U.S. DEPARTMENT OF ENERGY | Office of Science

# Informational Webinar:

# Established Program to Stimulate Competitive Research (DOE-EPSCoR) – Implementation Grants

## Funding Opportunity Announcement (FOA): DE-FOA-0002913

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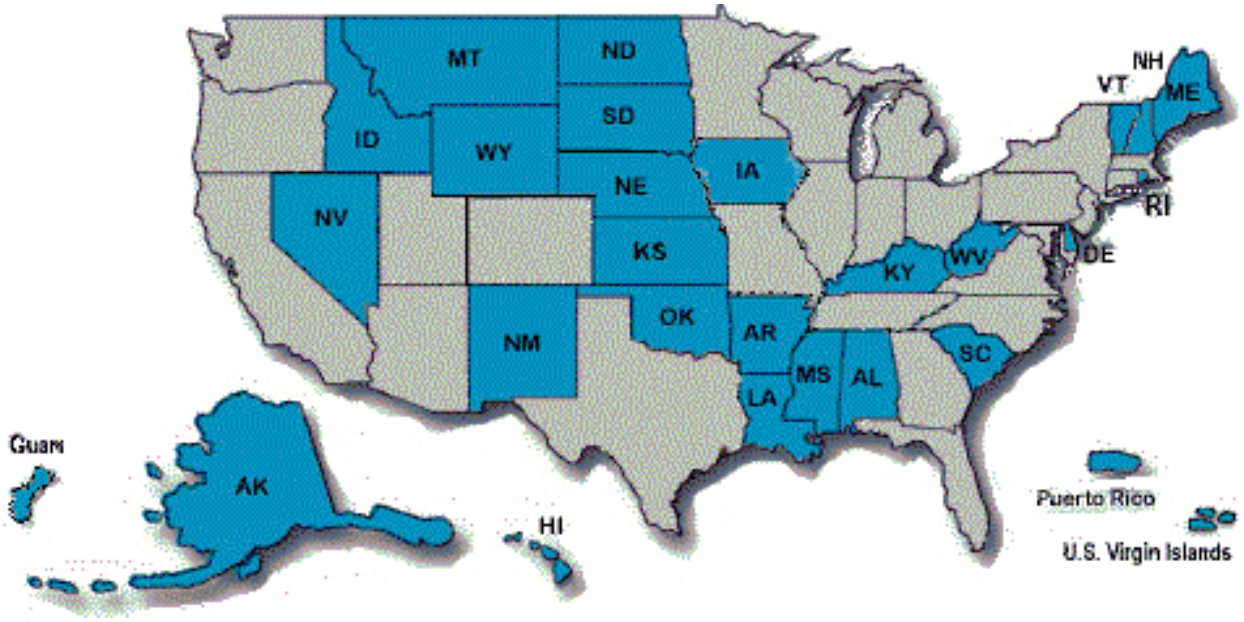
|---|---|
| FOA Issue Date | 12/14/2022 |
| Submission Deadline for Pre-Applications | 01/25/2023 at 5:00PM Eastern Time<br>A Pre-Application is required |
| Submission Deadline for Applications | 04/04/2023 at 11:59PM Eastern Time |

*Andrew Schwartz and Tim Fitzsimmons*
*Office of Basic Energy Sciences*
*January 5, 2023*

**Disclaimer**: This presentation summarizes the contents of the FOA. Nothing in this webinar is intended to add to, take away from, or contradict any of the requirements of the FOA. If there are any inconsistencies between the FOA and this presentation or statements from DOE personnel, the FOA is the controlling document.

# DOE EPSCoR – Eligibility

- DOE follows NSF eligibility criteria.
- Basis: Five year running average of NSF funding per jurisdiction. Jurisdictions receiving 0.75% or less of the total available funding are eligible to compete for EPSCoR funds.




- 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.

# DOE EPSCoR – Goals

- 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

# EPSCoR Implementation Grants

- Biennial Funding Opportunity Announcements for Implementation Grants (smaller EPSCoR State-National Lab Partnership grants in alternate years)
- 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 researchers working on a common theme
- Review criteria: In addition to the Office of Science standard criteria reviewers are also asked to assess "Synergism among the PIs/Programmatic Focus and Likelihood of success of the Implementation Award"
- Funding is provided only to institutions in EPSCoR jurisdictions (excluding DOE National Labs)

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

- From 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.

- Program policy factors include the following:
  - 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 awards
  - Ensures 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

* Typically, ~10% total co-funding. Multiple offices may partner on co-funding.

