



U.S. DEPARTMENT OF  
**ENERGY**

OFFICE OF  
**SCIENCE**

# Office of High Energy Physics Report to HEPAP

**June 23, 2011**

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# Outline

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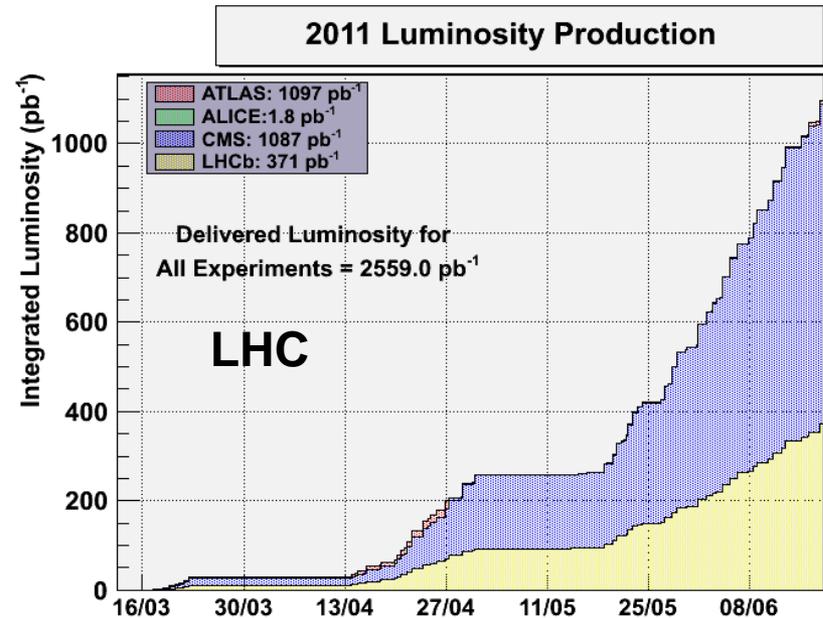
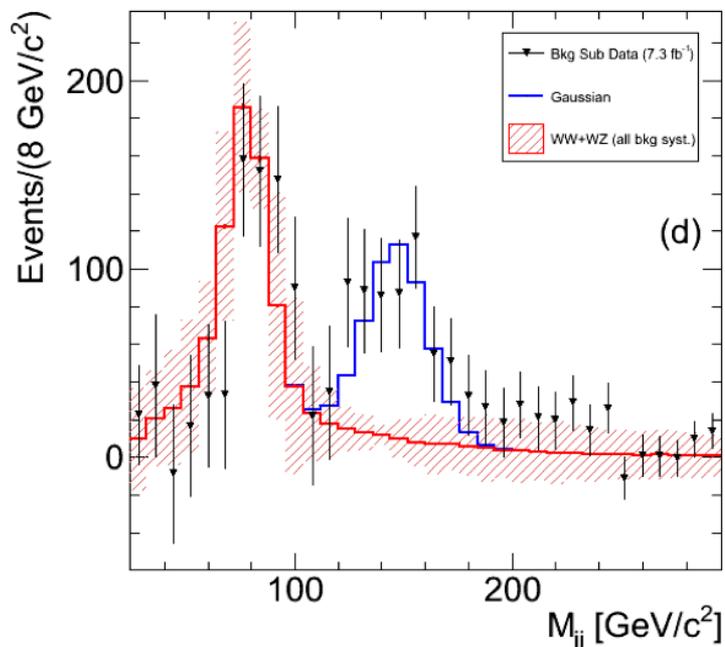
- **Status of the Three Frontiers**
- **Budget News**
- **Comparative Reviews**
- **Program Activities**

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# **STATUS OF THE 3 FRONTIERS**

# Energy Frontier

- The Tevatron continues to run exceptionally well.
  - A new weekly record was set last week.
- CDF and D-Zero disagree on  $W_{jj}$  signal.
  - Still looking for new physics.
- The LHC has exceeded  $1 \text{ fb}^{-1}$  of integrated luminosity.
- The Energy Frontier is healthy.

