News from NSF

Denise Caldwell

Division Director
Division of Physics

With Input from Program Directors: Allena Opper*, Kenneth Hicks**,
Bogdan Mihaila, (and Gail Dodge prior to her departure)

*New Permanent Staff in fall 2014
**New IPA in fall 2014

NSAC 17 November 2014

Physics Division Allocation for FY 2014 was $266.3 M

Approximately 2% for Operations -
Panels, IPA Appointments, IPA Travel, M&S

Approximately 30% for M&O for Facilities –
ATLAS and CMS, IceCube, LIGO, NSCL

Approximately 8% for Physics Frontiers Centers – Currently Ten

Approximately 3% for Education and Broadening Participation –
REU Sites, LIGO Education Center, QuarkNet

Leaves 57% ($151.8 M) to Cover Six Major Areas of Physics –
Experimental and Theoretical

NSF FY 2015 Budget Request

R&RA Funding

(Dollars in Millions)

	FY 2013 Actual	FY 2014 Estimate	FY 2015 Request	Change over FY 2014 Estimate Amount	Change over FY 2014 Estimate Percent
Biological Sciences	$679.21	$721.27	$708.52	-$12.75	-1.8%
Computer & Information Science & Engineering	858.13	894.00	893.35	-0.65	-0.1%
Engineering	820.18	851.07	858.17	7.10	0.8%
Geosciences	1,273.77	1,303.03	1,304.39	1.36	0.1%
Mathematical & Physical Sciences	1,249.34	1,299.80	1,295.56	-4.24	-0.3%
Social, Behavioral & Economic Sciences	242.62	256.85	272.20	15.35	6.0%
International and Integrative Activities	434.28	481.59	473.86	-7.73	-1.6%
U.S. Arctic Research Commission	1.39	1.30	1.41	0.11	8.1%
Total, R&RA	**$5,558.88**	**$5,808.92**	**$5,807.46**	**-$1.46**	**-**

NSF FY 2015 Funding Priority Areas

Funding for Selected FY 2015 Priorities

(Dollars in Millions)

Investment Priority	FY 2013 Actual	FY 2014 Estimate	FY 2015 Request	FY 2015 Request Change Over FY 2014 Estimate Amount	FY 2015 Request Change Over FY 2014 Estimate Percent
Cognitive Science and Neuroscience	-	$13.85	$29.00	$15.15	109.4%
Cyber-Enabled Materials, Manufacturing and Smart Systems (CEMMSS)	181.43	230.05	213.20	-16.85	-7.3%
Cyberinfrastructure Framework for 21st Century Science, Engineering, and Education (CIF21)	109.13	145.41	124.75	-20.66	-14.2%
Science, Engineering, and Education for Sustainability (SEES)	183.67	161.75	139.00	-22.75	-14.1%
Secure and Trustworthy Cyberspace (SaTC)	108.01	124.75	99.75	-25.00	-20.0%

Priority Area Funding/Total R&RA Funding = 605.7/5807.46 = 10% of Total

FY 2015 PHY Funding Request

MPS Funding

(Dollars in Millions)

	FY 2013 Actual	FY 2014 Estimate	FY 2015 Request	Change Over FY 2014 Estimate Amount	Change Over FY 2014 Estimate Percent
Astronomical Sciences (AST)	$232.17	$239.06	$236.24	-$2.82	-1.2%
Chemistry (CHE)	229.39	235.79	237.23	1.44	0.6%
Materials Research (DMR)	291.09	298.01	298.99	0.98	0.3%
Mathematical Sciences (DMS)	219.02	225.64	224.40	-1.24	-0.5%
Physics (PHY)	250.45	266.30	263.70	-2.60	-1.0%
Office of Multidisciplinary Activities (OMA)	27.22	35.00	35.00	-	-
Total, MPS	**$1,249.34**	**$1,299.80**	**$1,295.56**	**-$4.24**	**-0.3%**

Nuclear Physics – FY 2014 Budget

Base Program Fundir	$ in millions	
Precision Measurement	5.25	
Medium Energy	5.27	
Low Energy	4.22	
Nuclear Astrophysics	2.28	
NSCL Operations	22.50	
Nuclear Theory	3.50	
	43.02	17% of total PHY R&RA Available
Additional PHY Cross-Cutting Resources		
Midscale	1.20	Neutron edm at SNS; MUSE at PSI
CDS&E	0.30	
PFC	2.28	JINA at Michigan State/Notre Dame
	3.78	
Additional NSF-Wide Resources		
MRI	0.84	
Indirect Funding (Funding through Independent Programs into Awards that Impact Nuclear Physics)		
Accelerator Science	0.45	Possible Short-Term Impact
	0.45	
Total	48.09	

Major Divisional Undertakings in FY 2014

Launch of New Academic-Based Program in Accelerator Science

Initiation of Formal Midscale Funding Program

Triennial Physics Frontiers Centers Competition

Outcome: Funding for JINA was renewed for additional five years

Slide from S. Gonzalez.
Accelerator R&D workshop at
SLAC, July 2014.