# The Office of Science Research Portfolio

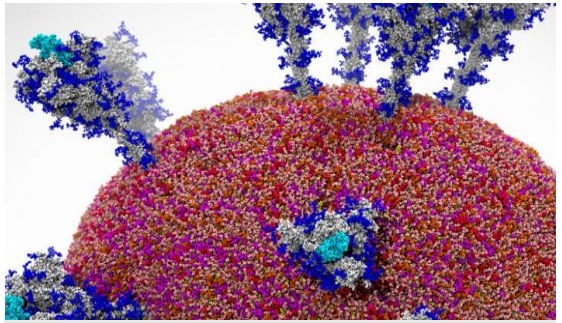
| | |
|---|---|
| **Advanced Scientific Computing Research** | • Delivering world leading computational and networking capabilities to extend the frontiers of science and technology |
| **Basic Energy Sciences** | • Understanding, predicting, and ultimately controlling matter and energy flow at the electronic, atomic, and molecular levels |
| **Biological and Environmental Research** | • Understanding complex biological, earth, and environmental systems |
| **Fusion Energy Sciences** | • Supporting the development of a fusion energy source and supporting research in plasma science |
| **High Energy Physics** | • Understanding how the universe works at its most fundamental level |
| **Nuclear Physics** | • Discovering, exploring, and understanding all forms of nuclear matter |
| **Isotope R&D and Production** | • Supporting isotope research, development, production, processing and distribution to meet the needs of the Nation |
| **Accelerator R&D and Production** | • Supporting new technologies for use in SC's scientific facilities and in commercial products |

# Advanced Scientific Computing Research (ASCR)

- ASCR research lays the groundwork for scientific discoveries
  - **Applied Mathematics and Computer Science foundations** to advance the understanding of natural and engineered systems and to reveal scientific insight from high end simulations, models, and data.
  - **Advanced Computing** to prepare for the future of science based on emerging advanced computing technologies and microelectronics.
- ASCR facilities drive American global leadership in computing, data and networking
  - As we deploy the world's first **exascale supercomputers** and the Nation's most **advanced scientific network**, we continue to build a more integrated and open national research infrastructure for all.
- ASCR's investments and strategic partnerships enable scientific breakthroughs and advance America's economic competitiveness
  - ASCR's world-leading programs in **interdisciplinary research** enable scientific applications take full advantage of computing and networking capabilities that push the frontiers.
  - Unique models of partnerships accelerate the competitiveness of **American computing technologies, advanced manufacturing,** and **high-tech companies -** large and small**.**
- ASCR invests in people
  - **Computational Science Graduate Fellowship** – producing computational leaders since 1991.

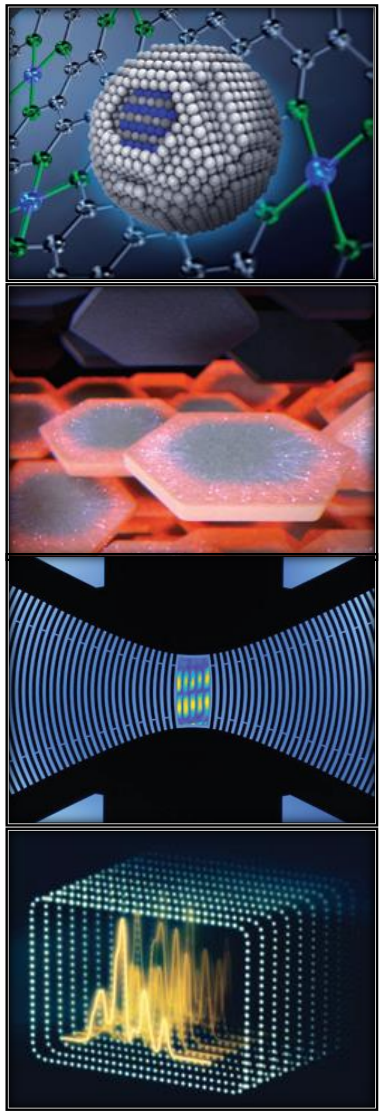
Leadership Computing


Quantum Testbeds


Gordon Bell Prize researchers leverage modeling and AI to understand COVID mutations

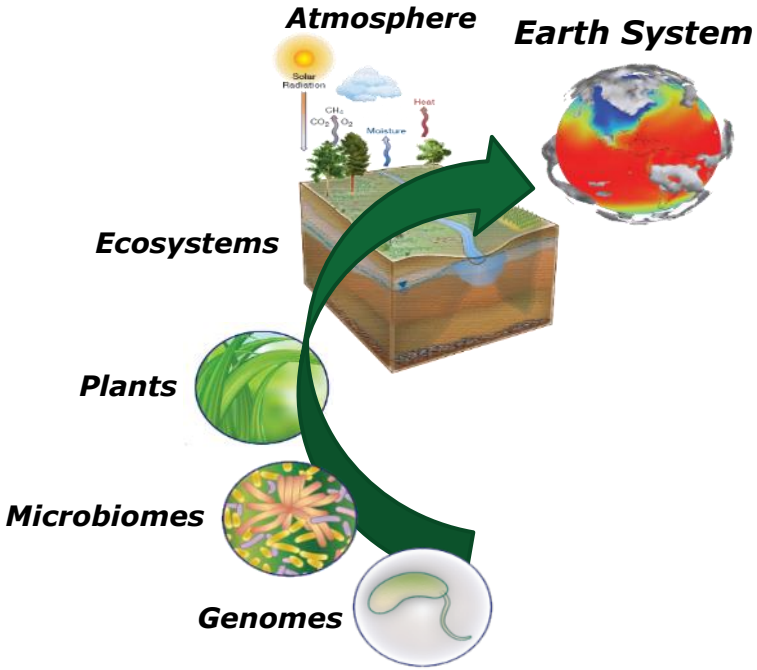
# Basic Energy Sciences (BES)