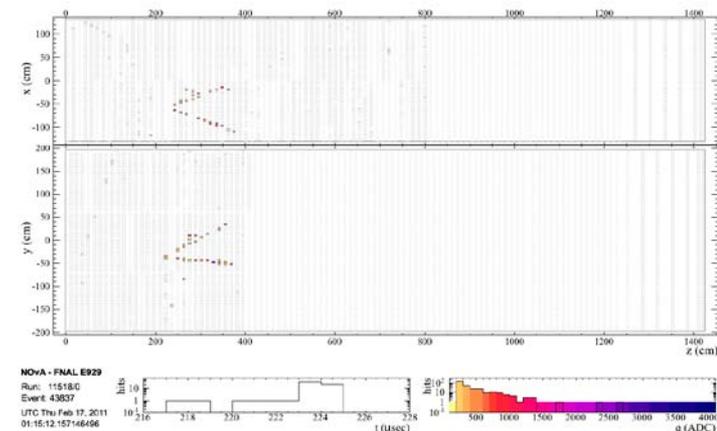


# Intensity Frontier

- Daya Bay has filled its first detectors and is on schedule.
- NOvA has finished the far detector building and is on schedule.
- MicroBooNE will have a CD-2 review this summer.
- T2K has reported the observation of electron neutrino appearance with a C.L. > 99%.
  - This has potentially positive implications on the future program of NOvA and LBNE.
- Report on Underground Science at Homestake will be discussed later today.
- The situation on the Intensity Frontier is clarifying.
  - We still await decisions on Homestake.



**Daya Bay Hall 1**



**NOvA Near Detector Prototype**

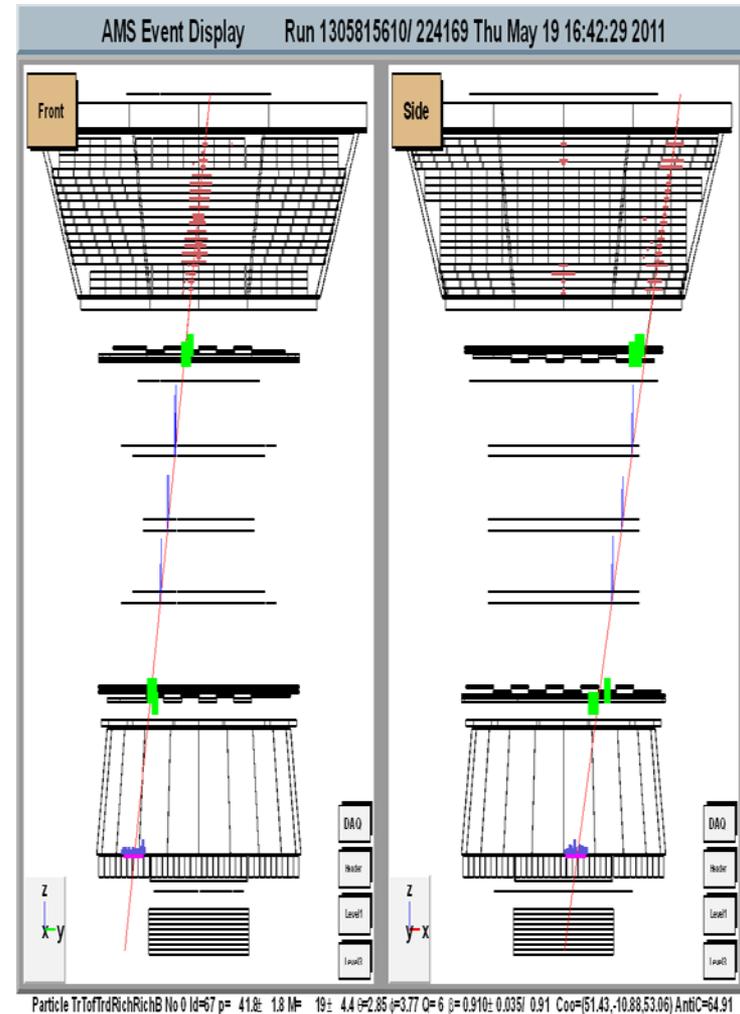
# Intensity Frontier Workshop

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- The Office is interested in identifying more opportunities on the Intensity Frontier.
  - The Long Baseline Neutrino Experiment is the flagship initiative and many people within and outside the field think it is the entire Intensity Frontier program.
  - Last year we did a review of three intensity frontier proposals and are now seeking to fund two of them: BELLE-II and muon  $g-2$ .
- We plan to have a workshop to discuss what is needed for a Leadership Program on the Intensity Frontier.
  - Goals:
    - Identify the physics topics that are ripe for attack by IF experiments.
    - Engage physicists working on the other two frontiers for their ideas, evaluations, and critiques of the IF physics.
    - Identify the facilities and technology development needed to make progress on the IF.
- We have recruited Harry Weerts of ANL and Joanne Hewett of SLAC to chair the workshop.
- We have a goal to hold the workshop in DC in the late fall.

# Cosmic Frontier

- AMS was launched on the space shuttle on May 16, 2011 and is working well.
- NOAO has scheduled a November shutdown of CTIO's Blanco telescope to install DES.
- Xenon 100 has reported a new limit on WIMP cross-sections.
- CoGeNT has reported a dark matter signal consistent with DAMA
- We are planning a next generation experiment(s) to search for dark matter.
  - Hope to brief HEPAP on the process at the next meeting.
- We have completed a Mission Need for a new ground-based dark energy experiment.



