



News from DOE HEP

HEPAP Meeting

March 11-12, 2010
Bethesda, Maryland

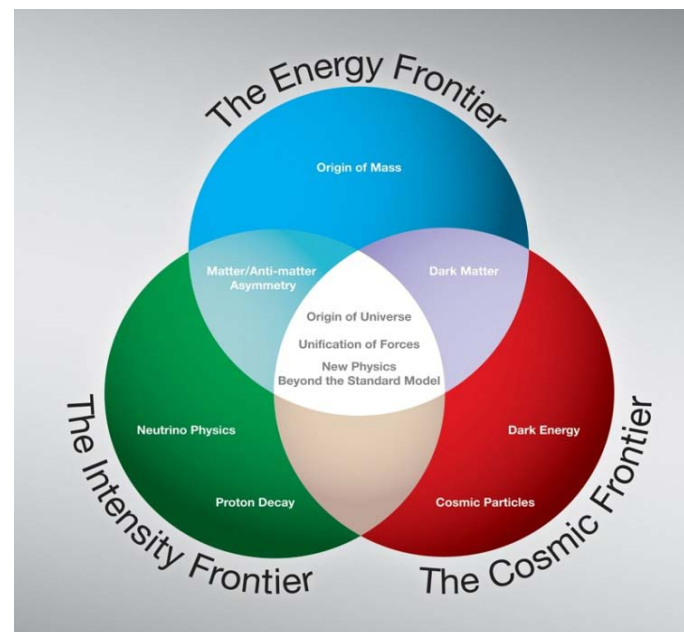
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Overview

The HEP program, with input from the scientific community (HEPAP), is pursuing a long-range plan that maintains a leadership role for the U.S. at the three scientific frontiers that define the field.

The major elements of this plan are to:

- maintain a strong, productive university and laboratory research community
- enable U.S. leadership roles in the Tevatron and LHC programs at the Energy Frontier
- achieve the vision of a world-leading U.S. neutrino and rare decay program at the Intensity Frontier, building on the existing accelerator infrastructure at Fermilab
- deploy selected, high-impact experiments at the Cosmic Frontier
- support accelerator R&D to position the U.S. to be at the forefront of advanced technologies for next-generation facilities.



HEP Budget Overview

HEP FY 2011 Budget Request

FY 2011 Request is a +2.3% increase compared to FY 2010 Appropriation

FY 2010 Appropriations were a +1.9% increase over FY 2009 Appropriations

(dollars in thousands)

	FY 2009 Current Appropriation	FY 2009 ** Current Recovery Act Appropriations	FY 2010 Current Appropriations	Delta	FY 2011 Request	Percent
High Energy Physics						
Proton Accelerator Based Physics	401,368	107,990	434,167	5,095	439,262	1.2%
Electron Accelerator Based Physics	32,030	1,400	27,427	-2,720	24,707	-9.9%
Non Accelerator Based Physics	101,138	4,445	99,625	-11,086	88,539	-11.1%
Theoretical Physics	66,148	5,975	66,962	2,562	69,524	3.8%
Advanced Technology R&D	195,042 *	116,690 *	182,302	7,666	189,968	4.2%
Subtotal, High Energy Physics	795,726	236,500	810,483	1,517	812,000	0.2%
Construction	0	0	0	17,000	17,000	
Total, High Energy Physics	795,726 *	236,500 *	810,483	18,517	829,000	2.3%
			1.90%			

** The Recovery Act Current Appropriation column reflects the allocation of funding as of September 30, 2009.

- Total includes SBIR/STTR: \$17,730,000 of which was transferred to the Small Business Innovation Research (SBIR) program and \$2,128,000 of which was transferred to the Small Business Technology Transfer (STTR) program.

FY 2011 Program Highlights

Energy Frontier

- Tevatron will operate in FY 2011 (possibility of discovery or ruling out over a significant fraction of the allowed mass region for the Higgs boson in the Standard Model at the 95% confidence level).
- U.S. LHC program is supported (at a level that will allow U.S. researchers to play an leading role in extracting physics from the data obtained and in planned upgrades).

