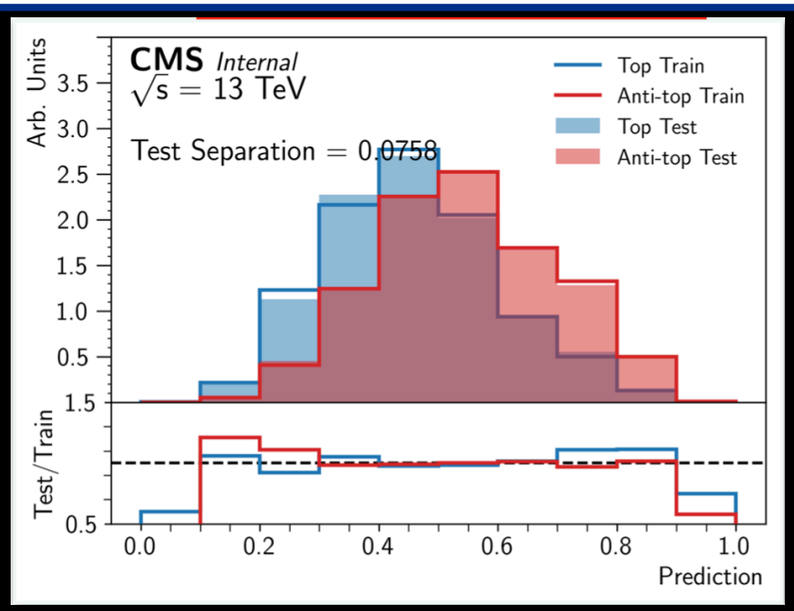
Vector Like Quarks B2G-17-011



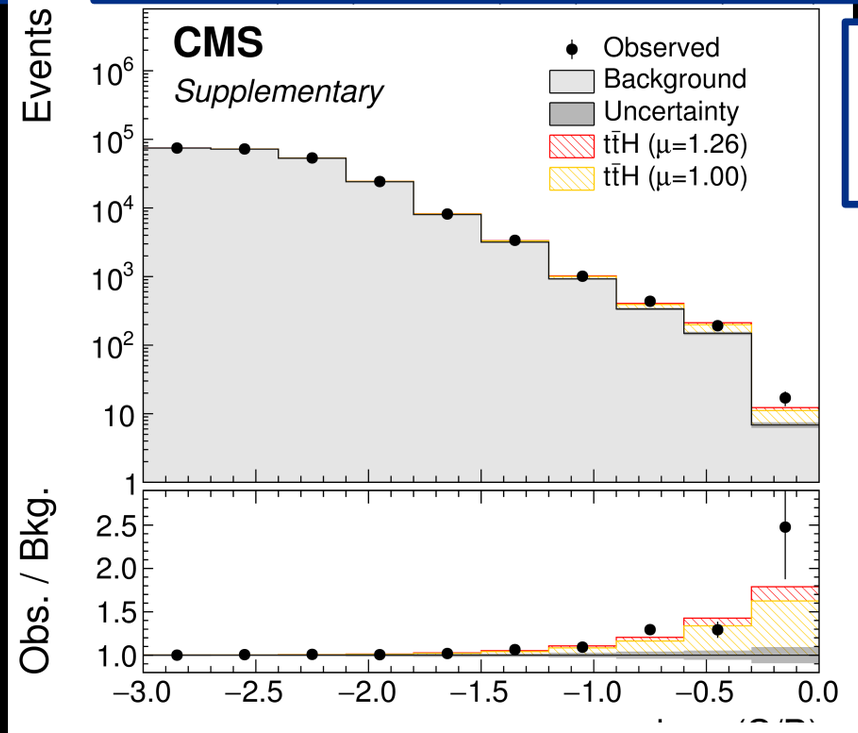
…circa 2018

Myrid of recent results involving the LPC

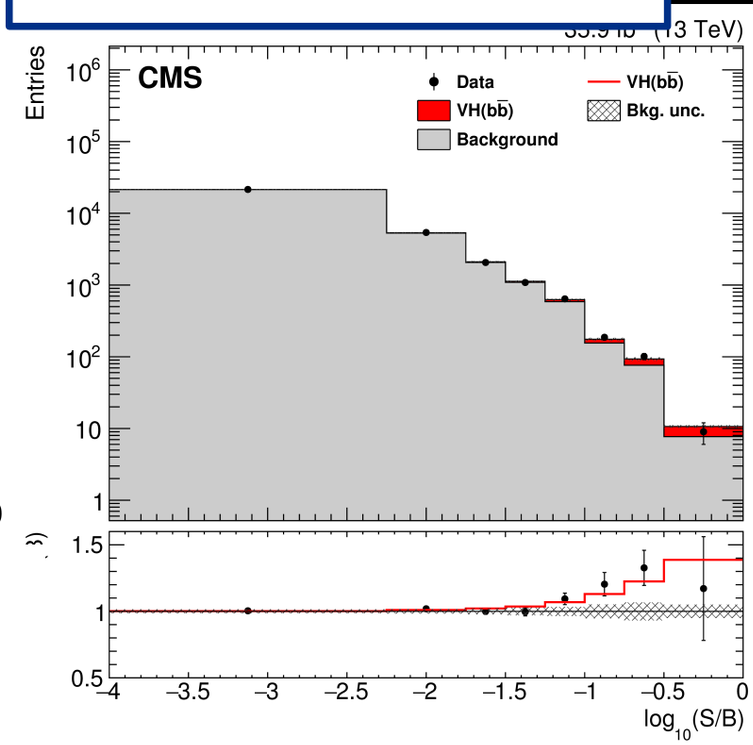