**42 GeV/c Carbon**

# Dark Energy Mission Need

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**Dr. Brinkman approved Critical Decision 0 (Mission Need) for a new, next-generation, state-of-the-art Stage IV ground-based dark energy experiment (DE-IV) on June 20, 2011.**

## **Potential Approaches:**

DOE/HEP will partner with NSF-Astronomy to build a new or enhance an existing ground-based telescope that is well optimized to make stage-IV dark energy measurements.

- **Option 1:** Develop the first Astro2010 priority, the LSST, which would include building a new telescope facility with associated instrumentation.
- **Option 2:** Bring new instrumentation and expanded capabilities to an existing ground-based telescope for studying dark energy, as part of the second Astro2010 priority.
- **Option 3:** Participate in both options.
- **Option 4:** Do nothing.

# Priorities and Recommendations

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P5 called for a balanced program across all three frontiers.

- Called for a staged program to study dark energy explicitly.

PASAG reiterated the priority of dark matter and dark energy studies.

- Said to wait for Astro2010 regarding dark energy

**Astro2010 - National Academies Decadal Survey of Astronomy & Astrophysics**

- Large Ground-based

1. LSST

Science: dark energy, dark matter, near-earth & Kuiper-belt objects, transient phenomena

2. NSF mid-scale innovation competed program (between MRI and MREFC)

e.g. BigBOSS, DecSPEC would be suitable for this program

- Large Space-based

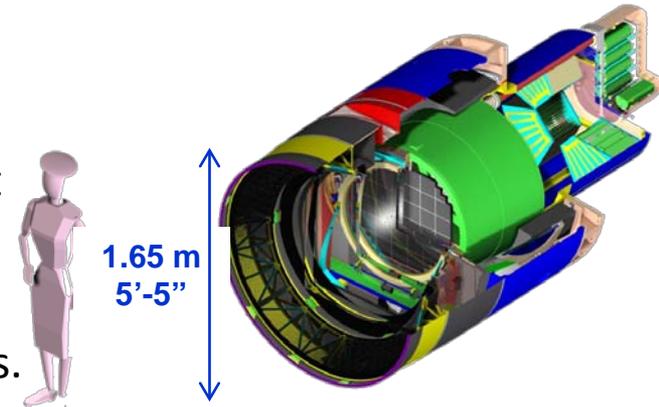
1. WFIRST

Science: dark energy, exo-planet searches, galaxy studies

**Astro2010 recommended that DOE participate in ground-based dark energy as a priority over space-based because our role was seen as critical to the experiments.**

# OHEP Plan to Proceed

- Follow top recommendation to participate on LSST; our projected funding profile supports this.
- DOE role would be to build the camera subsystem and associated instrumentation. SLAC hosts the camera Project Office.
- NSF will lead the overall project and build the telescope/infrastructure and data management subsystems.
- A DOE-NSF Joint Oversight Group (JOG) has been formed and biweekly meetings are being held. We are working on lining up our schedules and funding.
- CD-0 approved June 20, 2011.
- SLAC held a Director's review of the Camera on June 8-10, 2011 in preparation for CD-1 approval and is addressing the recommendations.
- NSF-AST is holding a Preliminary Design Review (PDR) of the entire project the week of August 29<sup>th</sup>.
- A Lehman review of the project, required for CD-1 approval, is being scheduled for the fall.



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# **BUDGET NEWS**

# FY 2011 Appropriation

	FY 2010 Actual	FY 2011 Request	FY 2011 Actual
HEP	810,483	829,000	795,420
SC	4,789,288	5,129,574	4,842,700

- **The 2011 appropriation was passed April 15, 2011**

- The funding was specified at the level of the Office of Science.
- The division between programs was determined by DOE with approval of OMB.
- HEP ended up \$4 million lower than in the CR.

- **No new starts for LBNE, Mu2e, and MicroBooNE.**

- Small amounts of funding were supplied to keep making progress towards CD-1 for LBNE and Mu2e and CD-2/3 for MicroBooNE.

# FY 2011 Impacts

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- **OMB had not allocated the funds to DOE in time for the May financial plan.**
  - As of now 95% of HEP's funds are available to be distributed in June.
  - All funds needed for grants are now available to be distributed.
    - We have a very limited time to complete all of our actions.
- **The awards for Collider Detector R&D solicitation will be postponed to FY 2012.**
  - Had to find some way to cover the unexpected \$4 M reduction at such a late time.
  - The proposals are out for review now.
- **The largest reductions were in Construction and in Advanced Tech R&D.**
- **We have 243 grants to process this year compared to 443 last year.**
  - Last year ARRA increased the load.
  - This year the long CR has throttled our ability to process grants.
  - We are limiting supplements to grants to get all regular grants out on time.
  - We have processed 195 grant actions so far and expect to complete all by the deadline.

