

PHYSICS

\$ 269,060,000

The FY 2008 Request for the Physics Division (PHY) is \$269.06 million, an increase of \$20.56 million, or 8.3 percent, over the FY 2007 Request of \$248.50 million.

Physics Funding

(Dollars in Millions)

	FY 2006 Actual	FY 2007 Request	FY 2008 Request	Change over FY 2007 Request	
				Amount	Percent
Physics	\$234.15	\$248.50	\$269.06	20.56	8.3%
Major Components:					
Research and Education Grants	145.58	165.19	187.15	21.96	13.3%
Facilities	77.00	83.31	81.91	-1.40	-1.7%
Laser Interferometer Gravitational Wave Observatory (LIGO)	31.68	33.00	28.20	-4.80	-14.5%
Large Hadron Collider (LHC)	13.36	18.00	18.00	-	-
IceCube	-	-	1.50	1.50	N/A
National Superconducting Cyclotron Laboratory (NSCL)	17.34	17.60	19.50	1.90	10.8%
Cornell Electron Storage Ring (CESR)	14.62	14.71	14.71	-	-

Totals may not add due to rounding.

About PHY:

PHY advances the intellectual frontiers of physics; contributes to advances in other scientific and engineering fields and to the ultimate benefit of the economy, health, and defense of the country; works toward early inspiration of the young, training the next generation of scientists and the high-tech workforce, and sharing the stimulation and understanding provided by science to the general public through the integration of research and education; and stewards the physics community to ensure it remains world-class as it evolves in the future. PHY supports research over a broad range of physics subfields, including atomic, molecular, optical, and plasma physics; elementary particle physics; gravitational physics; nuclear physics; astrophysics; theoretical physics; biological physics; physics cyber-enabled discovery and cyberinfrastructure; accelerator physics; and complex systems. The division maintains a balanced portfolio of research topics using appropriate modes of support and partnering across agency and national boundaries.

The PHY portfolio has two major modes of support: research and education grants and facilities.

- PHY research and education grants range in scope from individual-investigator awards to awards to major user groups, including groups with responsibility for experiments at national or international user facilities, and awards for frontier research efforts involving centers, institutes, and other multi-investigator collaborations.
- PHY also supports major world-class facilities that are needed by certain subfields to answer the highest priority science questions.

In FY 2008, approximately 20 percent of the funds requested will be available for new research grants, with the remainder going to continuing commitments from previous years and to facilities (approximately

30 percent of the portfolio), instrumentation, and education and outreach. In FY 2006, PHY made a total of 277 competitive research grants, for a funding rate of 44 percent for competitive actions.

PHY Priorities for FY 2008:

- **A strong, flexible program of research and education grants to create new ideas and technology and attract and train students** is the highest priority in overall stewardship of the portfolio. Emphasis will be given to increasing the support for cyberinfrastructure and cyber-enabled discovery, nanoscience, and biological physics. Additional large-scale, multidisciplinary research activities will be added through an open competition.
- **Elementary Particle Physics (EPP) Investment.** The opportunities for discovery in EPP and the challenges to addressing them are greater than at any time in the last half-century. The tools needed for breakthrough discoveries are more diverse and interdisciplinary, and NSF is well positioned to address the broader needs of EPP. By making the strategic, coordinated investment needed to realize the stunning opportunities laid out in numerous studies and plans, NSF will enable university researchers to participate fully in the emerging discovery period in EPP. The investment has three main components: the Energy Frontier, the Neutrino Frontier, and the Cosmic Frontier.
- **Physics of the Universe (POU)**, the highest scientific priority, addresses the compelling questions that have arisen at the interface of physics and astronomy and were posed by the National Research Council report, “Connecting Quarks with the Cosmos.” A subsequent National Science and Technology Council report, “The Physics of the Universe: A 21st Century Frontier for Discovery,” outlines a national investment plan involving NSF, DOE, and NASA. Within NSF, POU is coordinated and supported by the AST and PHY Divisions. Activities include funding within the grants program, instrumentation development, and new facilities.

Changes from FY 2007:

- Research and education grants increase by \$21.96 million to a total of \$187.15 million. PHY will continue to increase its investment in EPP and related areas of POU research. PHY will continue to enhance support for cyberinfrastructure, theoretical physics, biological physics, and computational physics. Education and outreach activities, and expanding diversity within the research community, will receive continued emphasis.
- Facilities decrease by \$1.40 million to a total of \$81.91 million. For detail, see the Facilities chapter. This includes:
 - Decreased support for operations of the Laser Interferometer Gravitational Wave Observatory (LIGO) and for advanced detector R&D during startup of AdvLIGO construction to a total of \$28.2 million, a decrease of \$4.8 million.
 - Increased support for operations of Michigan State University’s National Superconducting Cyclotron Laboratory radioactive ion beam facility at a total of \$19.5 million, an increase of \$1.9 million.
 - Initiation of operations for IceCube (\$1.5 million)