Hadronic Top charge asymmetry



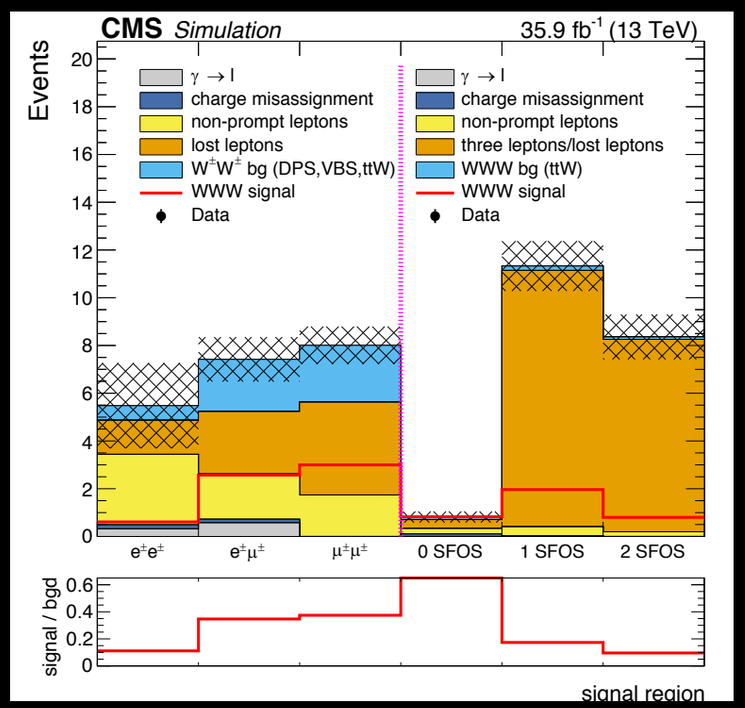
ttH observation: HIG-17-035

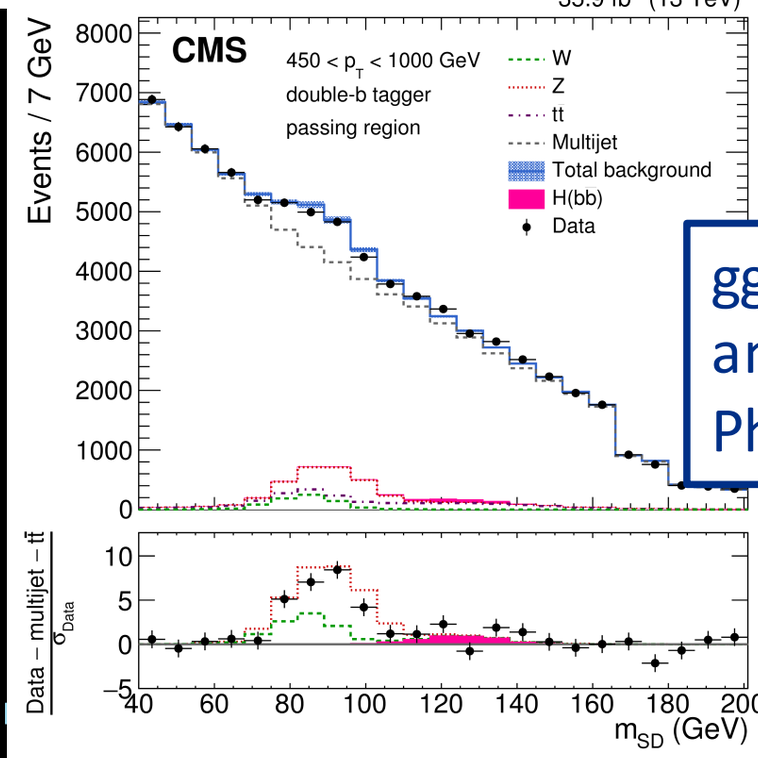


VH→Vbb evidence HIG-16-044



Tribosons (SMP- 17-013)