Intensity Frontier

- On-going MIE projects (NOvA and Daya Bay) are supported on planned schedules
- First investments (MicroBooNE, Mu2e and LBNE) made for next generation U.S. leadership program

Cosmic Frontier

- Support ongoing programs (e.g.; Fermi, AMS, VERITAS, Pierre Auger, BOSS, CDMS-II, COUPP, LUX, ADMX)
- On-going MIE projects (DES, SuperCDMS-Soudan) are supported on planned schedules
- R&D for possible future experiments (guidance from HEPAP (PASAG) and ASTRO2010)

Core Research

- EPP Research supported at a level that will maintain scientific workforce and the ability to be productive
- Advanced Technology R&D supports high risk, high impact initiatives, development of infrastructure (e.g.; BELLA and FACET) and core competencies important for the U.S.

FY 2011 Budget Breakout of Funding

Facility Operations are constant
Core Research and Projects maintained (grow somewhat)

HEP Functional Categories	FY 2009			Delta	FY 2011	
	FY 2009	ARRA	FY 2010		Request	vs FY10
Fermilab Accelerator Complex Operations	162.8	15.0	156.5	-1.4	155.1	-0.9%
LHC Detector Support/Operations	69.4	0.0	71.2	3.6	74.8	5.1%
SLAC Accelerator Complex Operations	15.3	0.0	12.1	-2.3	9.8	-19.0%
Facility Operations	247.5	15.0	239.7	-0.1	239.6	0.0%
EPP Research	284.5	24.8	286.3	10.9	297.1	3.8%
Advanced Technology R&D	167.2	78.9	162.6	4.1	166.7	2.5%
Core Research	451.7	103.7	448.9	15.0	463.9	3.3%
Intensity Frontier Projects	47.7	55.0	72.8	5.4	78.3	
Energy Frontier Projects	2.5	0.0	9.0	0.3	9.3	
Cosmic Frontier Projects	10.9	0.0	10.1	-6.1	4.0	
Technology Projects	8.0	33.7	0.0	3.2	3.2	
Projects	69.1	88.7	92.0	2.8	94.7	3.0%
Other (GPP/GPE/SBIR/STTR)	27.5	29.1	29.9	0.9	30.8	2.9%
High Energy Physics	795.7	236.5	810.5	18.5	829.0	2.3%

FY 2011 Budget Projects

HEP Projects (MIEs and Construction)	FY 2009			Delta	FY 2011	vs FY10
	FY 2009	ARRA	FY 2010		Request	
Project - NOvA - MIE	27.8	55.0	59.0	-12.8	46.2	
Project - Minerva - MIE	4.9	0.0	0.8	-0.8	0.0	
Project - MicroBooNE - MIE	0.0	0.0	2.0	6.0	8.0	
Project - Mu2e - Construction (Ops & TEC)	0.0	0.0	0.0	10.0	10.0	
Project - T2K - MIE	1.0	0.0	0.0	0.0	0.0	
Daya Bay - MIE	14.0	0.0	11.0	-8.9	2.1	
Project - LBNE - Construction (Ops & TEC)	0.0	0.0	0.0	12.0	12.0	
Intensity Frontier Projects	47.7	55.0	72.8	5.4	78.3	7.5%
LHC Accelerator Upgrade - APUL - MIE	2.5	0.0	9.0	0.3	9.3	
Energy Frontier Projects	2.5	0.0	9.0	0.3	9.3	2.8%
Project - DES - MIE	9.9	0.0	8.6	-4.6	4.0	
Project - Super CDMS - MIE	1.0	0.0	1.5	-1.5	0.0	
Cosmic Frontier Projects	10.9	0.0	10.1	-6.1	4.0	-60.4%
FACET	0.0	14.5	0.0	0.0	0.0	
Project - SRF Electron Beam Welder - MIE	0.0	0.0	0.0	3.2	3.2	
Project - BELLA - MIE	8.0	19.2	0.0	0.0	0.0	
Technology Projects	8.0	33.7	0.0	3.2	3.2	
Total, HEP Projects	69.1	88.7	92.0	2.8	94.7	3.0%

Energy Frontier: Recent Activities & Plans

LHC Program

- Collided beam at 900 GeV and ramped to 1.2 TeV center of mass energy (12/2009)
 - Congratulations to the accelerator and detector groups
 - 1fb^{-1} @ 7 TeV center of mass energy main objective for 2010-2011

