

USLUA NSF EPP-Experiment Report

Kaushik De, Jim Shank

Program Directors, EPP
US LHC Users Association
December 14, 2023



USLUA NSF EPP-Experiment Report

Focus on LHC support at the NSF

About NSF

- NSF research is organized around 8 Directorates:
 - [Directorate for Biological Sciences](#)
 - [Directorate for Computer and Information Science and Engineering](#)
 - [Directorate for Engineering](#)
 - [Directorate for Geosciences](#)
 - [Directorate for Mathematical and Physical Sciences](#)
 - [Directorate for Social, Behavioral and Economic Sciences](#)
 - [Directorate for STEM Education](#)
 - [Directorate for Technology, Innovation and Partnerships](#)
- Supports LHC research directly; Supports LHC programmatically; Could Support in the future



About MPS

- Directorate for Mathematical and Physical Sciences
- [See talk by](#) C. Denise Caldwell, Assistant Director (Acting) of MPS at HEPAP, December 7, 2023

NSF FY2024 Budget Request to Congress

MPS Funding

(Dollars in Millions)

	FY 2022 Actual ¹	Disaster Relief Supplemental				FY 2023 Estimate Total	FY 2024 Request	Change over FY 2023 Base Total ²	
		FY 2023 Estimate Base	Base	RI Damage Mitigation				Amount	Percent
Astronomical Sciences (AST)	\$283.61	\$283.57	\$8.76	-	\$292.33	\$303.33	\$11.00	3.8%	
Chemistry (CHE)	265.19	264.46	4.37	-	268.83	279.83	11.00	4.1%	
Materials Research (DMR)	338.75	338.78	0.63	-	339.41	350.41	11.00	3.2%	
Mathematical Sciences (DMS)	248.32	247.99	4.00	-	251.99	262.99	11.00	4.4%	
Physics (PHY)	309.89	308.90	4.23	-	313.13	324.13	11.00	3.5%	
Office of Strategic Initiatives (OSI) ³	169.50	169.20	48.45	2.50	220.15	315.10	97.45	44.8%	
Total	\$1,615.26	\$1,612.90	\$70.44	\$2.50	\$1,685.84	\$1,835.79	\$152.45	9.1%	

Source: Dec 7, 2023
C. Denise Caldwell



EPP Program in PHY at NSF

- Elementary Particle Physics (EPP) Program is in the PHY Division of MPS, both Experiment and Theory
- [EPP-Experiment](#) Program Directors: [Jim Shank](#), [Kaushik De](#)
 - Please reach out to us with any questions
- We provide overall support for the LHC and the HL-LHC
- EPP-Experiment divided into 3 subareas:
 - High Energy Physics (ATLAS, CMS, ...)
 - Precision Experiments (Neutrinos, LHCb, Rare-K, EDMs, ...)
 - Tools for Particle Physics (AI, Instrumentation, ...)
- [EPP-Theory](#) Program Director: [Keith Dienes](#)
- Funding opportunity – Division of Physics: Investigator-Initiated Research Projects (PHY) ([Proposal web site](#), Deadline Dec 3, 2024)



From P5 2023 Report



Recommendation 1

Not Rank-Ordered

As the **highest priority** independent of the budget scenarios, complete construction projects and support operations of ongoing experiments and research to enable maximum science. We reaffirm the previous P5 recommendations on major initiatives:

- a. **HL-LHC** (including ATLAS and CMS detectors, as well as Accelerator Upgrade Project) to start addressing why the Higgs boson condensed in the universe (reveal the secrets of the Higgs boson, section 3.2), to search for direct evidence for new particles (section 5.1), to pursue quantum imprints of new phenomena (section 5.2), and to determine the nature of dark matter (section 4.1).

Source: Dec 7, 2023
Hitoshi Murayama



NSF Investment in LHC and HL-LHC

- NSF continued its long history of support for LHC/HL-LHC in FY23
 - ATLAS, CMS, and LHCb
 - NSF is sole source of LHCb support in the US
 - Individual PI's, postdocs, and students supported for research through the EPP Program
 - For 2019-2022, as noted in 2023 COV, 65% of funding for ATLAS+CMS, 15% for LHCb, 15% for neutrinos, 5% other
 - Operations support for ongoing LHC Run 3 (including support for Software & Computing)
 - Upgrade construction support through MREFC
 - FY24 budget unknown, expect continued support



Additional Opportunities

- Proposals could be submitted to division-wide or directorate-wide solicitations. For example:
 - Faculty Early Career Development Program ([CAREER website](#))
 - Deadline July 24, 2024
 - Includes other criteria that must be addressed in the proposal
 - For development of instrumentation of up to \$4 M:
 - The Major Research Instrumentation (MRI) Program ([MRI Program Website](#))
 - Next Submission window: October 15, 2024 – November 15, 2024
 - Mid-Scale RI -- for projects > \$4 M ([NSF 22-637](#))
 - The NSF Mid-scale Research Infrastructure-1 Program (Mid-scale RI-1) supports either the design or implementation of unique and compelling RI projects.
 - Strongly advised to talk to an NSF Program Director before submission



Special Instructions/Opportunities

- Special instructions for PIs from RUI - [primarily undergraduate institutions](#): proposals should be submitted to general PHY solicitation on slide 5
- Supplements to existing NSF grants to fund a new graduate student.
 - Emphasis placed on “increasing the involvement by members of underrepresented groups”.
 - Apply anytime, fall preferred.
 - [“MPS AGEPE-GRS”](#) (only for allowed institutions).
 - [“PHY-GRS”](#) (similar, but for remaining institutions).
- For full list of all opportunities, see [talk by Jim Shank at HEPAP, Aug 7, 2023](#)



MPS-wide Opportunities

MPS Broadening Participation Programs

Mathematical and Physical Sciences Ascending Postdoctoral Research Fellowships (MPS-Ascend)

FY 23: 29 awards, including 24 to members of underrepresented groups.

Mathematical and Physical Sciences Ascending Faculty Catalyst Awards (MPS-AFCA) **New!**

Supports MPS-Ascending postdoctoral research fellows who transition into tenure track faculty positions

Launching Early-Career Academic Pathways in the Mathematical and Physical Sciences (LEAPS-MPS)

FY 23: 64 awards, including 53 Emerging Research Institutions and 22 MSIs.

MPS Partnerships Programs (PAARE; PREC; PREM; PREP; PRIMES)

Supports partnerships between minority serving institutions and MPS centers, institutes, and facilities. New NRT-PREM partnership granted 11 supplemental awards to existing awardees of NSF's Research Traineeship program (NRT) and Partnerships for Research and Education in Materials program (PREM).

Source: Dec 7, 2023

C. Denise Caldwell



Open for Questions