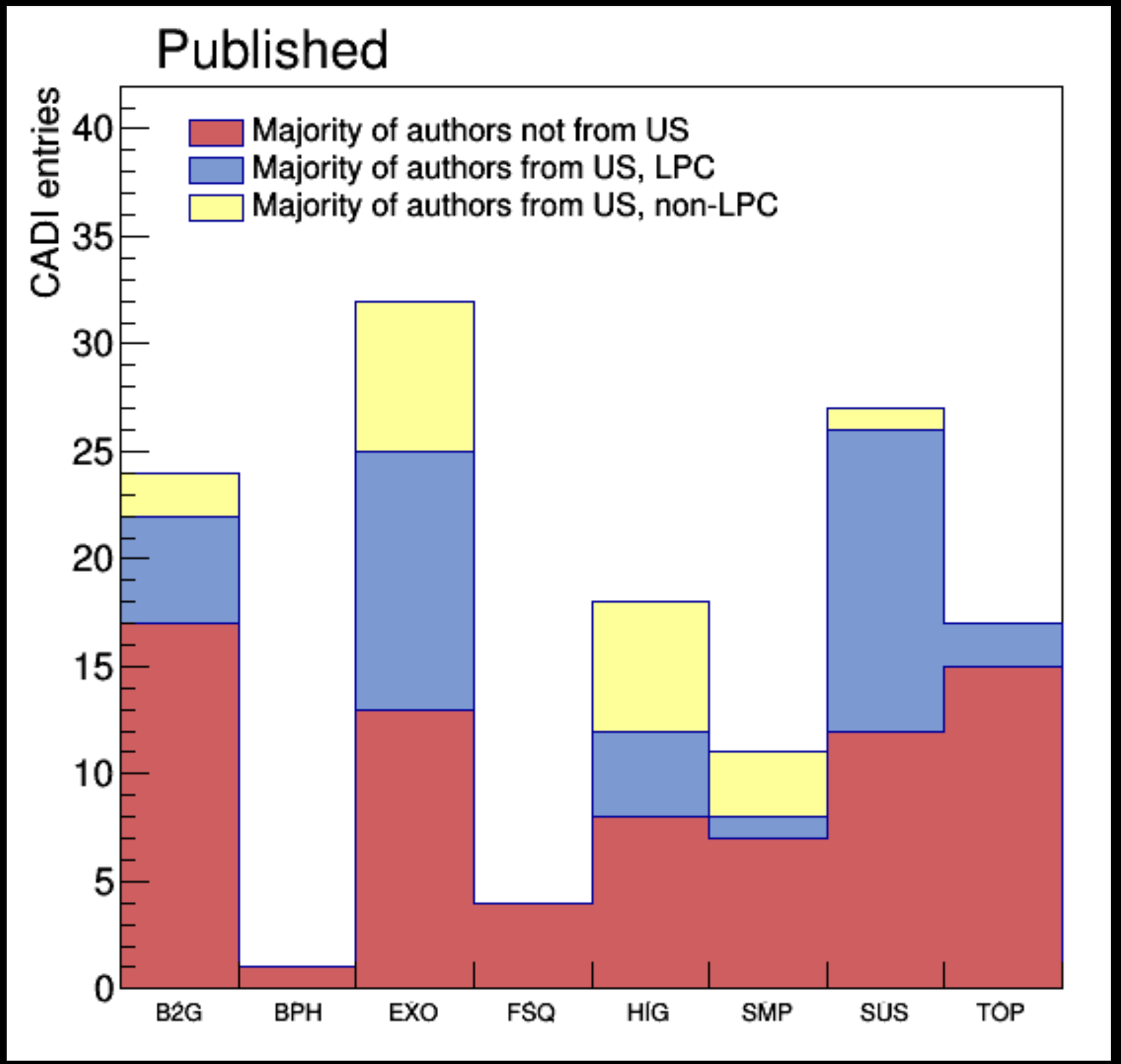
ggH H→bb HIG-17-010 and Phi→bb EXO-17-024

…circa 2018

Nearly 20 years after Dan’s first proposal…

…circa 2018

Nearly 20 years after Dan's first proposal…



…circa 2018

LPC Celebrating the 100th CMS Publication

Happy 4th of July

Fermilab


Three Frontiers
Energy Frontier
FRe

The New York Times

July 5, 2012

Peter Wynn Thompson for The New York Times

Scientists at the Fermilab in Batavia, Ill., on Wednesday watched the presentation about the discovery of the Higgs boson, which was shown from Geneva.

Approaching 20 years…

…since Dan’s first proposal circa 1999

Approaching 20 years…

The LPC had no real precedent

…since Dan’s first proposal circa 1999

Approaching 20 years…

The LPC had no real precedent

Scale, complexity, and geography of CMS unprecedented

…since Dan’s first proposal circa 1999

Approaching 20 years…

The LPC had no real precedent

Scale, complexity, and geography of CMS unprecedented

The LPC has transformed the way we do science

…since Dan’s first proposal circa 1999

Approaching 20 years…

The LPC had no real precedent

Scale, complexity, and geography of CMS unprecedented

The LPC has transformed the way we do science

The LPC represents a new form of scientific engagement enabling discovery

…since Dan's first proposal circa 1999

Thank you Dan!

We stand on your shoulders….

many thanks to the former and current coordinators:

Sarah Eno, Avi Yagil

Dan Green(!), Chris Tully

Ian Shipsey

Meenakshi Narain, Boaz Klima

Cecilia Gerber, Sergo Jindariani

special thanks to the following for making it all happen:

Patrick Gartung

Charles Plager

Sudhir Malik

Gabriele Benelli

Marguerite Tonjes