



Report from the NSF

Jim Thomas

June 6th, 2019

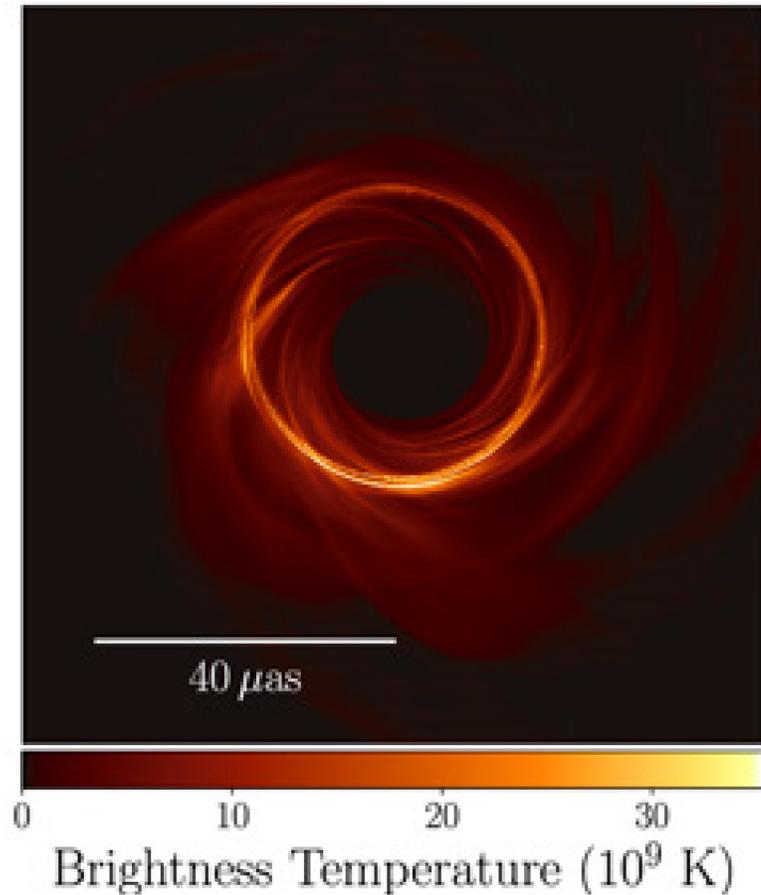
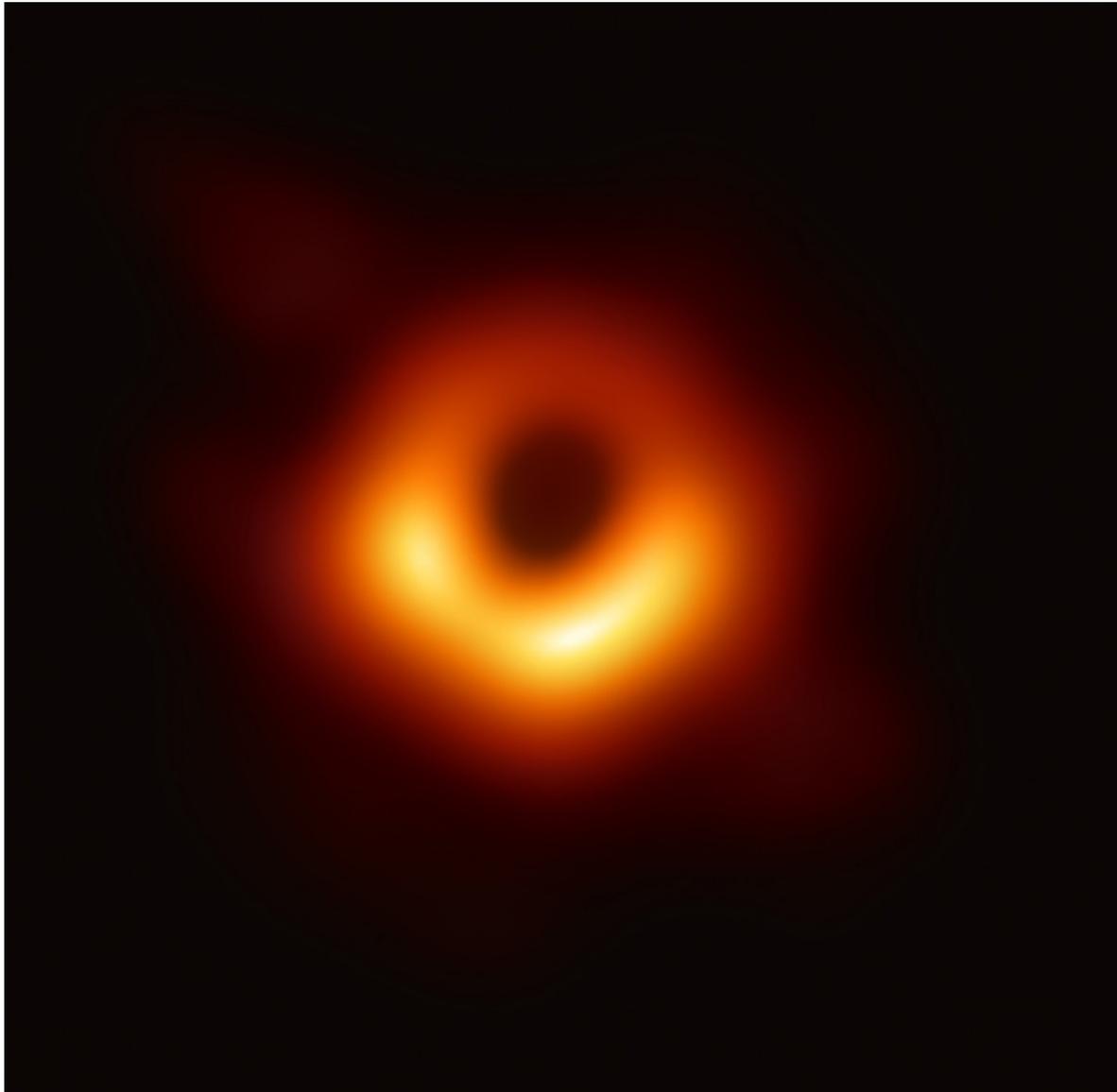


