



*U.S. Department of Energy*  
**Office of Science**

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# High Energy Physics Advisory Panel Meeting

*FY 2009 Budget Request  
for the Office of Science and Perspectives*

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Under Secretary for Science  
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[www.science.doe.gov](http://www.science.doe.gov)

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# The Scientific Opportunity of HEP

The [National Academy EPP 2010] committee arrived at three strong conclusions regarding both particle physics and the U.S. role in this global scientific and technological enterprise:

- **“Particle physics plays an essential role in the broader enterprise of the physical sciences.**
  - It inspires U.S. students, attracts talent from around the world, and drives critical intellectual and technological advances in other fields.”
- **“Although setting priorities is essential, it also is critical to maintain a diverse portfolio** of activities in particle physics, from theory to accelerator R&D to the construction and support of new experimental facilities.
  - The committee believes that accelerators will remain an essential component of the program, since some critical scientific questions cannot be explored in any other manner.”
- **“The field of elementary particle physics is entering an era of unprecedented potential.** New experimental facilities, including accelerators, space-based experiments, underground laboratories, and critical precision measurements of various kinds, offer a variety of ways to explore the hidden nature of matter, energy, space, and time.
  - The availability of technologies that can explore directly an energy regime known as the Terascale is especially exciting.” .....

The results of the committee’s analysis have led to its chief recommendation:

- **“The United States should remain globally competitive in elementary particle physics by playing a leading role in the worldwide effort to aggressively study Terascale physics.”**



# The Office of Science

## Office of Science FY 2009 Budget Request to Congress

(dollars in thousands)

	FY 2007 Approp.	FY 2008 Approp.	FY 2009 Request to Congress	FY 2009 Request to Congress vs. FY 2008 Approp.	
Basic Energy Sciences.....	1,221,380	1,269,902	1,568,160	+298,258	+23.5%
Advanced Scientific Computing Research.....	275,734	351,173	368,820	+17,647	+5.0%
Biological and Environmental Research.....	480,104	544,397	568,540	+24,143	+4.4%
High Energy Physics.....	732,434	689,331	804,960	+115,629	+16.8%
Nuclear Physics.....	412,330	432,726	510,080	+77,354	+17.9%
Fusion Energy Sciences.....	311,664	286,548	493,050	+206,502	+72.1%
Science Laboratories Infrastructure.....	41,986	66,861	110,260	+43,399	+64.9%
Science Program Direction.....	166,469	177,779	203,913	+26,134	+14.7%
Workforce Dev. for Teachers & Scientists.....	7,952	8,044	13,583	+5,539	+68.9%
Safeguards and Security (gross).....	75,830	75,946	80,603	+4,657	+6.1%
SBIR/STTR (SC funding).....	86,936	—	—	—	—
Subtotal, Office of Science.....	3,812,819	3,902,707	4,721,969	+819,262	+21.0%
Adjustments*.....	23,794	70,435	—	-70,435	—
<b>Total, Office of Science.....</b>	<b>3,836,613</b>	<b>3,973,142</b>	<b>4,721,969</b>	<b>+748,827</b>	<b>+18.8%</b>

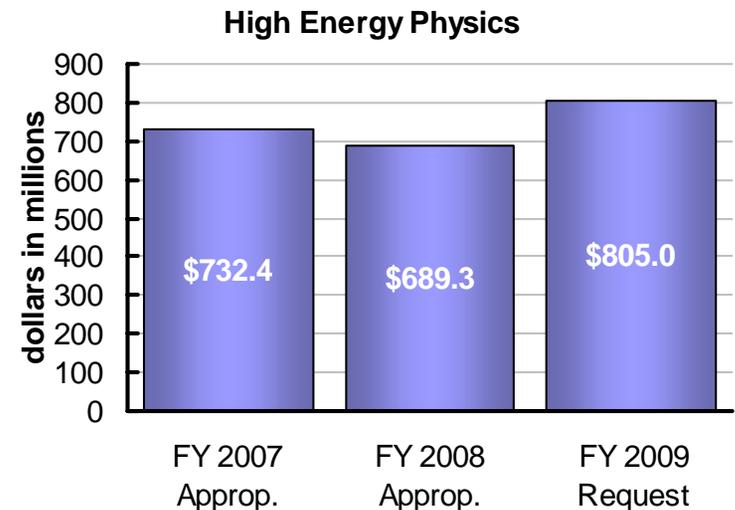
\* Adjustments include SBIR/STTR funding transferred from other DOE offices (FY 2007 only), a charge to reimbursable customers for their share of safeguards and security costs (FY 2007 and FY 2008), Congressionally-directed projects and a rescission of a prior year Congressionally-directed project (FY 2008 only), and offsets for the use of prior year balances to fund current year activities (FY 2007 and FY 2008).



