

# National Science Foundation – Nuclear Physics



# The Mission (of the Non-Mission Agency)





- Established by Congress in 1950
- Supports all fields of fundamental science and engineering (medical science)
- Vison: A Nation that is the global leader in research & innovation

\*NSF Strategic Plan for 2018 – 2022

Photo Credit: Maria Barnes, NSF

**July 2021** 

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# **NSF Nuclear Physics**

Supports the broad study of nuclear constituents within atoms and nuclei to the reactions in stars burning throughout the universe, as understood through the strong and electroweak interactions.

- Nuclear and hadron QCD
- Nuclear astrophysics, reactions, and structure
- Nuclear precision measurements of fundamental symmetries and constants
- National Superconducting Cyclotron Laboratory
- University labs (FSU & UND)
- Nuclear Theory & Theory Hubs
- Co-review and co-funding with other NSF programs







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# Proposal Trends in Experimental Nuclear Physics







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# **Funding Opportunities**



#### PHY Investigator Initiated Research NSF 21-593

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

- Deadlines: First Tuesday in December for *Experimental & Theoretical Nuclear Physics* → December 7, 2021 5 pm in your home institution's time zone
- Collaborators and Other Affiliations Template: list those people with whom you have actively collaborated in last 48 months – not everyone in the collaboration. Do not use collaboration url. Questions – contact cognizant program director.
- Follow instructions that are specific to this solicitation; non-compliant proposals may be returned without review
- Must conform to the NSF Proposal & Award Policies & Procedures Guide (PAPPG) <u>https://www.nsf.gov/pubs/policydocs/pappg22\_1/index.jsp</u>

Follow the Proposal Preparation checklist

# **PHY Mid-scale Instrumentation**



- Design and Construction or Acquisition of Instrumentation
   R & early D, operations *funded by research programs*
- ~ \$4M < TPC < ~ \$20M; over multiple years</li>
- Selection based on
  - o merit review
  - exceptional opportunity
  - o research community priorities.
- Currently 3 ENP Midscale projects (nEDM, LEGEND-200, MOLLER)

March 2021

For more info, see PHY Solicitation





# Research at Undergraduate Institutions (RUI) andResearch Opportunity (ROA) AwardsNSF 14-579

RUI and ROA funding opportunities support research by faculty members at **Predominantly Undergraduate Institutions (PUIs)**.

- RUI proposals support PUI faculty in research that engages them in their professional field(s), builds capacity for research at their home institution, and supports the integration of research and undergraduate education.
- ROA proposals support PUI faculty research, but these awards typically allow faculty to work as visiting scientists at research-intensive organizations where they collaborate with other NSF-supported investigators.
- Proposal deadlines are the same as ENP and NT (7-dec-2021).
- Contact ENP and NT program directors for information.

Fall 2020

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# PHY DCL: Growing a Strong, Diverse Workforce NSF 21-065

PHY-GR Supplements – emphasis on URMs in STEM fields

- Graduate Student Eligibility
  - Not currently supported by federal government (NSF, DOE, NIH, ...)
  - o US Citizen, US National, or US Permanent Resident
- Stipend, tuition, benefits, and IDC (~\$60k)
- Renewable up to two times, no deadline for submission however, early submission suggested

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#### REU Supplements – emphasis on URMs in STEM fields

• US Citizen, US National, or US Permanent Resident

# LEAPS and ASCEND MPS intends to renew these in FY22



#### LEAPS: Launching Early-Career Academic Pathways in MPS

- Designed to launch careers of pre-tenure faculty in MPS fields at minority-serving institutions (MSIs), predominantly undergraduate institutions (PUIs), and Carnegie Research 2 (R2) universities with the goal of achieving excellence through diversity
   Due date = 14-jun-2021 Awards = 24 months, up to \$250k
- ASCEND Postdoctoral Research Fellowships
- Goal: to support Postdoctoral Fellows who will broaden the participation of groups that are underrepresented in Mathematical and Physical Sciences (MPS) fields in the U.S.

