U.S. DEPARTMENT OF ENERGY | Office of Science

Introducing DOE EPSCoR

High Energy Physics Advisory Panel

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DOE EPSCoR Program History

- Initial DOE funding in FY 1991
- Authorization: Energy Policy Act of 1992, codified at 42 U.S.C. §§ 13503(b)(3)(A) (P. L. 102-486, Sec. 2203)
- Transition to Basic Energy Sciences FY 1996 (H. Rpt. 109-275)
  - Increased focus on strengthening research capabilities relevant to energy research
  - Program management at the same technical level as other BES programs
- Name change from the Experimental Program to Stimulate Competitive Research to the **Established Program to Stimulate Competitive Research**
  - In response to language accompanying the American Innovation and Competitiveness Act (S. Rpt. 114-389) in December 2016

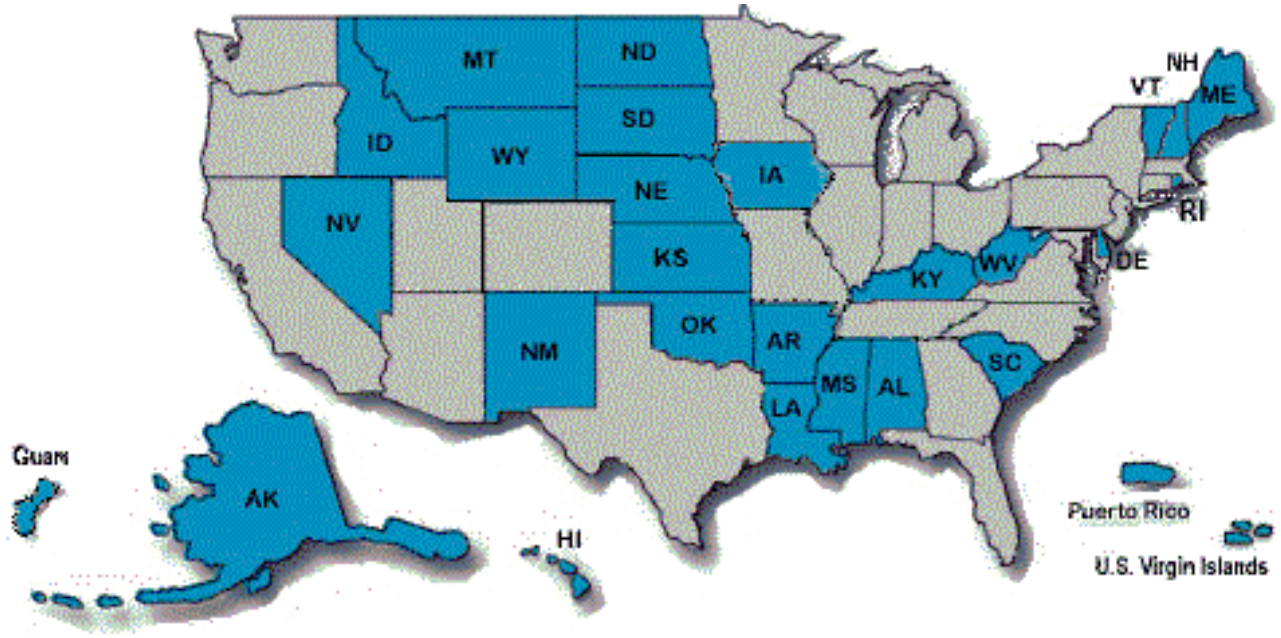
DOE EPSCoR – Overview

- The DOE EPSCoR Program seeks to:
  - Enhance the research capabilities of designated states
  - Support competitive energy-related research
  - Develop science and engineering personnel to meet current and future needs in energy-related areas
- The program is proactively managed with four award modalities
  - EPSCoR Implementation Grants (up to $2.5M/year, 2-years per award with up to 2 renewals)
  - EPSCoR State – National Laboratory Partnerships (~$250K/year for 3 years)
  - Participation in DOE Office of Science Early Career Research Program (Annual FOA)
  - Co-funding of new or renewal Office of Science grant awards
- All awards are selected based on peer review