- CERN is in the process of defining its mid-term plan for the LHC program
 - U.S. is planning to participate in the LHC program
 - Participation includes detector / accelerator "modest upgrades"
 - Present US-CERN MOU lasts until 2017

Next generation Lepton Collider

- Next generation lepton collider "decision" awaits results from LHC and commitments of interested participants
 - Envisioned to happen ~ FY 2012 – now expected to happen later
 - Working with ART to define a US ILC R&D FY2012–2015 program

- Working with to establish a five year national muon accelerator R&D plan
 - Fermilab has been charged to organize this national effort

Intensity Frontier: Recent Activities and Plans

DOE and NSF are coordinating planning for LBNE and for DUSEL

- Mission Need (CD-0) approval obtained for the Long Baseline Neutrino Experiment (LBNE) that includes the neutrino beam and a large underground detector (01/2010)
- NSF supporting conceptual design of the DUSEL facility and a suite of experiments
- Joint Oversight Group (JOG) coordinating these efforts

Other Intensity Frontier “scientific opportunities”

OHEP has received a report from SLAC describing possible US options in SuperB (Italy)

- Three possible scenarios (both minimal and optimal)
 - 1 Provision of reusable PEP-II and BABAR components
 - 2 1 + additional funding for US participation in detector program
 - 3 2 + additional funding for US participation in accelerator program

OHEP expects to get a proposal for participation in Belle-II at SuperKEKB (Japan)

- Participation in detector subsystems

OHEP expects to get a proposal for implementing the g-2 experiment at Fermilab

- Utilizes existing Fermilab infrastructure and planned upgrades (and BNL D&D)

OHEP will conduct peer-reviews of these “scientific opportunities”



Non-Accelerator Physics: Recent Activities and Plans

DOE and NASA continue to work to identify the path forward on a JDEM

- Two concepts (IDECS and OMEGA) presented to Astro2010 in June 2009.
- Costs are not compatible with current budget projections
- Project Offices (GSFC and LBNL) developing a \$650M-capped mission concept
- Advice being provided by the Interim Science Working Group (since December 2009)

DOE and NSF charged HEPAP to assess opportunities in particle astrophysics

- HEPAP (PASAG) Report was submitted in 2009
- Guidance is being utilized in DOE SC HEP planning

Looking for guidance from Astro2010 - the findings and recommendations:

- Will influence the opportunities for HEP participation
- Will inform OHEP on scientific/technical aspects of particle astrophysics (e.g.; optimum dark energy strategy with available resources)

OECD Global Science Forum Astroparticle Physics Working Group

- Global coordination and planning of astroparticle physics experiments
- Study report will be completed in Oct. 2010

OHEP Summary of HEPAP (PASAG) Report

Prioritization Criteria for Particle Astrophysics

- Science addressed by the project necessary (significant step towards HEP goals)
- Particle physicist participation necessary (significant value added/feasibility)
- Scale matters (particularly at boundary between particle physics and astrophysics)

Priorities are generally aligned with recommendations for Cosmic Frontier in the 2008 HEPAP (P5) Report

- Dark matter & dark energy both remain high priorities

Guidance:

- Dark energy funding (recommended for largest budget portion) should not significantly compromise US leadership in dark matter, where a discovery could be imminent
- Dark energy and dark matter together should not completely zero out other important activities (except in the lowest funding scenario - even then a limited CMB participation is recommended)
- DOE SC HEP funding is somewhere between the lower budget scenarios (A & B)
- HEP (along with NASA and NSF) awaits Astro2010 Report before decisions on proposed major projects (AGIS, Auger-North, BigBOSS, JDEM, LSST).