RHIC & AGS Users Meeting

Jim Thomas

(2)
6/06/2019

Extreme Physics – Event Horizon Telescope

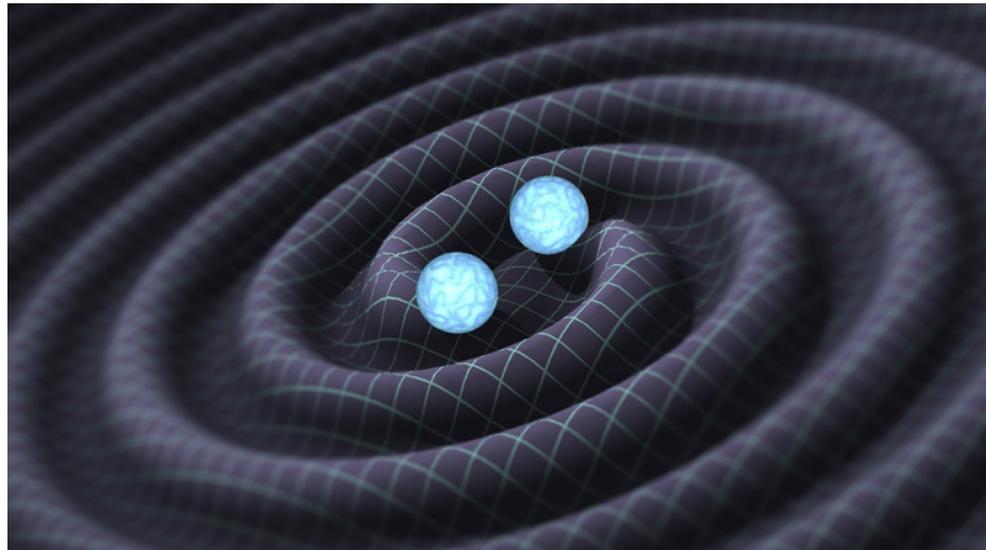


- M87 Observed w/1.3 mm radio network
- Shadow due to photon orbits that terminate on the event horizon
- Extreme lensing and doppler shift
- Rotating w/axis 163° wrt line of sight

