



Department of Energy



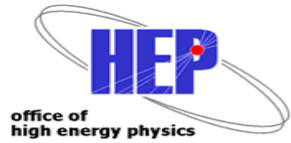
---

\$\$\$\$\$\$\$\$  
\$\$\$HEP\$\$\$  
\$\$\$\$\$\$\$\$  
FY2008\*

Dr. Robin Staffin  
Associate Director of Science  
for High Energy Physics

February 22, 2007

\* and what we can say about FY2007



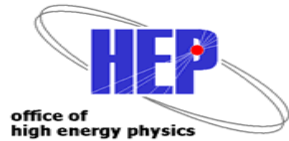
# HEP Budget Top Line

---



<b>FY 2006 Actual</b> (includes SBIR/STTR)	<b>FY 2007 Request</b>	<b>FY 2008 Request</b>
<b>716.7</b>	<b>775.1</b>	<b>782.2</b>
<b>746.1*</b>	<b>815.1*</b>	<b>843.7*</b>

\*w/SLAC LINAC Funding from Basic Energy Sciences



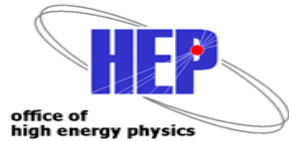
# FY 2007 Budget – Requested and Received

---

Department of Energy



- **FY 2007 President's Request:**
  - \$4.1B for DOE Office of Science, \$775M for HEP
- **House passed this request in June 2006, but no Senate vote on bill**
  - Continuing Resolutions at FY2006 spending rates since Oct 2006
- **FY2007 Joint Resolution signed into law Feb 15:**
  - \$3.8B for DOE Office of Science, HEP bottom-line TBD
- **FY 2007 Overall Priorities:**
  - Facility Operations
  - Maintain staffing to the degree possible
  - Defer new projects to FY2008



# High Energy Physics FY 2008 Budget Request



		(\$M)		
		FY06 Actual	FY07 Request	FY08 Request
Facility Operations	Tevatron Operations*	198.9	207.6	174.6
	B-factory Operations*	87.4	89.6	53.3
	LHC (project+support)	60.1	60.0	62.0
	Other	5.9	15.4	11.1
<b>Subtotal Facility Operations</b>		<b>352.3</b>	<b>372.6</b>	<b>301.0</b>
Research	University physics research	103.3	105.0	108.1
	Laboratory physics research*	86.1	84.3	107.5
	Accelerator Science (Univ & Lab)*	27.4	33.0	41.0
	General Accelerator Development*	42.3	28.0	47.6
	Other Technology R&D (Univ & Lab)*	22.2	18.6	15.0
	Projects & Other (incl. dark energy)	13.4	15.8	19.1
<b>Subtotal Research</b>		<b>294.7</b>	<b>284.7</b>	<b>338.3</b>
Projects & Initiatives	NOvA	4.3	10.3	36.1
	ILC R&D	29.7	60.0	60.0
	SNAP	2.9	7.6	3.5
	Dark Energy Survey (DES)	0.0	0.0	4.7
	Reactor Neutrino (Daya Bay)	0.0	3.0	5.0
<b>Subtotal Projects &amp; Initiatives</b>		<b>36.9</b>	<b>80.9</b>	<b>109.3</b>
<b>Others (GPP/GPE, SBIR/STTR in 07 and 08)</b>		<b>14.3</b>	<b>36.9</b>	<b>33.6</b>
<b>Total as shown in FY07 budget</b>		<b>698.2</b>	<b>775.1</b>	<b>782.2</b>
SBIR/STTR in FY 2006		18.5		
<b>Grand Total incl SBIR/STTR</b>		<b>716.7</b>	<b>775.1</b>	<b>782.2</b>

\* Caution: Accounting changes for overheads in FY2008 make comparisons non-trivial.

## ILC R&D budget process

---

- In FY2007, the America's Regional Team (ART) generated its budget request on the basis of proposals by the Laboratories and Universities.
- For FY2008-2009, ART put a new WBS structure in place to guide and prioritize ("projectize") the R&D, design effort and test infrastructure. Eleven WBS categories were created to cover the main elements of the work –damping rings, positron source, main linac cavities etc. Each WBS category has a work package leader responsible for developing priorities, work plans, effort coordination.
- Based on upper and lower guidance budget ranges from DOE and ART input on the relative balance of WBS categories, work plans were proposed by the WBS leaders.
- In the budget guidance, detector R&D was assumed to be part of the ILC funding line. Advice from the Linear Collider Steering Group of the Americas (LCSGA) was sought to help establish the relative balance between accelerator and detector budgets.

## SCRF – A New Category in FY08

---

- DOE recognizes that high-gradient superconducting rf will have wide applications for new facilities across the Office of Science – XFELs, ERLs, high intensity proton or ion sources for neutrino factories, neutron sources, rare isotope studies etc.
- Developing SCRF competence connects to the ACI objectives.
- The ILC will be the initial driver for extending SCRF activities.

What can be included in the SCRF line - \$23.45M (FY08)?

- R&D facilities for developing new cavity fabrication methods, surface processing, materials characterization.
- Test facilities for single cavities, cryomodules, cryomodule strings, beam injection, and the cryo, rf power, controls, diagnostics infrastructure needed.
- Developing productive interactions with US industry to bring their capability to world standards.