PASAG Guidance

Dark Matter

Dark Matter:

Scenario A

- Maintain world-leading program by supporting 2 next-generation (G2) experiments and SuperCDMS-SNOLab
- Not able to do a third-generation (G3) experiment this decade which may mean loss of world leadership

Scenario B

- Maintain world-leading program by supporting 2 G2 experiments and SuperCDMS-SNOLab
- Start a G3 experiment this decade.
- A broad G2 program is higher priority than a 2nd G3 experiment

Currently DOE is supporting: LUX -SUSEL, COUPP, SuperCDMS-Soudan, ADMX

- Proposals submitted for R&D efforts
- Current experiments are also planning their G2 and, in some cases, their G3 experiments
- Developing with NSF a plan for a path forward, with milestones and decision points
 - Will use review panel(s) to make decisions on which ones to go forward
 - Insufficient funds for each of the efforts to go to the next generation
 - Agencies will decide what they will contribute and to which efforts



PASAG Guidance

Dark Energy

Dark Energy:

Scenario A

- **Not possible to have major hardware and science contributions to any large project – participation supported only in very limited areas**

Scenario B

May have just enough funding for significant participation in one large project but there are risks since costs are uncertain; fast start may not be possible

DES is under fabrication, BOSS is operating & there are a number of smaller research efforts

- **Providing some R&D funding for JDEM and LSST**
- **BigBOSS has sent in a letter of intent in response to a call for proposals from NOAO for new instrumentation on existing telescopes at Kitt Peak**
- **Astro2010 is expected to recommend a coordinated ground/space dark energy program**
 - **DOE is talking regularly with NASA and NSF-AST about coordination of efforts.**

PASAG Guidance

High Energy Cosmic Particles

High Energy Cosmic Particles

Scenario A

- Effort is severely curtailed in order to preserve viable program in dark matter & energy
- VERITAS upgrade & HAWC should be a priority.
- Auger-North & AGIS are not possible

Scenario B

- VERITAS upgrade and HAWC
- A reduced but leading role in an AGIS that is merged with CTA
- Auger-North is not possible

Currently DOE is supporting VERITAS, Auger-South and Fermi

- NSF and DOE are holding a joint review of HAWC in April
- The VERITAS upgrade is being considered for an NSF-MRI.

- Astro2010 is considering AGIS and Auger-North.

PASAG Guidance

Cosmic Microwave Background

Cosmic Microwave Background

Scenario A, B, C, D

- QUIET-II should be supported along with other small investments that meet prioritization criteria.

Currently DOE is not supporting any CMB projects but we do have a number of small research efforts.

- Fermilab and SLAC are proposing roles in QUIET-II
- NSF recently held a review of QUIET-II proposal (with DOE attending as an observer)



Other Program Activities

HEPAP/Advisory

- HEPAP Committee of Visitors (COV) to examine/evaluate operations of the DOE SC OHEP
- Report from Accelerator Workshop will be utilized in developing the strategic plan for the HEP Accelerator Science/R&D program

Early Career Awards

- Funding of \$16M provided in FY 2009 ARRA (4 laboratory & 10 university 5-year awards)
- Coordinated/managed at Office of Science (SC) level
- Steady state funding of ~\$16M will be established for such awards in out-years

Office of HEP

- Two recent appointments - still several open federal positions in HEP
- Need for IPAs / Detailees (a number of appointments ending in FY2010 and FY2011)