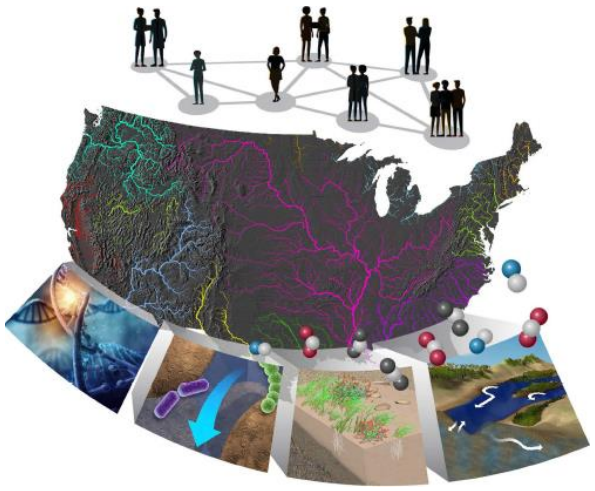
- BES supports discovery science and use-inspired research to solve the challenges facing today's advanced technologies for energy, manufacturing, medicine, and national priorities. BES provides:
  - A **vibrant community of academic and national laboratory researchers** who focus on understanding materials and chemical sciences at the atomic and molecular scales
  - **Cutting-edge scientific facilities** with specialized, state-of-the-art instrumentation such as advanced x-ray light sources, neutron scattering sources, and nanoscale science research centers that are used by **thousands of scientists from many fields**
- BES-supported discoveries drive U.S. leadership in science, sustain innovation across diverse technologies and improve economic and national security.
  - **Foundational scientific understanding** of chemical and materials processes starting at the level of electrons is essential for advancing energy, transportation, chemical, manufacturing, quantum information science, and microelectronics technologies.
  - Continuous progress in basic science is critical to **sustaining U.S. innovation and competitiveness**.
  - Some of the toughest challenges are being tackled by **collaborative teams with diverse skills** at the BES-supported Energy Innovation Hubs and Energy Frontier Research Centers.



# Biological and Environmental Research (BER)

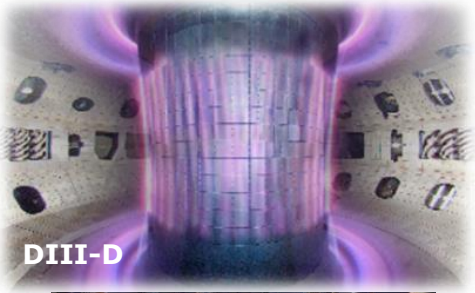
- BER research initiated the human genome project and pioneered research that led to climate and Earth system models.
  - The biology portfolio is using genomics to lay the groundwork for a **thriving bioeconomy** based on sustainable biofuels and bioproducts.
  - The Earth and environment portfolios are adopting AI, machine learning, and exascale-class computing to enhance predictability from local urban scales that include disadvantaged communities, to global scales, for a variety of **energy and environmental issues** of national importance.
- The better we understand how complex Earth and environmental systems work, and can predict their behavior, the more we can harness that knowledge to transform our lives.
  - Through insights gained from genome-enabled research of plants and microbes, BER is advancing the **understanding and design** of new biological systems for sustainable bioenergy and bioproduct production.
  - BER Earth and environmental research explores the science of the atmosphere, oceans, land systems, and cryosphere, how they combine with advanced analytics and DOE's fastest computers to **accurately model the Earth system**.
  - Both efforts are integral to a broad-based effort to **sustain the Earth system** as a habitable environment for humanity into the future.
- To enable these efforts, BER supports three DOE Office of Science user facilities with unique **world-class scientific instruments and capabilities** that are available to the research community.
  - DOE Joint Genome Institute (JGI), Atmospheric Radiation Measurement (ARM) user facility, Environmental Molecular Science Laboratory (EMSL)



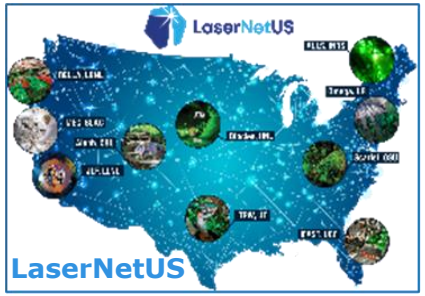



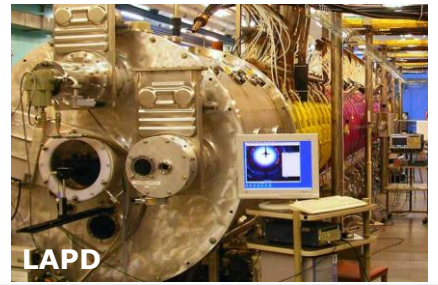
# Fusion Energy Sciences (FES)