The chirp heard around the world



LIGO/Virgo release first catalog of gravitational-wave events

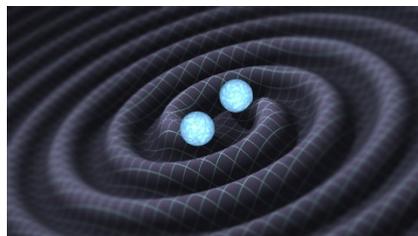


- 12 “confident detections”
- Including 1 binary neutron star merger which was observed optically, w/ γ rays and across the E&M spectrum
- A new candidate every 3 or 4 days
 - <https://gracedb.ligo.org/latest/>
- A tremendous stimulus for NAp community
- Theory & Exp – bright future for FRIB

Physics Division – within Mathematical and Physical Sciences



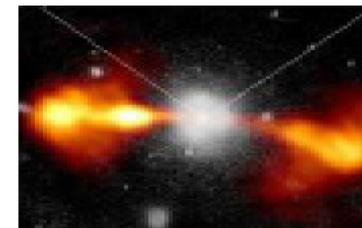
**Nucleosynthesis
in accreting white
dwarfs at JINA**



**Black hole – Black
hole mergers
observed in LIGO**



**Ultracold Molecules
at JILA**



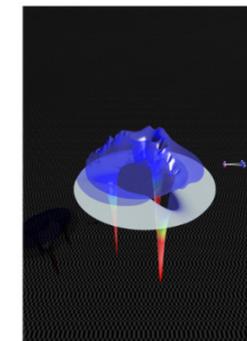
**Active Galactic Nuclei produce
HE cosmic rays in Pierre Auger
Observatory**



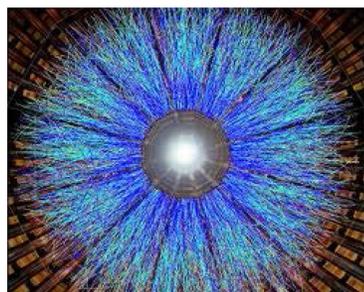
**Broadening
Participation
In STEM**

**Heavy Ion
collisions at RHIC**

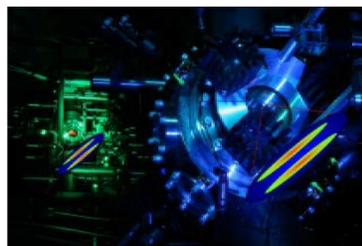
**Ultracold atom three
particle states at JQI**



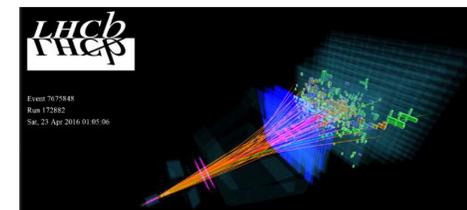
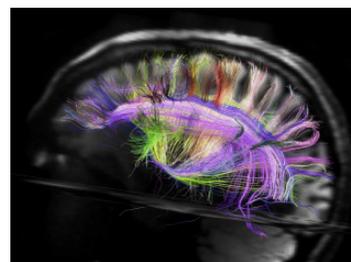
**LHCb at CERN –
tetraquarks, pentaquarks**



**Quantum Networks
at Caltech**



**Brain Wave Images
with diffusion MRI**



NSF in context

- The NSF responds to proposals from a broad community
 - Extraordinary science from outstanding University groups + Labs
 - Extraordinary science from small Colleges
 - with compelling Broader Impacts
- Two review criteria
 - Intellectual Merit
 - Broader Impacts

} With no prescribed weight on either criteria

 - Education & Outreach
 - Building the economy & workforce of the future through STEM
 - Broadening participation
 - Impact on other fields of science & engineering
 - National Security ... more
- Appreciation for everyone who reviewed proposals and sat on panels
 - The government shutdown lasted 35 days
 - This put us behind schedule – you worked on short deadlines, thank you!



