

DIVISION OF PHYSICS (PHY)

\$253,300,000
-\$23,610,000/ -8.5%

PHY Funding
(Dollars in Millions)

	FY 2016 Actual	FY 2017 (TBD)	FY 2018 Request	Change Over	
				FY 2016 Actual Amount	Percent
Total	\$276.91	-	\$253.30	-\$23.61	-8.5%
Research	174.12	-	152.09	-22.03	-12.7%
CAREER	8.12	-	7.30	-0.82	-10.1%
STC: Center for Bright Beams (CBB)	-	-	5.00	5.00	N/A
Education	5.40	-	4.80	-0.60	-11.1%
Infrastructure	97.39	-	96.41	-0.98	-1.0%
IceCube	3.48	-	3.50	0.02	0.6%
Large Hadron Collider (LHC)	20.00	-	16.00	-4.00	-20.0%
Laser Interferometer Gravitational Wave Observatory (LIGO)	39.43	-	39.43	-	-
Nat'l Superconducting Cyclotron Lab. (NSCL)	24.00	-	23.00	-1.00	-4.2%
Midscale Research Infrastructure	10.48	-	8.18	-2.30	-21.9%
Pre-construction planning:	-	-	6.30	6.30	N/A
High-Luminosity LHC Upgrade Planning	-	-	6.30	6.30	N/A

PHY supports fundamental research addressing frontier areas of physics that lead to the understanding of the make-up of the universe, from the formation of stars and galaxies to the principles of life processes on Earth. This research covers a range of physics subfields: atomic, molecular, optical and plasma physics, elementary particle physics, gravitational physics, nuclear physics, particle and nuclear astrophysics, physics of living systems, physics at the information frontier, and theoretical physics. PHY is the primary supporter of all research in the United States in gravitational physics and the leading supporter of fundamental research in atomic, molecular, and optical physics in the United States. PHY is a major partner with DOE in support of elementary particle physics, nuclear physics, and plasma physics. PHY also has the only U.S. program designed for the support of physics research in living systems.

Research in physics is invariably accompanied by the development of new analytical, computational, and technological approaches, many of which then go on to have major impact in other scientific and engineering fields. These include, for example: advances in ways to move, analyze, and store large data sets that are directly related to the data revolution; advances in understanding of quantum mechanics that underpin the development of a spectrum of quantum technologies that influence communication, computation, and sensing; and the search for theoretical concepts that could provide guidance to understanding how and why cancer develops.

In general, about 20 percent of the PHY portfolio is available for new research grants. The remaining 80 percent is used primarily to fund continuing grants made in previous years (47 percent) and to support operations and maintenance for four facilities that are a key part of the division portfolio (32 percent).

FY 2018 Summary

All funding decreases/increases represent changes over the FY 2016 Actual.

Research

- CAREER (-\$820,000 to a total of \$7.30 million): This level preserves the percentage of CAREER awards as a fraction of the overall D&IR budget and will support roughly 60 awards.
- Disciplinary and Interdisciplinary Research (-\$25.56 million to a total of \$135.53 million): Funding will retain emphasis on investments in Quantum Information Science and computational needs for addressing large data sets and in NSF-wide investments such as:
 - UtB (-\$1.75 million to a total of \$4.0 million): This provides continued support for physics-based research that enables scientific understanding of the full complexity of the brain, in action and in context.
- Science and Technology Center: Center for Bright Beams (+\$5.0 million to a total of \$5.0 million): Funding will ramp up as planned for this Class of 2016 cohort.

Education

- REU (-\$570,000 million to \$4.70 million): This level preserves the percentage of funding for the REU program as a fraction of the overall D&IR budget.

Infrastructure

- IceCube (+\$20,000 to a total of \$3.50 million): This reflects the funding profile developed under the new cooperative agreement initiated in FY 2016.
- LHC (-\$4.0 million to a total of \$16.0 million): This supports operations of the ATLAS and CMS detectors at LHC. The decrease is due to the redirection of funds to planning for the High-Luminosity LHC Upgrade as described below.
- LIGO (level at \$39.43 million): This supports operations of LIGO and commissioning of its upgraded interferometer following completion of the Advanced LIGO construction project in FY 2014.
- NSCL (-\$1.0 million to a total of \$23.0 million): This supports operations of NSCL at Michigan State University. This will result in fewer operating hours, but is consistent with prior funding levels..
- Mid-scale Research Infrastructure (-\$2.30 million to a total of \$8.18 million): Funding will support the continuation of projects started in previous years. The decrease is due to the redirection of funds to planning for the High-Luminosity LHC Upgrade as described below.
- High-Luminosity LHC Upgrade Planning (+\$6.30 million to a total of \$6.30 million): This added funding will allow development and planning that could possibly lead to a major construction upgrade of the ATLAS and CMS detectors at LHC beginning in FY 2020.