- FES program aims to expand the fundamental understanding of plasma and its interactions at very high temperatures and densities to build the scientific foundation needed to **develop fusion as an energy source** that has the potential to provide limitless, carbon-free, clean energy, inherently safe, and without the production of long-lived radioactive waste.
- Among FES priorities are the science and technology needs for the design basis of a **Fusion Pilot Plant**. Currently, FES invests in flexible U.S. experimental facilities of various scales, international partnerships leveraging U.S. expertise, large-scale numerical simulations based on experimentally validated theoretical models, development of advanced fusion-relevant materials, future blanket concepts and tritium fuel cycle, etc.
- FES also supports **partnerships with the private fusion sector** to accelerate progress toward the development of fusion energy, consistent with the Administration's **Bold Decadal Vision** for commercializing fusion energy. FES invests in transformational technologies such as AI/ML, fundamental science to transform advanced manufacturing, microelectronics, and quantum information science (QIS), that have the potential to accelerate progress in several mission areas.
- FES supports research in the following areas*
  - **Burning Plasma Science**
    - Foundations— (a) Advanced Tokamak, (b) Enabling Research and Development, (c) Spherical Tokamak, and (d) Theory & Simulation
    - Long Pulse— (e) Tokamak, (f) Stellarator, (g) Materials, and (h) Fusion Nuclear Science
  - **Discovery Plasma Science**
    - (i) Plasma Science and Technology – General Plasma Science (GPS) and High Energy Density Laboratory Plasma (HEDLP), and (j) Measurement Innovation





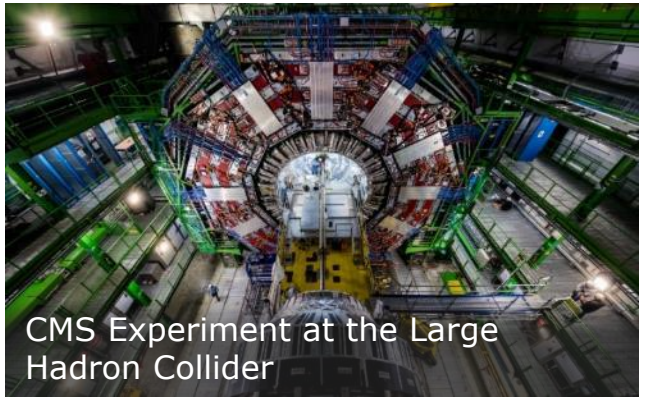


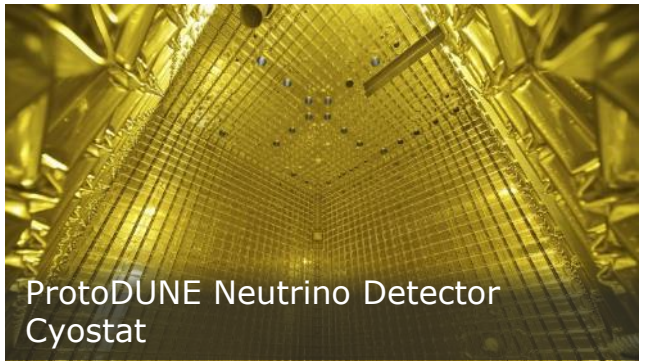




*as listed in the FY23 SC Open call.

# High Energy Physics (HEP)

- Particle physics explores what the world is made of and how it works at the smallest and largest scales.
  - It seeks new discoveries from the **tiniest particles** to the **outer reaches of space**: What is the Universe made of? What forces govern it? How did it become the way it is today?
  - Finding these answers requires the combined efforts some of the largest international **scientific collaborations** in the world, using some of the most sensitive detectors in the world, at some of the largest scientific machines in the world.
- The quest to understand our world inspires young minds, trains an expert workforce, and drives innovation that improves the nation's health, wealth, and security.
  - Particle physicists develop **new tools and technology** that in turn improve medical diagnosis, medicine development, national security, big data computing, and industrial manufacturing.
  - Advancing **microelectronics, accelerators, and detectors** together with **Quantum Information Science** provides opportunities for new insights and approaches.
- Five compelling, intertwined lines of inquiry show great promise for discovery over the next decade.
  - The **Higgs boson**, discovered in 2012, is a new tool for discovery.
  - The puzzling physics of ghostly, very low-mass **neutrinos** is being probed.
  - Experiments seek to identify the physics of **dark matter**.
  - Observations of the Universe aim to reveal the causes of **cosmic acceleration**, such as dark energy and inflation.
  - Experiments also **explore the unknown** for new particles, interactions, and physical principles.