Accelerator Science Program Description

PD 13-743: Particle accelerator systems have been key drivers for a broad array of fundamental discoveries and transformational scientific advances since the early 20th century. Since their inception, they have also been core components of U.S. technological innovation and economic competitiveness.

The Accelerator Science program will support and foster research at universities that exploits the educational and discovery potential of basic accelerator physics research, and allows the development of transformational discoveries in this crosscutting academic discipline. In particular, this program seeks to support research with the potential to disrupt existing paradigms and advance accelerator science at a fundamental level, such as enabling discoveries that lead to novel, compact, powerful, and/or cost-effective accelerators. Key questions that this program will address include: what are the fundamental limitations affecting the acceleration, control, intensity, and quality of particle beams? What novel approaches can be employed to substantially increase accelerating gradients? How can developments in other fields lead to new approaches in accelerator science and beam physics?

The goal of this program is to seed and support fundamental accelerator science at universities as an academic discipline, providing the foundation in knowledge and workforce upon which major advances in accelerator-driven technologies will be based. An important component of the program will be the support and training of the next generation of accelerator scientists, including students, postdoctoral researchers, and junior faculty, who will lead innovations in the field and will form the backbone of the nation's highly trained accelerator workforce.

Proposals for experimental, theoretical, and/or simulation-based research are welcome. Priority will be given to those proposals that enable the discovery science supported by the MPS Division of Physics.

Slide from S. Gonzalez.
Accelerator R&D workshop at
SLAC, July 2014.

Key Features of NSF Accelerator Science

- Focus on fundamental science best done at universities
  - High risk, transformational, academic discipline
  - Cross-cutting with other disciplines
  - Can take place on campus or off campus (national lab, etc.)
- Workforce
  - Attract the best students/postdocs by tackling hard and interesting problems
- This program is **NOT** intended to be
  - Directed R&D towards a foreseen project or facility
  - Incremental improvement to an existing facility (unless it is proof of concept of a new idea)
  - "Supplement" to an existing DOE award or program (does not mean that NSF award will not be issued to DOE award recipient; scope must be different than DOE's)
- Accelerator Science NSF web page
- Next solicitation deadline: Feb. 4, 2015

Accelerator Science Program

- FY2014 Portfolio.
  - 60 proposals, 52 projects (some proposals were collaborative)
  - Request total
    - $70M
  - 12 awards
    - $9M

	Amount $	No. awards
Beam Dynamics	520,397	2
Plasma	1,469,900	3
Sources	1,006,910	2
SRF	4,522,786	2
Education	700,000	1
Other	720,000	2
Total	8,939,993	12

Mid-Scale Instrumentation

One of the most critical needs of research projects funded through the Physics Division is that of having cutting-edge instrumentation that enables investigators to remain competitive in a rapidly-changing scientific environment.

- The Physics Division has established a Mid-Scale Instrumentation Fund.
  - Dear Colleague Letter *NSF 13-118*: "Announcement of Instrumentation Fund to Provide Mid-Scale Instrumentation for FY2014 Awards in Physics Division"
  - http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf13118
- This is not a separate program to which investigators can apply directly. PI's should request funding for specialized equipment as part of a regular proposal to a disciplinary program in the Division. The Program Officer can then request funds be provided through the Mid-Scale Instrumentation Fund.
- Mid-Scale Instrumentation Funds are one-time only, non-renewable and are not intended to cover the cost of operations for equipment constructed using the funds. These costs must be borne by the disciplinary program.

Mid-Scale Instrumentation

- Resources from the Mid-Scale Instrumentation Fund can be used for off-the-shelf purchases or for construction of specialized equipment.
- Mid-Scale Instrumentation Fund resources are intended to be one-time investments in the research project and require that the project have a well-defined beginning and end.
- Merit reviews proceed through the base programs or special reviews.
- Funding Levels begin at TPC of ~$4.0M and can go up to TPC of ~$20.0M.
- Mid-Scale awards for FY14:
  - Neutron edm experiment at SNS and MUSE at PSI
  - LHC Upgrades in ATLAS, CMS, and LHCb
  - Support for Xenon1T Dark Matter Experiment
  - Contribution to Funding for South Pole Telescope (Primary in Polar Programs)