New measures to protect research community from harassment



- News Release 18-082: September 19, 2018 Effective October 22, 2018
- New term and condition "Notification Requirements Regarding Findings of Sexual Harassment, Other Forms of Harassment, or Sexual Assault" requires awardee organizations to notify NSF of:
 - Any findings or determinations that an NSF-funded principal investigator or co-principal investigator committed harassment, including sexual harassment or sexual assault.
 - The placement of the principal investigator or co-principal investigator on administrative leave, or of the imposition of any administrative action relating to a harassment or sexual assault finding or investigation.
- NSF will consult with the awardee organization, and determine what action is necessary under NSF's authority.
 - NSF actions may include substituting or removing principal investigators or co-principal investigators, reducing award funding, and – where neither of those options is available or adequate – suspending or terminating awards.

Funding opportunities

- Standard research grants
- Career Proposals
- Opportunities to broaden participation through co-funding
 - AGEP
 - EPSCoR
 - HBCU
- MRIs, Physics MidScale, MSRI-1, MSRI-2, MREFC
 - Construction funds to build instrumentation and facilities
 - (limited resources for design ... it is usually assumed that early R&D is supported by the base program)

A few examples in the following slides; but not a comprehensive review



Faculty Early Career Development Program (CAREER)



- CAREER - Awards in support of early-career faculty who have the potential to serve as academic role models in research and education
- PECASE - Presidential Early Career Awards for Scientists and Engineers from among the most meritorious recent CAREER awardees
- Selection for these awards is based on two important criteria:
 - Innovative research (IM)
 - Community service [...] through leadership in education & outreach (BI)
- Eligibility – must be assistant professor, untenured ...
 - NSF 17-537
 - 5 year awards
 - Deadline: Third Friday in July ⇒ July 19, 2019
 - PECASE nominees are chose from within pool of CAREER winners

Standard Grants



- Investigator Initiated Research Projects NSF 18-564
- Deadlines:
 - Proposals due the first Tuesday in December ⇒ December 3rd, 2019
 - **Note:** new Proposal & Award Policies & Procedures Guide (PAPPG)
 - https://www.nsf.gov/pubs/policydocs/pappg19_1/index.jsp
 - Follow the Proposal Preparation checklist
- Collaborators and Other Affiliations Template
 - List conflicts of interest ... not everyone in your collaboration
- Follow instructions that are specific to this solicitation

All proposals submitted to the Division of Physics programs must go through this solicitation

MRI – Major Research Instrumentation

- Two tracks:
 - Track 1 \$100 k < \$ from NSF < \$1 M; max of 2/university
 - Track 2 \$1 M < \$ from NSF < \$4 M; max of 1/university
- Two types: development and acquisition
- Deadlines & details
 - January 1 – January 19, annually
 - NSF 18-513
 - contact your program directors well ahead of time to discuss & avoid pitfalls
- Maximum award is \$4M
 - 30% cost share req'd for PhD granting institutions
 - Awards above \$1M compete across the entire Foundation