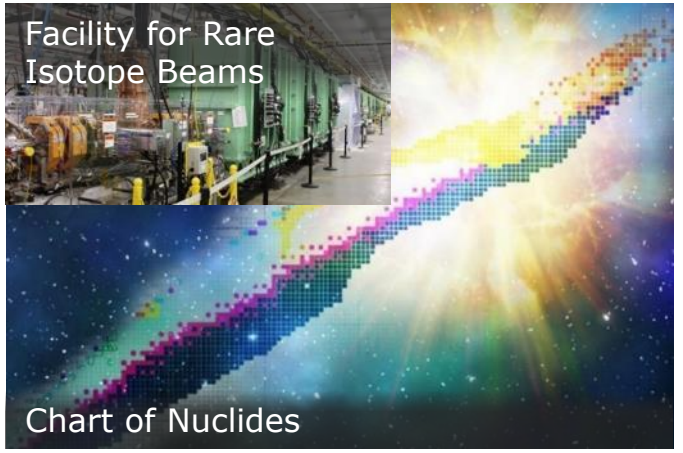

CMS Experiment at the Large Hadron Collider

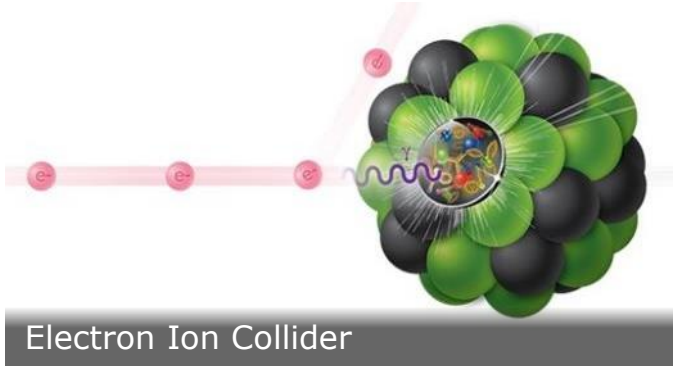

ProtoDUNE Neutrino Detector Cyostat


DESI Experiment at Kitt Peak

# Nuclear Physics (NP)

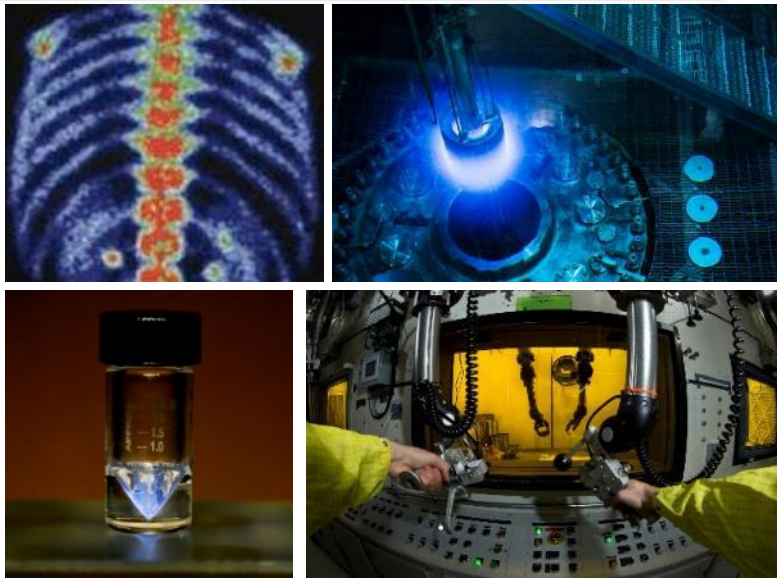
- Nuclear physics seeks to discover, explore, and understand all forms of nuclear matter.
  - The aim is to understand why matter takes on the specific forms observed in nature: How did **visible matter come into being** and how does it evolve? How does **subatomic matter organize** itself and what phenomena emerge? Are the fundamental interactions basic to the **structure of matter** fully understood?
  - To accomplish its mission, NP stewards operations at multiple national **accelerator user facilities**.
- The quest to understand all forms of nuclear matter inspires brilliant scientific minds and benefits society in the areas of energy, commerce, medicine, and national security.
  - Students trained in Nuclear Physics are in **high demand.**
  - They **bring expertise** in nuclear science, accelerator physics, real-time signal processing, high-performance computing, cryogenics, quantum simulators, quantum sensors, AI/ML, lasers, atomic traps, nuclear technology, and particle detection technologies.
- To maintain U.S. leadership, NP builds advanced instrumentation and new tools such as the Facility for Rare Isotope Beams (FRIB) and the future Electron-Ion Collider (EIC).
  - FRIB will uniquely afford access to eighty percent of all isotopes predicted to possibly exist in nature, including over 1,000 **never produced on Earth**.
  - The EIC will provide unprecedented ability discover how the **mass of everyday objects** is dynamically generated by the interaction of quarks and gluons inside protons and neutrons.