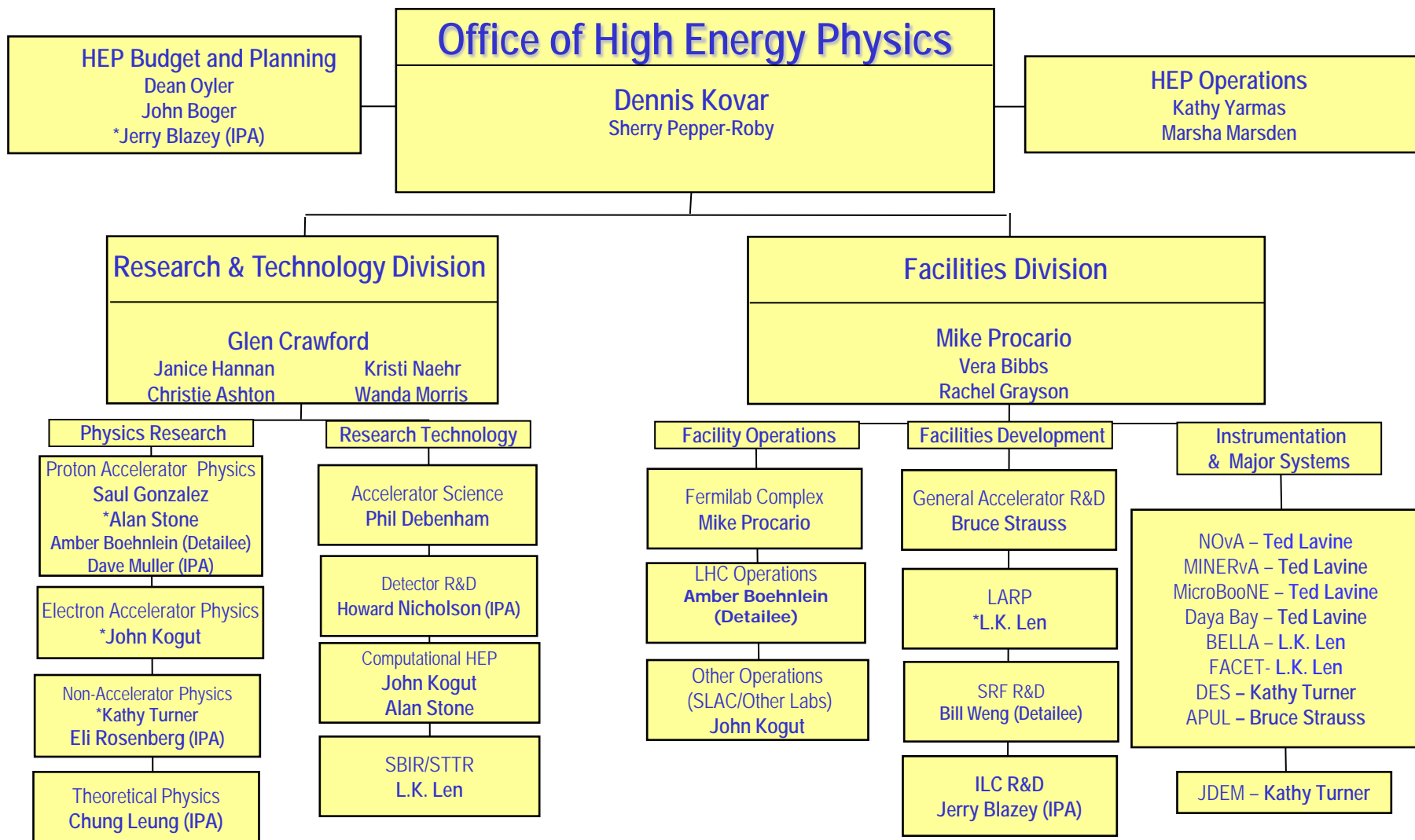
HEP Early Career Program

- **Supersedes HEP Outstanding Junior Investigator (OJI) program**
- **Breakdown of proposals:**

	Experiment	Theory	Total
Lab	41	6	47
University	64	43	107
Total	105	49	154

- **Three HEP panels met in early December:**
 - **Laboratory Experiment**
 - **University Experiment**
 - **Theory**
- **Statistics:**
 - **Theory: Six awards (49 proposals) spanning research frontiers ,mostly focused on LHC physics**
 - **Experiment: Eight awards (105 proposals); Three Energy Frontier; Three Intensity Frontier; Two Cosmic Frontier; One Accelerator R&D**
 - **Gender: Three women; Eleven men**
 - **Geography: Six East; Four Midwest; Four West**
 - **Evenly distributed in year since PhD**

HEP Organization Chart



*Denotes base position



Staffing Actions

- **New Personnel**

- **Christie Ashton - Program Analyst – Effective 02/14/10**
- **Fred Borcharding - Instrumentation Program Manager – Effective 04/12/10**

- **Federal Vacancies**

- **Non-Accelerator Physics Program Manager – candidate selected**
- **Computational HEP Program Manager – reviewing applications**

- **Theoretical Physics Program Manager – reposting March 2010**
- **Accelerator Science Program Manager – vacancy to be posted**



Congratulations and Good Luck!

- **Phil Debenham is retiring April 2 after 30 years of Federal Service**
- **Would like to recognize and thank him for his stewardship of accelerator science.**
- **Wish him well in all of his new endeavors.**



PAC05 – Knoxville, TN