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- And to prepare PD Fellows to transition from a postdoctoral position into the first few years of an academic faculty position
- Fellowships are awards to individuals, not institutions, and are administered by the Fellows
- Due date = 15-jun-2021

\$100k/year for up to 3 years

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## **NSCL ReA6 Upgrade Completed**

- Coupling between ReA3 and ReA6 completed
- ReA6 Cryomodule cooled down to 4.5K and operating at full field
- First ReA6 experiment started 12 May 2021



ReA?



Lynx

## NSF FY21 Budget Appropriations \$ in () = FY21 amounts



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# **COVID Relief Bill**



- \$600 million for the National Science Foundation to "fund or extend new and existing research grants, cooperative agreements, scholarships, fellowships, and apprenticeships, and related administrative expenses to prevent, prepare for, and respond to coronavirus."
- PHY set aside funding for supplements to existing PHY awards to help address the needs of those PIs, postdocs, and students disproportionately impacted by the pandemic with the goal of maintaining a robust scientific workforce.

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Approximately \$1.5M in supplements to Nuclear Physics awards



National Science Foundation

#### FY 2022 BUDGET REQUEST TO CONGRESS



- Enhance fundamental research and development;
- Address racial equity in science and engineering;
- Address climate science and sustainability research;
- Strengthen U.S. leadership in emerging technologies; and
- Construct additional major research facilities.

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## FY22 President's Budget Request – NSF \$ in () = FY21 estimates



- Impressive increase
- Details are complicated

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\* Figures account for consolidation of the Graduate Research Fellowship Program budget in the EHR Directorate.

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## FY22 President's Budget Request – Directorates \$ in () = FY21 estimates



\* The Engineering Directorate topline excludes programs that NSF proposes to transfer to the Technology Directorate.



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# NSF and DOE Coordination in Nuclear Physics

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- MOLLER parity violating Moller (elastic e e) scattering
   DOE CD-1 Dec 2020
- NSE Diverse of NSF
   NSF responds to proposals with no guarantee of NSF
   EIC
   D participation in a future mission-driven project D participation in a future fully and enthusiastically
   Pi but we are listening carefully and enthusiastically
  - Next Generation  $0\nu\beta\beta$ 
    - Prior NSF support: CUOREcino, CUORE, MJD, EXO-200, KamLAND-Zen, NEMO, ...
    - $_{\text{O}}\,\text{DOE}\,0\nu\beta\beta$  portfolio review



# **NSF/PHY: Summary**



- Recent fiscal years have been challenging
- And the physics has been compelling
- NSF-wide priorities offer opportunities for nuclear physics
  - Mid-scale programs (NSF wide and within PHY)
  - Windows on the Universe
  - o Quantum Leap
  - Al Institutes
- NSF Nuclear Physics continually works on programmatic balance

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- University labs, large groups, single PIs
- Research scope
- o Risk

# **NSF/MPS/PHY Personnel**



- Sethuraman Panchanathan Director (as of 23-jun-2020)
- Sean L. Jones Assistant Director for MPS
- Denise Caldwell Physics Division Director
- Jean Cottam Alan Deputy Division Director
- Bogdan Mihaila Nuclear Theory Program Director
- Jim Thomas Expt'l Nuclear Physics Program Director
- Allena Opper Expt'l Nuclear Physics Program Director



www.nsf.gov/pubs/2019/phy19001/phy19001.jsp www.nsf.gov/careers/rotator

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For the latest updates: https://www.nsf.gov/physics

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Physics (PHY)	Physics (PHY) PHY Replaces DCL with Solicitation NSF 14-576	Email 🗙 Print 🛄 Share 🛖
PHY Home About PHY Funding Opportunities Awards News Events Discoveries Publications Career Opportunities	The Physics Division has issued a solicitation ( <u>NSF 14-576</u> ) 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 ( <u>NSF 14-009</u> ) 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.	
Facilities and Centers PHY Program Director Jobs See Additional PHY Resources View PHY Staff Search PHY Staff		
MPS Organizations	MPS Alliances for Graduate Education and the Professoriate - Graduate Research Supplements (AGEP-GRS) Dear Colleague Letter (NSF 13-071)	
Chemistry (CHE) Materials Research (DMR)	Dear Colleague Letter - Announcement of Instrumer Instrumentation for FY2014 Awards in Physics Divisi	ntation Fund to Provide Mid-Scale on (NSF 13-118)