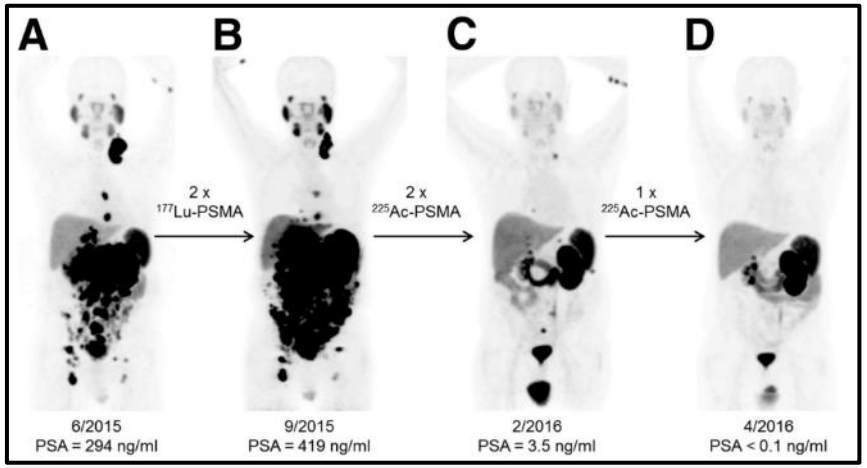



# Isotope R&D and Production (DOE IP)

- **Isotopes** have unique properties that make them useful in medicine, nuclear batteries, clean energy, basic research, and national security.
  - Isotopes of an element have the same number of protons, electrons, and same chemical properties but **differ in the number of neutrons**.
  - Stable and very long-lived unstable isotopes exist in nature and can be **enriched**, or extracted and purified based on their mass. **Short-lived unstable (or radioactive) isotopes are created** in nuclear reactors and particle accelerators.
- DOE IP researches and develops **new isotope production techniques** of critical radioactive and stable isotopes for the nation.
  - Radioactive and stable isotopes are required for **advancement in basic research** (including QIS), **medical applications** (diagnostic imaging, cancer therapies, infectious diseases), **commercial applications** (energy exploration), **national security** (threat detection, nuclear forensics), **space exploration** (long lived power sources), and other applications.
  - As the only Mission Essential Function within the Office of Science, part of DOE IP's mission is to ensure robust domestic isotope supply chains to reduce U.S. dependency on foreign supply to maintain national preparedness.
- Leveraging the reactor, accelerator, enrichment and isotope processing expertise at the DOE national labs and universities, IP scientists are delivering isotopes for **medical research** on new **diagnostic and therapeutic applications**.
  - Applications include targeted cancer therapy research using short lived radioisotopes such as actinium-225, copper-67 and astatine-211.



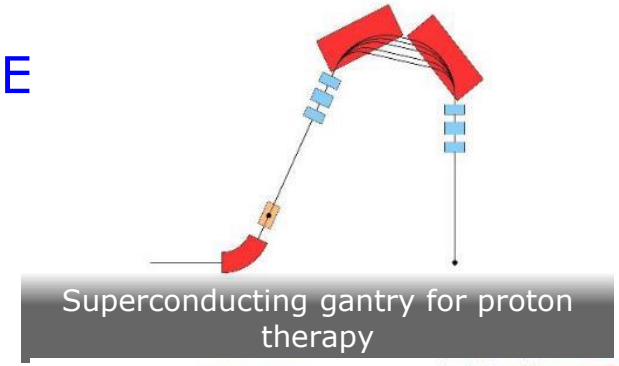


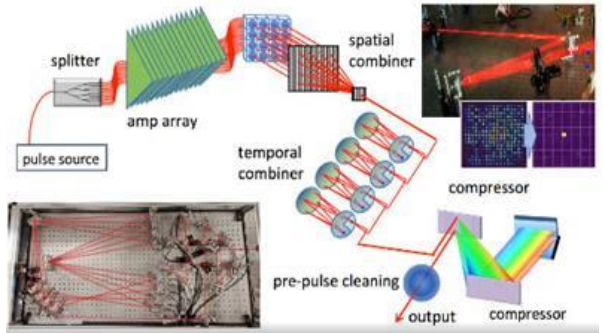

Effective response of a prostate cancer patient to $^{225}$Ac-PSMA-617 treatment

# Accelerator R&D and Production (ARDAP)

- **ARDAP supports fundamental accelerator science and technology development of relevance to many fields**
  - Cross-cutting basic R&D for science
    - High power ultrafast laser technology
    - New accelerator technology for scientific facilities
  - Develop innovative solutions to critical problems outside of the DOE Office of Science
    - Compact accelerators for medicine and security
    - High power accelerators for environmental and industrial applications
  - Broaden and strengthen the community
    - Awards support multi-institutional R&D teams
    - Public-private partnerships to develop domestic technology companies
  - Facilitate access to national lab accelerator R&D capabilities
- For more information, contact Eric.Colby@science.doe.gov, (301)-903-5475


Accelerator Test Facility II (ATF-II)