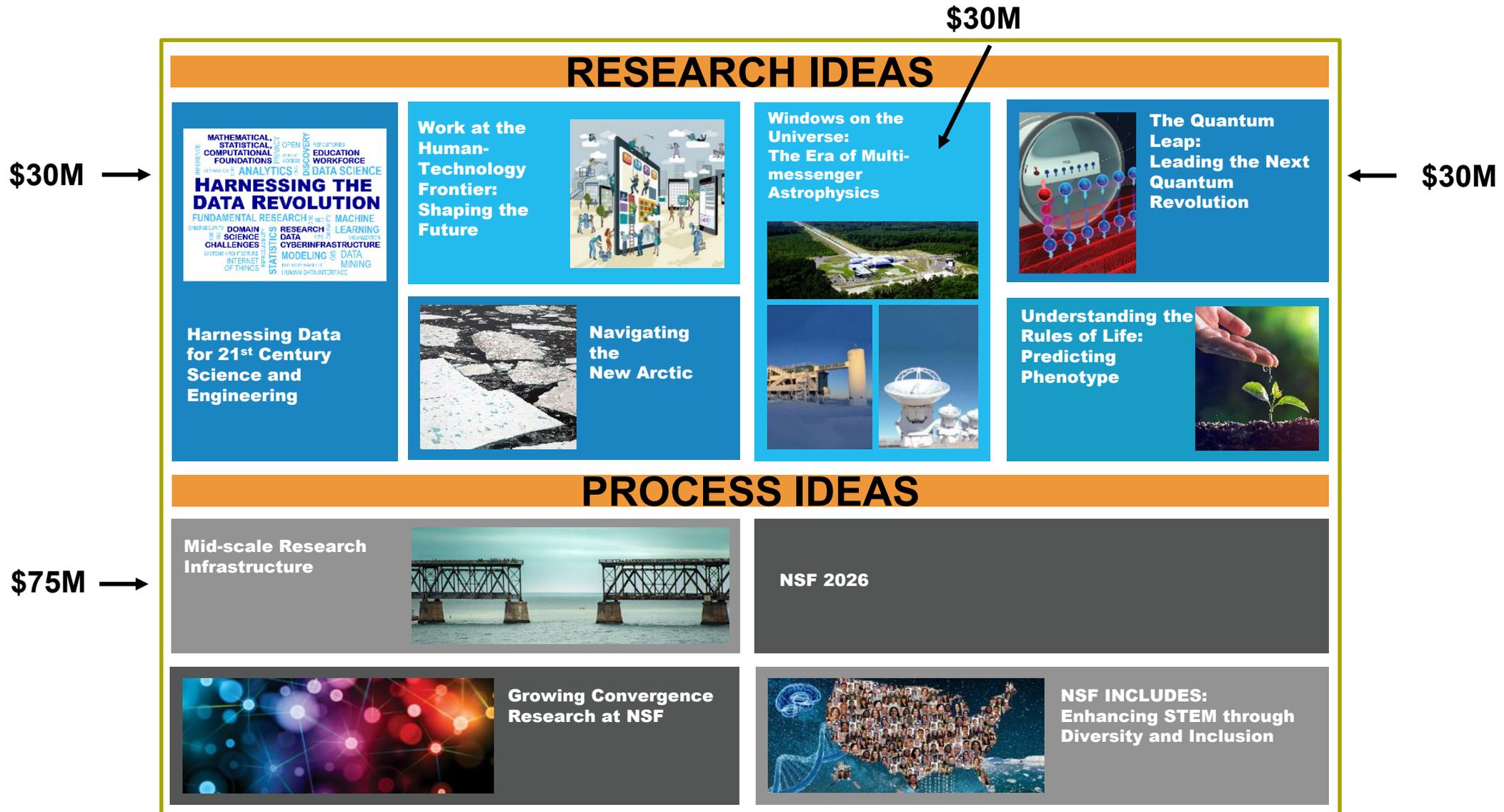


Mid-Scale Instrumentation

- Physics Midscale
 - \$4M - \$15M NSF 14-116
 - non-renewable one time grant
 - Grants are awarded annually
 - Design, Construction or Acquisition of Instrumentation
 - Although early R&D is expected to be funded by the base program
- Midscale Research Infrastructure-1 (MSRI-1)
 - \$6M - \$20M NSF 19-537
 - Grants are awarded every other year (not this year)
 - Two types: Implementation & Design
 - Implementation proposals are usually “shovel ready” projects
 - Design proposals may request as little as \$600k
- Midscale Research Infrastructure-2 (MSRI-2)
 - \$20M - \$70M NSF 19-542 “shovel ready” only
 - Grants are awarded every other year (not this year)



The 10 Big Ideas in the FY2020 request



Money – where does it come from, where does it go?



- The NSF is a little different than other Departments of the government
 - Congress makes appropriations for the NSF budget with respect to six broad categories ... rather than line by line
 - So developing the NSF's final 'operating plan' requires an extra step
- The President's office prepares a budget in consultation with the NSF and the Office of Management and Budget
- Congress passes an appropriation for the NSF
 - Often with additional instructions and not always the same as the Presidents request
 - The president signs the appropriations bill
- The NSF proposes an operating plan based on the final budget and submits it to Congress via OMB
- Congress approves the operating plan

We are here FY19

FY20 Request for the NSF Physics Division (FY18 Reference)



(Dollars in Millions)