# Dark Energy

---

- **The Long and Winding Road:**
  - NASA and DOE are jointly sponsoring a National Academy study “Beyond Einstein Program Assessment Committee”, due by Fall 2007, to advise NASA by identifying the highest priority among the five proposed NASA “Beyond Einstein” missions
  - Should this top priority be the Joint Dark Energy Mission (JDEM), DOE and NASA would propose to proceed with this mission.
  - In the interim, DOE continues to support R&D for JDEM
- **DOE/HEP will also provide funding for dark energy concepts to support R&D activities that can deliver advances in key areas identified by the Dark Energy Task Force report.**
  - These concepts can be near or longer-term and can be ground and/or space-based.
  - A peer-reviewed solicitation has recently been announced, proposals due next week
  - Support “generic” dark energy R&D as funding permits in FY07-08

# HEP P5 Roadmap vs. FY2008 Request

- 
- |                                                                                                                                                                              |                                                                                                                                                                                                                                                                                             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Highest priority: “investigations at the energy frontier. These are the full range of activities for the LHC program and the R&amp;D for the ILC.”</p>                 | <ul style="list-style-type: none"><li>• Support for LHC physics through university grants (~\$26M) and LHC Research Program (\$50M)</li><li>• ILC R&amp;D continues at \$60M, increased support for SCRF R&amp;D</li></ul>                                                                  |
| <hr/>                                                                                                                                                                        |                                                                                                                                                                                                                                                                                             |
| <p>2. A near-term program in dark matter and dark energy, and specific neutrino measurements: CDMS 25 kg, DES, Daya Bay. Also, support long-term R&amp;D in these areas.</p> | <ul style="list-style-type: none"><li>• Daya Bay fabrication begins in FY2008 (TPC: \$29M)</li><li>• DES fabrication begins in FY2008* (TPC: \$20M)</li><li>• CDMS 25kg to be considered for FY2009</li><li>• Long-term R&amp;D for dark matter, dark energy, neutrinos continues</li></ul> |
| <hr/>                                                                                                                                                                        |                                                                                                                                                                                                                                                                                             |
| <p>3. “Construction of the NOvA experiment at Fermilab along with a program of modest machine improvements.”</p>                                                             | <ul style="list-style-type: none"><li>• NOvA fabrication begins in FY2008 (delayed from FY2007 by CR). TPC: Not to exceed \$260M. Accelerator improvements to provide additional beam power to NuMI is included in project.</li></ul>                                                       |

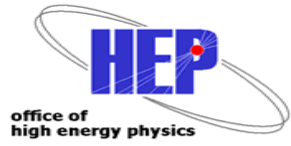
\*Subject to successful review of interested agencies



## P5 Scorecard : Continued

---

- P5 assumption for “base” FY2008 DOE/HEP budget was \$785M
- Actual FY2008 HEP budget is \$782M
  
- “We find that the first three groupings [items on the previous slide] can be carried out in the base budget plan”
- “The ILC R&D ramp up profile...and the NOvA construction schedule must both be slowed with respect to the most aggressive proposals, if costs are to be matched to the assumed annual budgets.”
- “In making a plan, we have arrived at a budget split for new investments of about 60% toward the ILC and 40% toward the new projects in dark energy, dark matter and neutrinos.”
  - FY08 split is ~55% ILC and 45% all other (see budget detail)
  - Not including:
    - small projects (Minerva, T2K) below P5 threshold,
    - SCRF R&D and infrastructure which supports ILC and other possible projects,
    - “generic” dark energy R&D



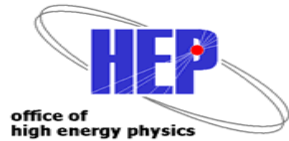
Department of Energy



Office of Science

---

# Backup



# Office of Science FY 2008 Congressional Budget Request

- FY 2008 Request for Office of Science is 7% above FY 2007 Appropriation
- FY 2008 Request for HEP is 1% above FY 2007 Appropriation
  - Does not include additional \$21.5M from BES for SLAC Linac Ops
- Most of SC \$\$ increase is in Fusion and Basic Energy Sciences, see Table below
- Most increases are for construction of new facilities (see following slide)

(\$M)

	FY 2006 Non-Comparable Approp.	FY 2007 Non-Comparable Request	FY 2008 President's Request	FY 2008 Request vs FY 2007 Request	
Basic Energy Sciences	1,110	1,421	1,498	+77	+5%
Advanced Scientific Computing Res.	228	319	340	+21	+7%
Biological & Environmental Research	564	510	532	+22	+4%
High Energy Physics	698	775	782	+7	+1%
Nuclear Physics	358	454	471	+17	+4%
Fusion Energy Sciences	281	319	428	+109	+34%
Other	357	304	347	+43	+14%
Total, Science	3,596	4,102	4,398	+296	+7%

# Summary of Other SC programs

---

- **Basic Energy Sciences:**
  - ALS User Building construction (+\$17.5M)
  - NSLS-II construction (+\$25M)
  - SLAC Linac operations (+\$21.5M)
- **Advanced Computing:**
  - CS and Applied Math Research (+\$12.8M)
  - High Performance Computing and Networking facilities (+\$8M)
- **Biological and Environmental Research:**
  - Bioenergy Research Centers (+\$55M)
- **Nuclear Physics:**
  - RHIC Operations and Heavy-ion research (+\$5.7M)
  - Low energy nuclear physics facilities and research (+\$6.8M)
  - CEBAF 12 GeV Upgrade (+\$6.5M)
- **Fusion:**
  - ITER (+\$112M)