Superconducting gantry for proton therapy



High-Efficiency High Power Ultrafast Lasers

# The DOE Technology Office Research Portfolio

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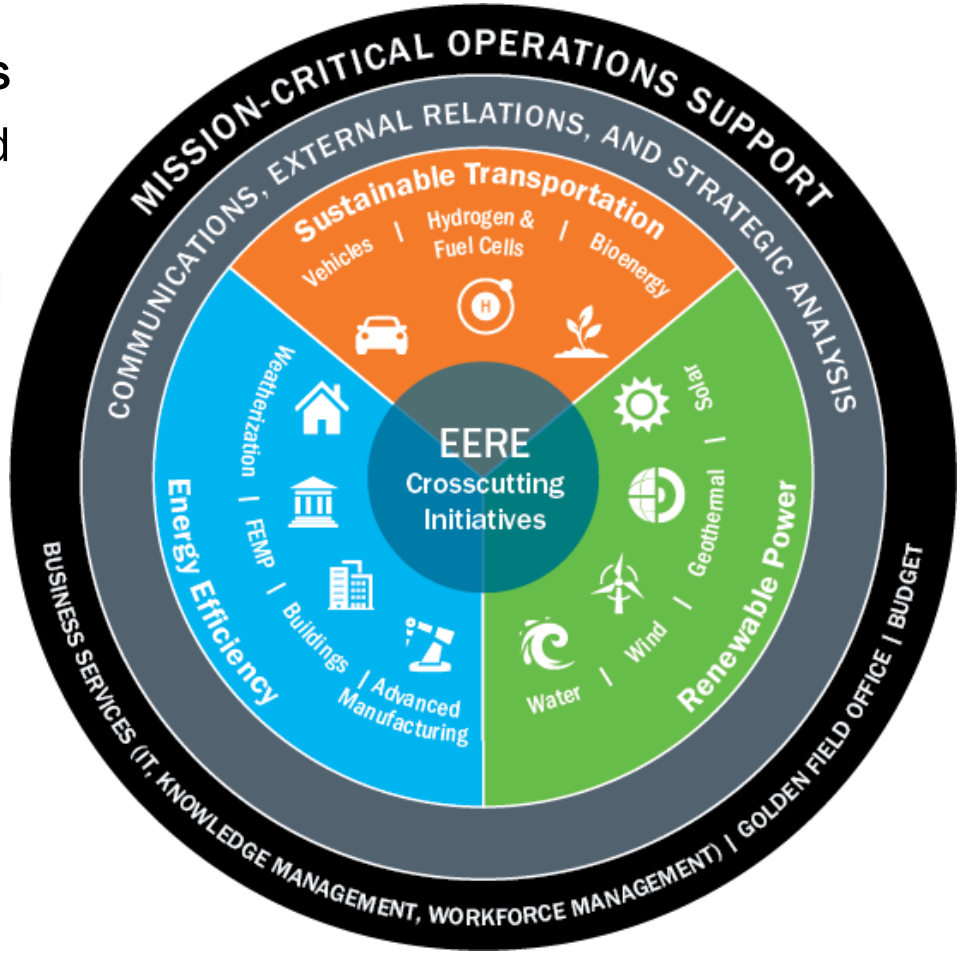
| Office of Energy Efficiency and Renewable Energy (EERE) | https://www.energy.gov/eere/office-energy-efficiency-renewable-energy |
| Office of Fossil Energy and Carbon Management (FECM) | https://www.energy.gov/fecm/office-fossil-energy-and-carbon-management |
| Office of Nuclear Energy (NE) | https://www.energy.gov/ne/office-nuclear-energy |
| Office of Electricity (OE) | https://www.energy.gov/oe/office-electricity |
| Office of Cybersecurity, Energy Security and Emergency Response (CESER) | https://www.energy.gov/ceser/office-cybersecurity-energy-security-and-emergency-response |
| Office of Environmental Management (EM) | https://www.energy.gov/em/office-environmental-management |

# Office of Energy Efficiency and Renewable Energy (EERE) – Mission

**The mission of EERE is to accelerate the research, development, demonstration, and deployment of technologies and solutions to equitably transition America to net-zero greenhouse gas emissions economy-wide by no later than 2050,** while creating good paying jobs for the American people – with a particular focus on workers and communities who have been most negatively impacted by the energy transition, and those historically underserved by the energy system and overburdened by pollution.

EERE is organized into four sectors—each managed by a Deputy Assistant Secretary (DAS).

- Office of Sustainable Transportation
- Office of Renewable Power
- Office of Energy Efficiency
- Office of Operations



# Office of Carbon Management FY2023 Emphasis

**Carbon Capture (point-source) and Storage**

- Focus on higher technology readiness level (TRL)
- Focus on more FEEDs to span more industrial sectors
- Expand storage portfolio to include mineralization
- Begin to focus on transport – to include rail and ship

**Clean Hydrogen**

- Flexible feedstocks for advanced gasification
- Sensors and controls – expanding to $H_2$ leakage (climate impacts)
- Advanced turbines aimed to fire 100% $H_2$
- Advanced materials – high-temperature alloys
- Solid oxide fuel cell

**Carbon Dioxide Removal (CDR)**

- Carbon Negative Shot – \$100/tonne $CO_2$-equiv. in a decade
- Increased focus on measurement, reporting and verification across broad range of CDR
- More fields and pilots for direct air capture (DAC) that could lead to DAC hubs
- Expand to include Direct Ocean Capture and recognize ecosystem benefits (ocean health)

