PHYSICS $ 297,700,000

The FY 2009 Request for the Physics Division (PHY) is $297.70 million, an increase of $47.18 million, or 18.8 percent, over the FY 2008 Estimate of $250.52 million.

Physics Funding
(Dollars in Millions)

	FY 2007 Actual	FY 2008 Estimate	FY 2009 Request	Change over FY 2008 Estimate Amount	Change over FY 2008 Estimate Percent
Physics	**$248.47**	**$250.52**	**$297.70**	**47.18**	**18.8%**
Major Components:					
Research and Education Grants	156.33	162.95	213.69	50.74	31.1%
Centers	7.68	6.36	6.36	-	-
Facilities	84.46	81.21	77.65	-3.56	-4.4%
Laser Interferometer Gravitational Wave Observatory	33.00	29.50	28.50	-1.00	-3.4%
Large Hadron Collider	18.00	18.00	18.00	-	-
IceCube Neutrino Observatory	0.25	1.50	2.15	0.65	43.3%
National Superconducting Cyclotron Laboratory	18.50	18.50	20.50	2.00	10.8%
Cornell Electron Storage Ring	14.71	13.71	8.50	-5.21	-38.0%

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. 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; biological physics; physics at the information frontier; and theoretical physics and instrument development across all these subfields. 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 needed by certain subfields to answer the highest priority science questions.

In FY 2009, approximately 35 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 2007, PHY made a total of 263 competitive research grants, for a funding rate of 39 percent for competitive actions.

PHY Priorities for FY 2009:

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 the PHY portfolio. Investments in FY 2009 will focus heavily on new directions grown out of earlier discoveries that show special promise to introduce revolutionary new technologies, especially those that derive from quantum control; to capitalize on modern grid technology and computational capabilities to develop new cyberinfrastructure to enable new discoveries and address increasingly complex scientific problems; and to more rapidly enhance support for emerging physics research on living systems. Support is provided through internal physics programs as well as joint participation with other parts of NSF, other agencies, and international partners.

Physics of the Universe (POU) continues to be a high priority within the Division. Research at this frontier addresses compelling questions at the interface of physics and astronomy in line with the joint investment plan between NSF, Department of Energy, and NASA put forth in the National Science and Technology Council report "The Physics of the Universe: A 21st Century Frontier for Discovery". Within NSF, POU is coordinated and supported by the AST and PHY Divisions. Activities include funding within grants programs, instrumentation development, and technical design for new facilities.

Changes from FY 2008:
Research and education grants increase by $50.74 million to a total of $220.05 million. PHY will enhance its support for ACI-related research in atomic, molecular, and optical physics, especially science beyond Moore's law ($1.75 million), physics at the information frontier, especially quantum information science ($3.0 million), cyberinfrastructure and cyber-enabled discovery ($1.20 million), and the physics of living systems ($2.0 million), with connections to Adaptive Systems Technology and the physical-life sciences interface. A mid-career ACI Fellows program ($1.0 million) will enhance the continuing emphasis on education and outreach activities and expanding diversity within the research community.

Facilities decrease by $3.56 million to a total of $77.65 million. For detail, see the Facilities chapter. This includes:

- Continued support for operations of the Laser Interferometer Gravitational Wave Observatory (LIGO) and for advanced detector R&D during startup of AdvLIGO construction at $28.50 million, a decrease of $1.0 million.
- Increased support for operations of the National Superconducting Cyclotron Laboratory (NSCL) radioactive ion beam facility to a total of $20.5 million, an increase of $2.0 million, back on plan after an unplanned $1.0 million reduction in FY 2008.
- Increased support for operations of IceCube to a total of $2.15 million from PHY, an increase of $650,000.
- Decreased support for the Cornell Electron Storage Ring (CESR) by $5.21 million to a total of $8.50 million as the continuation of the phase-out of operations as a high-energy research facility.
- Funding for instrumentation development and acquisition requiring investment at levels beyond the maximum limit of the agency-wide Major Research Infrastructure program or the resources of disciplinary programs will be increased by $3.35 million to a total of $8.50 million.

Support for technical design for the proposed Deep Underground Science and Engineering Laboratory (DUSEL) and R&D for detectors relevant to the proposed DUSEL will be increased by $6.0 million to a total of $10.0 million.