# High Energy Physics (HEP)

(FY 2009=\$805.0M)

- Physics Research.** Core experimental and theoretical research at universities and laboratories are supported to carry out world-class programs, advancing scientific discovery at the Fermilab Tevatron and the CERN Large Hadron Collider (LHC) and with new initiatives in astrophysics and neutrino science. (FY 2007=\$244.1M; FY 2008=\$244.9M; **FY 2009=\$254.8M**)
- Facility Operations.** Fermilab Tevatron operations are fully supported (42 weeks) in its search for the Higgs Boson and funding is provided for the NOvA and Minerva projects; the B-Factory program was completed in FY 2008 and is supported for ramp-down and D&D activities; increased operational support is provided for U.S. researchers participating in the LHC at CERN. (FY 2007=\$297.3M; FY 2008=\$286.2M; **FY 2009=\$320.1M**)
- Non-Accelerator Projects.** Funding is provided for the Dark Energy Survey (DES), Reactor Neutrino Experiment (Daya Bay) and Cold Dark Matter Search (CDMS) Major Items of Equipment (MIEs) and R&D for a Joint Dark Energy Mission (JDEM). Each of these has the potential for shedding new information and insight on the mysteries of dark matter and energy. (FY 2007=\$8.8M; FY 2008=\$20.8M; **FY 2009=\$32.2M**)
- Advanced Technology Development.** Accelerator R&D efforts are directed at development of a proton source for a U.S. neutrino program; SRF technologies and infrastructure for the HEP program and the nation; demonstration of technologies for the ILC; and advanced accelerator concepts for next-generation accelerators. Detector R&D efforts are increased. (FY 2007=\$166.9M; FY 2008=\$102.8M; **FY 2009=\$166.7M**)
- Other.** Includes SBIR/STTR, stewardship responsibilities, and miscellaneous program activities. (FY 2007=\$15.3M; FY 2008=\$34.6M; **FY 2009=\$31.2M**)





# The Status of HEP

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- **HEP is at an extraordinary productive and exciting period**
  - with significant discoveries anticipated at the energy frontier and in particle astrophysics and neutrino science.
- **The FY 2008 Omnibus Bill funding is short \$93M from the FY 2008 President's Request to Congress, and \$43M less than the FY 2007 appropriation, leading to the loss of:**
  - HEP scientific productivity and workforce, and;
  - U.S. credibility as an interagency/international partner.
- **Planning is addressing the EPP 2010 priorities:**
  - exploration of the Terascale at the LHC;
  - investment in R&D for an international linear collider, and;
  - expansion of the program in astrophysics and internationalization of a staged program in neutrino physics.
- **Current circumstances are challenging for the U.S. program:**
  - the imminent closing of U.S. HEP facilities;
  - the recognition that the earliest start for the ILC will be in the middle of the next decade, and;
  - the budget uncertainties for all of Science.



## The Plan for HEP

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- **The goal must be a world-class, vigorous, and productive program, which**
  - recognizes the internationalization of particle physics,
  - incorporates recent and likely budget realities, and
  - ensures the vitality of the field for the next 10-20 years.
- **A robust, scientifically compelling plan for U.S. HEP must be developed that is supported by**
  - the scientific community, the Administration, Congress and the public.
- **The scientific community is critically important:**
  - The community, through HEPAP and P5, is developing a science-driven plan. I look forward to their report in May.
  - To assist with the realization of this plan, the just released FY2009 Budget Request maintains future options for HEP. We will use the plan to articulate the case in the FY 2010 Budget Request.
  - The community needs to make the case for the science, and its benefits to the nation, to Congress and the public. It is not an entitlement.



# Our Challenge

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- The very large percentage increase between the essentially flat funding for the DOE Office of Science in FY2008 and the FY2009 President's Request will be an attractive target.
  - We could easily, again, become a “donor” program. This is true for all three American Competitiveness Initiative agencies.
- Compounding the danger is the widespread attitude that the proposed increases for the physical sciences under the ACI and America COMPETES act are “a done deal”.
- There is the possibility we may see a “three-peat” and a perpetuation of flat-to-declining budget trajectories.
- If we are to avoid this scenario we need to actively and publicly make the case for LONG-TERM basic research rather than short-term applied research.

**It is now up to us to make the case.**



# Looking Forward

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- The President's Budget Request for FY2009 remains a vote of confidence for the physical sciences, expressing unprecedented support:

"To keep America competitive into the future, we must trust in the skill of our scientists and engineers and empower them to pursue the breakthroughs of tomorrow . . . This funding is essential to keeping our scientific edge."

President George W. Bush  
State of the Union Address  
January 28, 2008