**Artificial Intelligence**

- Cross-cutting – materials synthesis, geologic computational sciences

# Checklist for avoiding common errors: Pre-Applications (not a comprehensive list of all FOA requirements) – 1

- A Pre-Application is required and should be submitted by the date indicated on the cover of this FOA (1/25/2023).
  - **Late submissions** of pre-applications are rarely accepted (see Sec. IV.F.4 of the FOA)
- Institutions are limited to submit 1 and only 1 pre-application. That 1 pre-application may be **for a new or if your institution has an existing Implementation Grant Award it may be for a renewal but it may not be for both**.
  - The PI on a pre-application may be listed as a senior/key personnel on submissions from other institutions without limitation.
- **Tables**: FOA requires a table listing "individuals who should not serve as reviewers" be submitted in pdf format as an attachment
  - More info on List of Individuals Who Should Not Serve as Reviewers in FOA Sec. VIII.A.10.
  - A link to forms/templates leading to the "Collaborator Template" is provided in that Section. A link leading to a collaborator template is available: https://science.osti.gov/grants/Policy-and-Guidance/Agreement-Forms . This is also listed in the FOA sec. VIII.A.10.

# Checklist for avoiding common errors: Pre-Applications
(not a comprehensive list of all FOA requirements) – 2

- The FOA also require that applicants list the relevant DOE program office and the relevant program staff person in that office (on cover page)
- Submit Pre-applications **via PAMS** at https://pamspublic.science.energy.gov, not via www.grants.gov (due January 25, 5pm ET)
- Pre-applications must include a **clear** and **concise description** of the **objectives** and **technical approach** of the proposed research.
- Pre-Applications are evaluated on the basis of responsiveness to FOA objectives, scientific and technical merit, appropriateness of the proposed research approaches and likelihood of scientific impact.
- Pre-Applications are utilized to help in the selection of potential reviewers.

# Checklist for avoiding common errors: Applications
(not a comprehensive list of all FOA requirements)

- **Tables**: FOA requires a table of collaborators and conflicts of interest with the pre-application, if there are any updates please also include the updated version with the application. Refer to Section VIII.A.10 in FOA for details.
- **Budget**: For multi-institutional projects, the lead institution must request a larger percentage of the budget than each of the other institutional partners.
- **Biographical sketch** and list of **current/pending support**
  - Required for each senior/key personnel; follow instructions in FOA, including the use of the NSF format.
  - Ensure complete list of activities regardless of source of funding.
  - Do not attach a list of individuals who should not be used as merit reviewers as part of the bio sketch.
- Submit application via www.grants.gov, not PAMS (due April 4 by 11:59pm ET)
- **Late submissions** of applications are rarely accepted (see Sec. IV.F.4 of the FOA)

# Merit Review (see Section V of FOA)

Applications are subject to **scientific merit review** (peer review) and will be evaluated against the following **criteria** which are listed in decreasing order of significance, though their importance is comparable**:**

- Scientific and/or Technical Merit of the Project
- Appropriateness of the Proposed Method or Approach
- Competency of Applicant's Personnel and Adequacy of Proposed Resources
- Reasonableness and Appropriateness of the Proposed Budget
- Quality and Efficacy of the Promoting Inclusive and Equitable Research (PIER) Plan
- Synergism among the PIs in a program and the programmatic focus of a multi-PI effort
- The likelihood of success of the implementation grant

# EPSCoR Implementation Grants FOA: Key Dates

- **Pre-Application due date:** 01/25/2023, by 5:00PM Eastern Time
  - Pre-applications must be submitted via the DOE Portfolio Analysis and Management System (PAMS) at https://pamspublic.science.energy.gov
- **Application due date:** 04/04/2023, by 11:59PM Eastern Time
  - Applications must be submitted via www.grants.gov
- DOE anticipates that **award selection** will be completed by the end of June 2023 and that awards will be made in Fiscal Year 2023.

# Where to find more information

- **FOA:** https://science.osti.gov/bes/Funding-Opportunities
- **Department of Energy Programs:**
  - **Office of Science Programs –** https://science.osti.gov/Programs
  - **Office of Cybersecurity, Energy Security and Emergency Response—** https://www.energy.gov/ceser/office-cybersecurity-energy-security-and-emergency-response
  - **Office of Electricity –** https://www.energy.gov/oe/office-electricity
  - **Office of Energy Efficiency and Renewable Energy –** https://www.energy.gov/eere/office-energy-efficiency-renewable-energy
  - **Office of Environmental Management –** https://www.energy.gov/em/office-environmental-management
  - **Office of Fossil Energy and Carbon Management –** https://www.energy.gov/fecm/office-fossil-energy-and-carbon-management
  - **Office of Nuclear Energy –** https://www.energy.gov/ne/office-nuclear-energy
- **This webinar is being recorded**; slides and the recording will be posted on the FOA page listed above
- **Questions about the FOA**: Please send an email with your question(s) to tim.fitzsimmons@science.doe.gov

# Questions & Answers

Please submit questions using Zoom Q&A window, which should be accessible at the bottom of your zoom window.

If your question is not answered today, or you have additional questions about the presentation, please submit to:
Tim.Fitzsimmons@science.doe.gov

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