# The FY 2012 HEP Budget Request

Description	FY 2010	FY 2011	FY 2012 Request	FY12 - FY11
Proton Accelerator-Based Physics	438,369	439,512	411,207	-28,305
Electron Accelerator-Based Physics	30,212	24,663	22,319	-2,344
Non-Accelerator Physics	97,469	87,657	81,852	-5,805
Theoretical Physics	68,414	68,261	68,914	653
Advanced Technology R&D	156,347	175,327	171,908	15,561
Construction	0	0	41,000	41,000
Total, High Energy Physics	790,811	795,420	797,200	6,389

**FY 2010 appropriation including SBIR/STTR was \$810 million, so the FY 2012 request is a reduction of \$13 million from FY 2010.**

# Congressional Action so far this year.

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- House Energy & Water Development (EWD) committee recommends that HEP receive the President's request of \$797.5 M.
  - This was a timely.
  - Reduced Mu2e and LBNE by 7% and put those funds into research.
    - All SC construction projects were treated this way.
- The committee recommended that Office of Science receive \$4.8 B, which is down \$43 M from FY 2011 and \$616 M from the request.
- No word from the Senate yet.
- The full House has not passed the EWD appropriation yet.
- The Committee weighed in the subject of DUSEL:
  - Supports the funding to dewater Homestake while decisions are made.
  - Cautions against taking over construction and long term management of the site.
  - Requests a report on assessment of the alternatives to DUSEL and the Department's recommendations on how to move forward.

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# **HEP COMPARATIVE GRANT REVIEWS**

# What It Is, and Why?

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- DOE/HEP is undertaking a round of **comparative** grant reviews for existing research grants which are scheduled for renewal in FY2012 (+ any new proposals as desired)
  - Existing grants which are not renewing in FY2012 (“continuations”) will not be affected by this change.
- Previously all HEP proposals responding to the general Office of Science call were **individually** peer-reviewed by independent experts.
- This change in process has been recommended by several DOE advisory committees, most recently the 2010 HEP COV.
- The goal of this effort is to improve the overall quality and efficacy of the HEP research program by identifying the best proposals.

# About the Process

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- **Conceptually the review process we are planning is similar to that employed by the NSF**
  - But the implementation is tailored to the different structure of DOE HEP grants and the logistics of DOE grant procurements.
  - Main issue is synchronizing grants to enable comparative review
- **HEP proposals will continue to be evaluated using the standard SC merit review criteria**
  - Additional criteria will address the alignment of the proposed research with the strategic directions outlined in recent HEPAP reports (e.g., P5, PASAG)
  - Plus other factors as set forth in the upcoming funding opportunity announcement (FOA)
- **More details about the HEP comparative review process and criteria will be available in the comparative review FOA to be released in August.**
  - We will also provide a FAQ page on the Funding Opportunities section of the DOE HEP website and provide a centralized email address to respond to queries.
  - Further discussions possible at DPF Meeting

# What is Expected of PIs?

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- If you are renewing in FY 2012 then you should submit your renewal proposal as planned.
- The proposal will be mail reviewed and a terminal renewal will be issued that ends in April. There will be no site reviews.
- A new FOA will be posted in August that will specify how to restructure your proposal into sections for energy frontier, intensity frontier, cosmic frontier, theory, or technology R&D, but it will still be one proposal.
- Review panels for each of those areas will evaluate the proposals.
- A new grant will be established to provide funding.
  - A new umbrella grant for groups that currently have umbrella grants and review well.

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# **PROGRAM ACTIVITIES**

# OHEP Activities

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- HEP Comparative Laboratory Review in Theory is planned for late July.
  - This is the second time around for the lab comparative reviews.
- Have not yet scheduled the Comparative Laboratory Review in Accelerator Science.
- We held institutional reviews at ANL and FNAL this year.
- New HEP SciDAC solicitation to be announced in Aug/Sept.
  - HEP will have a stand-alone solicitation but it will be coordinated with other offices.

# Personnel

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- Laurence Yaffe from the University of Washington has joined the office as a IPA.
- We are in process of hiring a new program manager for accelerator science.
- David Mueller will complete his IPA this summer.
  - Anyone interested in becoming an IPA contact Glen Crawford.
- The AD announcement closed May 10, 2011 and the interview process is underway.

# Early Career Awards

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- **Completion of the program was delayed due to the late appropriation.**
- **The were 14 HEP awards this year out of a total of 69.**
  - 4 in theory
  - 8 in experimental particle physics
    - 3 energy frontier
    - 4 cosmic frontier
    - 1 intensity frontier
  - 2 in accelerator physics
- **9 from universities and 5 from labs.**
- **FY 2012 Early Career FOA will be announced in July.**
  - Pre-applications will be required.