DOE EPSCoR – Overview (continued)

- DOE EPSCoR emphasizes early-stage research that supports DOE's science and energy mission programs that will:
  - Improve the capability of designated states and territories to conduct sustainable and nationally competitive scientific and energy-related research
  - Jumpstart research capabilities in designated states and territories through training of scientists and engineers in energy-related areas
  - Build beneficial relationships between scientists and engineers in the designated jurisdictions with world-class laboratories managed by the DOE, leveraging DOE national user facilities and taking advantage of opportunities for intellectual collaboration across the DOE system
- Through broadened participation, DOE EPSCoR seeks to augment the network of energy-related research performers across the Nation

DOE EPSCoR – Eligibility based on NSF Assessment



- Basis: NSF funding per jurisdiction. Jurisdictions receiving 0.75% or less of the total available funding are eligible to compete for EPSCoR funds.

- DOE follows NSF eligibility criteria. Current total DOE/NSF eligible entities: 25 states, Guam, Puerto Rico, and the US Virgin Islands.
- Eligibility has varied over time with Missouri, Tennessee and Utah having been eligible in the past decade or so. Changes in eligibility are posted by NSF annually.

EPSCoR Implementation Grants

- Funding Opportunity Announcements in alternate years: Most recently in FY 2019 and FY 2021; next announcement anticipated in FY 2023
- Initial awards of up to $1,500,000 per year for two years. Maximum funding of $2,500,000 per year for renewal applications for up to six years total support
- Closely focused research effort (group of scientists working on a common theme) per application
- Applicants may propose nominal human resource development activities coupled with research cluster
- Additional review criterion: Synergism among the PIs/Programmatic Focus and Likelihood of success of the Implementation Award
- Funding is provided only to institutions in EPSCoR jurisdictions
  - DOE National Labs are not eligible for funding

EPSCoR State – National Lab Partnership Grants

- Funding Opportunity Announcements in alternate years: Most recently in FY 2018, 2020 and FY 2022
- Maximum funding of $750,000 over three years (all to EPSCoR university PIs, no funds to DOE national laboratories)
- One three-year grant per topic per PI (not renewable)
  - Encourage follow-up grant applications to core DOE Program identified in EPSCoR application
- Promotes interactions between the EPSCoR Community and unique scientific capabilities at the DOE National Laboratories in conducting collaborative research and training students
- Visit(s) by Lab scientist to EPSCoR states encouraged
- Proposal originated by individual university PI
- Additional review criterion: Likelihood of success of the collaboration between the EPSCoR Applicant and the National Laboratory Partner

Diversity, Equity, and Inclusion are Factors in EPSCoR Award Selections

- From FY 2022 FOA:

  DOE is committed to promoting the diversity of investigators and institutions it supports, as indicated by the ongoing use of program policy factors in making selections of awards. To strengthen this commitment, DOE encourages applications led by Minority Serving Institutions (MSIs) that are underrepresented in the BES portfolio and applications led by individuals from groups historically underrepresented in STEM. In addition, applications are encouraged from multi-PI and multi-institutional teams that include the participation of MSIs that are underrepresented in the BES portfolio as well as researchers from groups historically underrepresented in STEM.

- For final selections, program selection factors address diversity:
  - Promoting the diversity of supported investigators
  - Promoting the diversity of institutions receiving awards

- DEI will be strengthened in FY 2023 FOAs with inclusion of Promoting Inclusive and Equitable Research (PIER) Plans and an explicit review criterion focused on these plans.