	FY 2018 Actual	FY 2019 (TBD)	FY 2020 Request	Change over FY 2018 Actual	
				Amount	Percent
Total	\$310.75	-	\$247.50	-\$63.25	-20.4%
Research	182.35	-	145.63	-36.72	-20.1%
CAREER	10.14	-	6.78	-3.36	-33.1%
Centers Funding (total)	4.81	-	5.00	0.19	4.0%
STC: Center for Bright Beams	4.81	-	5.00	0.19	4.0%
Education	4.50	-	4.70	0.20	4.4%
Infrastructure	123.90	-	97.17	-26.73	-21.6%
IceCube	3.50	-	3.50	-	-
LHC	15.86	-	20.00	4.14	26.1%
LIGO	39.43	-	44.60	5.17	13.1%
Midscale Research Infrastructure	14.42	-	6.67	-7.75	-53.7%
NSCL	24.00	-	22.00	-2.00	-8.3%
Research Resources	0.09	-	-	-0.09	-100.0%
Facilities Design Stage Activities (total)	26.60	-	0.40	-26.20	-98.5%
High Luminosity-LHC ¹	16.60	-	-	-16.60	-100.0%
Advanced LIGO Plus (LIGO A+)	10.00	-	0.40	-9.60	-96.0%

¹ FY 2018 Actual reflects \$7.50 million of funding for FY 2019 and FY 2020 development and design. No additional funds are expected in these years.

FY20 Budget request to Congress (M\$) (FY18 Reference)



House
2020/2018

NSF by Account	FY 2018 Actual	FY 2019 Annualized CR ¹	FY 2019 Enacted ²	FY 2020 Request	FY 2020 Request change over FY 2018 Actual		
					Amount	Percent	
Research & Related Activities	\$6,380.38	\$6,334.48	\$6,520.00	\$5,662.96	-\$717.42	-11.2%	11%
Education & Human Resources	\$903.87	\$902.00	\$910.00	\$823.47	-\$80.40	-8.9%	
Major Research Equipment & Facilities Construction	\$186.30	\$182.80	\$295.74	\$223.23	\$36.93	19.8%	20%
Agency Operations & Award Management	\$328.51	\$328.51	\$329.54	\$336.89	\$8.38	2.6%	3%
National Science Board	\$4.30	\$4.37	\$4.37	\$4.10	-\$0.20	-4.6%	
Office of Inspector General	\$15.09	\$15.20	\$15.35	\$15.35	\$0.26	1.7%	
Total, NSF	\$8,039.91	\$8,031.35	\$8,338.99	\$7,226.00	-\$813.91	-10.1%	

Source for House Mark: www.aip.org/fyi/

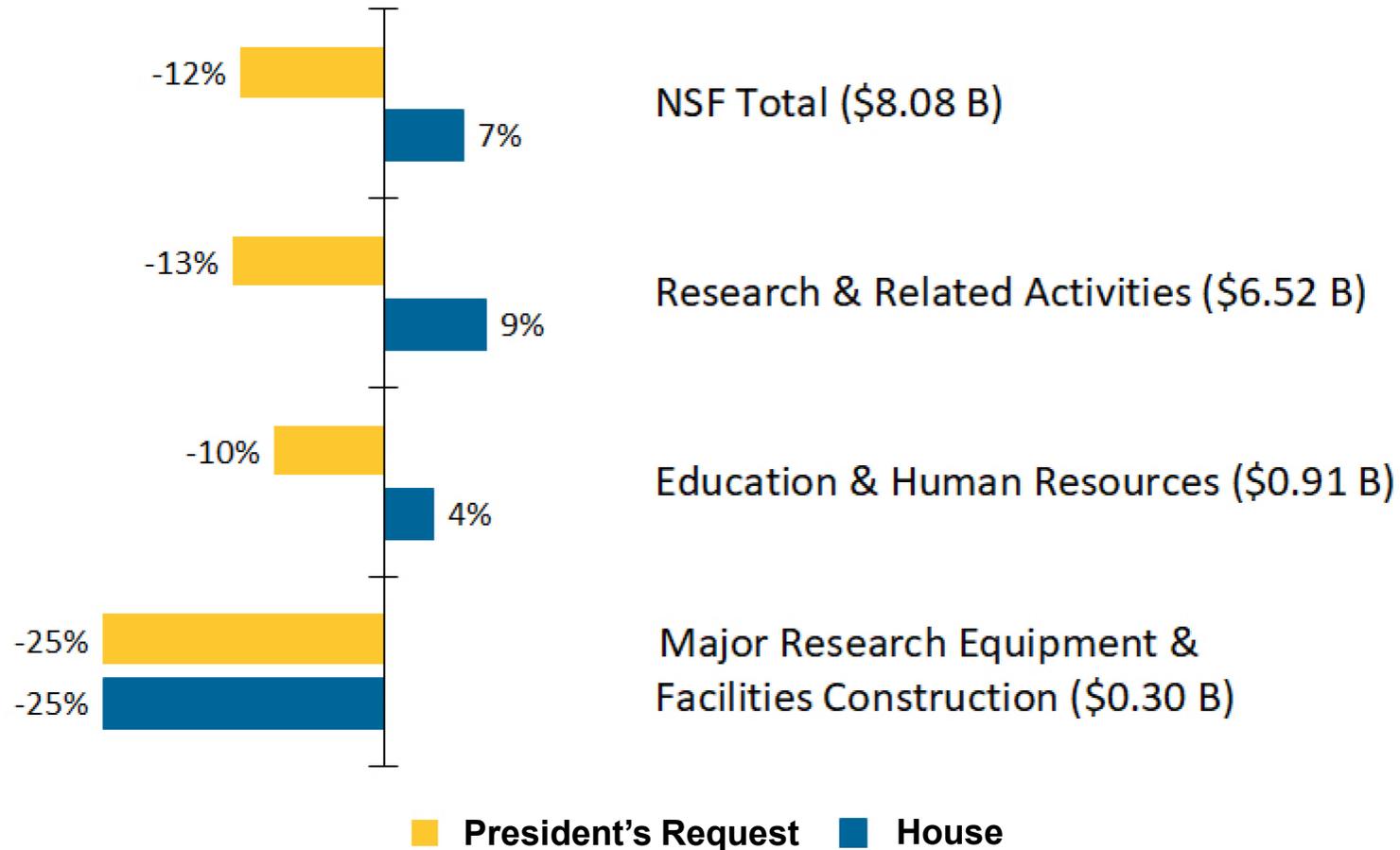
A note of caution, however. Using an FY19 reference would make the FY2020 MREFC look like **-25%**

