



NATIONAL SCIENCE FOUNDATION
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NSF 22-097

Dear Colleague Letter: Partnership in Experimental Elementary Particle Physics and STEM Education Research to Promote Broadening Research Participation

June 17, 2022

Dear Colleagues:

BACKGROUND

NSF's Physics Division (PHY) supports research at the Large Hadron Collider (LHC) at CERN, the European Organization for Nuclear Research, through Cooperative Agreements that fund operation, maintenance, and major upgrades of the [ATLAS](#) (A Toroidal LHC Apparatus) and [CMS](#) (Compact Muon Solenoid) detectors. PHY also funds physics research using these detectors through individual grants. Part of PHY's mission¹ is to support fundamental research across the intellectual frontiers of physics and to enhance education at all levels through integration of education and research.

NSF's Division of Undergraduate Education (DUE) promotes excellence in undergraduate science, technology, engineering, and mathematics (STEM) education for all students. One component of DUE's mission² is to fund research on students' STEM learning, research on STEM learning environments, and research on broadening participation in STEM. DUE's programs support efforts to design, develop, and implement high-quality educational experiences, coupled with scientific research to understand the effectiveness and impacts of those experiences.

NSF has agency-wide goals of increasing the diversity of STEM communities, broadening participation in research, and increasing the diversity, quantity, and quality of the next generation of STEM professionals who enter the workforce with two- or four-year degrees or who continue their studies in graduate and professional schools.

CALL FOR PROPOSALS

With this Dear Colleague Letter (DCL), PHY and DUE encourage proposals that involve collaboration between an experimental physicist(s) involved in research with the ATLAS or CMS detector and an educator(s) conducting research in STEM education. This partnership between the investigators should enable them to concurrently carry out research in experimental elementary particle physics (EPP) and advance educational practice and education research at the undergraduate (college/university) level within state-of-the-art research environments in physics. NSF is especially interested in receiving proposals from collaborations that have these goals and expected outcomes:

- Exhibit strong intellectual merit for both the experimental particle physics research and the STEM education research at the undergraduate (college/university) level,
- Strengthen diverse participation in physics research, and
- Increase the diversity, quantity, and quality of the next generation of STEM professionals.

All proposals will be peer-reviewed by a panel of physics and STEM education researchers against NSF's two standard review criteria:

Intellectual Merit: The proposed work has the potential to advance knowledge in both EPP and STEM education; and

Broader Impacts: The proposed work has the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

This is a pilot initiative. It is anticipated that no more than two projects will be funded in FY 2023.

PROPOSAL PREPARATION INSTRUCTIONS

This DCL does not constitute a new competition or new program. Interested proposers should prepare and submit proposals in accordance with the instructions in the Division of Physics: Investigator -Initiated Research Projects (PHY) program solicitation ([NSF 21-593](#)) and the *NSF Proposal & Award Policies & Procedures Guide* ([PAPPG](#)). Proposals should be submitted to the deadline for the "Elementary Particle Physics – Experiment" Program. When preparing the proposal, select [NSF 21-593](#) as the Funding Opportunity, MPS as the Directorate, PHY as the Division, "HEP–High Energy Physics" as the Program, and "Research" as the Type of Proposal. Begin the proposal title with "Partnership in EPP and STEM Ed Research." After submitting the proposal, please alert both NSF points of contact listed below by email.

NSF is particularly interested in proposals that exhibit the following characteristics:

- They involve genuine collaborations between physics and education researchers to achieve synergistic outcomes that are greater than those that would be realized from separately funding independent activities in experimental particle physics and education research. The Project Description should provide a clear statement of the activities to be undertaken for both the EPP and STEM education research. It should describe the objectives for the period of the proposed work and their expected significance; the relationship of the proposed work to the present state of knowledge in the fields of EPP and STEM education research; and the relationship of the proposed work to the investigators' other research in progress. The PI/Co-PI team should include one person from the EPP experiment community and one person from the DUE STEM education community.
- They request equal, or nearly equal, divisions of the proposed budget between the physics researchers and the education researchers, and they request a total budget of \$500K or less. Budgets should be well-justified for the scope of the activities. The Budget Justification should also clearly show the breakdown of resources by project area to assure balance between the physics and education research.
- They propose work plans of no more than three years.

Prospective PIs are encouraged to contact one or both of the program directors listed below

POINTS OF CONTACT

James Shank
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Directorate for Education and Human Resources (EHR)
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Sincerely,

Sean L. Jones
Assistant Director for Mathematical and Physical Sciences

Sylvia M. Butterfield
Acting Assistant Director for Education and Human Resources

REFERENCES

¹A complete description of PHY goals is at: <https://www.nsf.gov/mps/phy/about.jsp>

²A complete list of DUE goals is at: <https://www.nsf.gov/ehr/duel/about.jsp>