Program Office Engagement in DOE EPSCoR Awards

- DOE program offices provide co-funding* for EPSCoR FOA awards
  - Concrete measure of DOE mission relevance
  - Promotes engagement of the PI in programmatic activities (e.g., PI meetings) to promote a pathway to follow-on funding outside of EPSCoR
- Program office engagement
  - DOE program offices are involved in review of pre-applications and in identification of peer reviewers for applications
  - Partnering program offices are requested to invite and involve EPSCoR PIs/Co-PIs in program meetings that involve program PIs
  - Subsequent support after the completion of an EPSCoR award follows normal program competitive solicitation processes

* 10% total co-funding requested. Multiple offices may partner on co-funding.

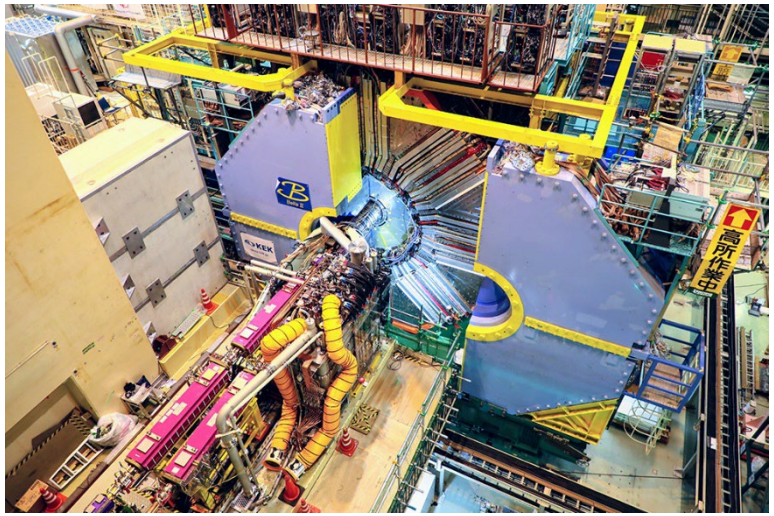
DOE EPSCoR Awards in High Energy Physics

Program Area Institution	**Title**	**Principal Investigator**
Early Career Research Program		
Kansas State University	Robust Dark Energy Constraints with Dark Energy Spectroscopic Survey	Samushia, Lado
Boise State University	Realizing the constraining power of galaxy clusters on cosmic acceleration: from DES to LSST	Wu, Hao-Yi
EPSCoR State National Laboratory Partnerships		
University of Kansas	Searching for The Nature of Dark Matter and Dark Energy	Lewis, Ian
University of Mississippi	CP violation searches and distributed computing development with the Belle II experiment at the University of Mississippi and Brookhaven National Lab	Bennett, Jake

World-Lealding Precision Measurements with the Belle II Detector at the SuperKEKB Collider

PI: Jake Bennett (University of Mississippi)

The Belle II experiment



The Belle II experiment at the SuperKEKB accelerator facility is able to make extremely precise measurements of particle interactions. Collisions of electron and positron beams create a high-energy environment needed to produce particles that do not otherwise exist in nature.

Work was performed at the University of Mississippi and Brookhaven National Laboratory and supported by DOE EPSCoR award DE-SC0021274

F. Abudinen et al. (Belle II Collaboration), "Measurement of the Λ_c^+ lifetime", arxiv:2206.15227 (Accepted at **PRL**).

Scientific Achievement

Using the new, state-of-the-art detector, a world-leading measurement of the Λ_c^+ particle was reported by the Belle II experiment.

Significance and Impact

Precise measurements of particle lifetimes allow for stringent tests of theoretical predictions, which can be used to inform searches for physics beyond the Standard Model of particle physics.

Research Details

- Measurement of the lifetime of the Λ_c^+ charmed baryon using the weak decay $\Lambda_c^+ \to p\mathrm{K}^-\pi^+$
- This world-leading result was made with a small fraction of the data sample to be collected at Belle II and shows the ability of the detector and software to make precision measurements
- This measurement is highly sensitive to, and therefore provides a probe of, the calibration and alignment of detector components
- Measurement was aided by improved vertex resolution (~2x better than Belle/BaBar) in part due to pixelated silicon vertex detectors and the very small beam size achieved at SuperKEKB

Thank you.

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