FY20 Proposed NSF Budget (FY19 Reference)



\$ in () are the FY19 amounts

- The President's budget is a low bid
- We have to show our IM and BI
- The House (and Senate) will respond
- Then we have to be patient to see what develops



Patience and Grace \Rightarrow Great Science

- Do good science with high intellectual merit
- Acknowledge your funding agencies in your publications and talks
- Pursue the broader impacts of your work
 - Education and outreach
 - When possible, open your lab to the community for tours
 - Talk to the 10 year old who lives next door
- Don't get into trouble
 - Be mindful of your implicit biases
 - Broaden participation of all groups in your activities



More information

- News & updates
 - <https://www.nsf.gov/physics>
- Contact us:
 - bmihaila@nsf.gov
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 - aopper@nsf.gov
(703) 292-8958
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PHY Replaces DCL with Solicitation NSF 14-576

The Physics Division has issued a solicitation (NSF 14-576) for FY2015 that replaces its prior annual Dear Colleague Letter. The solicitation follows most of the requirements in the Grant Proposal Guide, but has additional requirements that relate primarily to proposers who anticipate having multiple sources of support, and proposals involving significant instrumentation development. The solicitation also has deadlines instead of target dates. All proposals submitted to the Physics Division that are not governed by another solicitation (such as CAREER) should be submitted to this solicitation; otherwise they will be returned without review.

PHY Int'l Activities - Potential Co-Review

The Physics Division has issued a Dear Colleague Letter (NSF 14-009) to announce the guidelines for "International Activities within the Physics Division - Potential International Co-Review". The DCL outlines a possible coordinated review of projects involving international colleagues and counterpart funding organizations where a mutual review and funding process is beneficial to the advancement of Physics research. Contact with the appropriate NSF Program Officer is a necessary first step and additional time for this coordination must be allowed. Proposals requesting co-review will be competing with all other proposals in that area and must succeed on the strengths of their intellectual merit and broader impact.

Special Announcements

MPS Alliances for Graduate Education and the Professoriate - Graduate Research Supplements (AGEP-GRS) Dear Colleague Letter (NSF 13-071)

Dear Colleague Letter - Announcement of Instrumentation Fund to Provide Mid-Scale Instrumentation for FY2014 Awards in Physics Division (NSF 13-118)

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