

BES Office Hours: Materials Sciences and Engineering Division

March 21, 2024

Andy Schwartz

Director, Materials Sciences and Engineering Division

Office of Basic Energy Sciences

Slides Posted here: <https://science.osti.gov/bes/officehours>



U.S. DEPARTMENT OF
ENERGY

Office of
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[Energy.gov/science](https://science.osti.gov/bes/mse/)

<https://science.osti.gov/bes/mse/>

Office of Science Statement of Commitment & Other Guidance

- **SC Statement of Commitment** – SC is fully and unconditionally committed to fostering safe, diverse, equitable, inclusive, and accessible work, research, and funding environments that value mutual respect and personal integrity.

<https://science.osti.gov/SW-DEI/SC-Statement-of-Commitment>

- **Expectations for Professional Behaviors** – SC’s expectations of all participants to positively contribute to a professional, inclusive meeting that fosters a safe and welcoming environment for conducting scientific business, as well as outlines behaviors that are unacceptable and potential ramifications for unprofessional behavior.

<https://science.osti.gov/SW-DEI/DOE-Diversity-Equity-and-Inclusion-Policies/Harassment>

- **How to Address or Report Behaviors of Concern** – Process on how and who to report issues, including the distinction between reporting on unprofessional, disrespectful, or disruptive behaviors, and behaviors that constitute a violation of Federal civil rights statutes.

<https://science.osti.gov/SW-DEI/DOE-Diversity-Equity-and-Inclusion-Policies/How-to-Report-a-Complaint>

Outline

- Introduction
 - DOE and the Office of Science
 - Office of Basic Energy Sciences
 - Materials Sciences and Engineering Division
- Funding Opportunity Announcements
- Where to find more information
- Q&A and Discussion – Three Zoom Breakout Rooms
 - CMMP
 - MDDS
 - SIS



U.S. DEPARTMENT OF
ENERGY

Office of
Science

Our Mission:

Deliver scientific discoveries and major scientific tools to transform our understanding of nature and advance the energy, economic, and national security of the United States.



More than **34,000** researchers supported at more than **300** institutions and **17** DOE national laboratories



Steward **10** of the 17 DOE national laboratories



More than **37,000** users of **28** Office of Science scientific user facilities



\$8.1B
(FY 23 enacted)

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

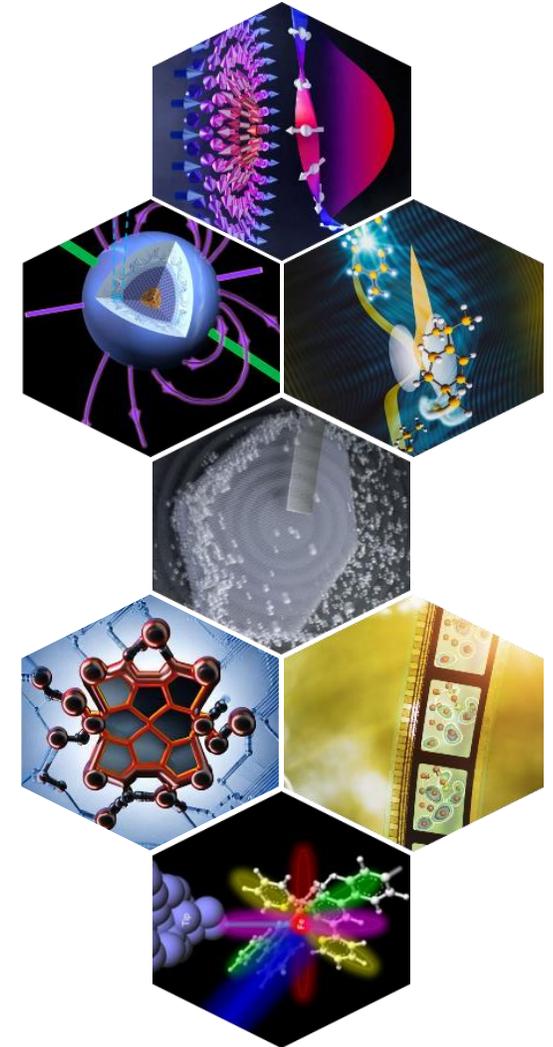
Accelerator R&D and Production

- Supporting new technologies for use in SC's scientific facilities and in commercial products

Basic Energy Sciences: Understanding Matter and Energy at Electronic, Atomic, and Molecular Levels

BES fulfills its mission through:

- Supporting **basic research**
 - “Grand Challenge” science
 - Discovery and design of materials and chemical processes that underpin a broad range of energy technologies
- Operating **world-class scientific user facilities** in X-ray, neutron, and nanoscale science
- Managing **construction and upgrade projects** to maintain **world-leading** scientific user facilities
- Ensuring **broad participation** in the research portfolio and user communities



Fundamental Research is Supported in Each of the Major BES Research Modalities

Core Research (>1500 awards)

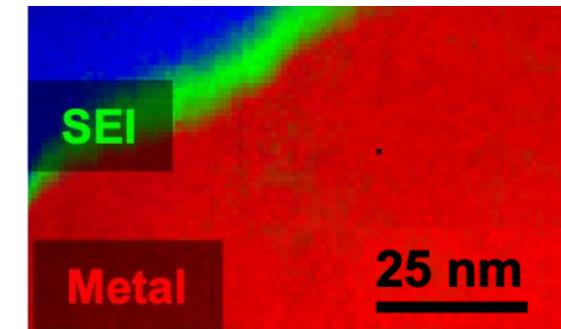
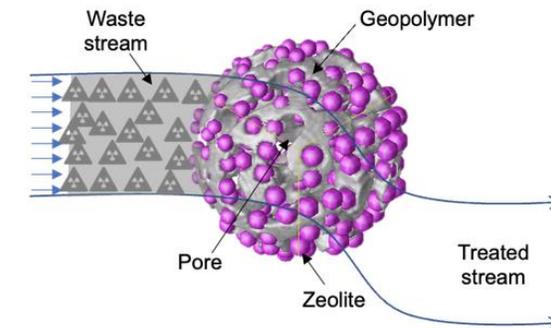
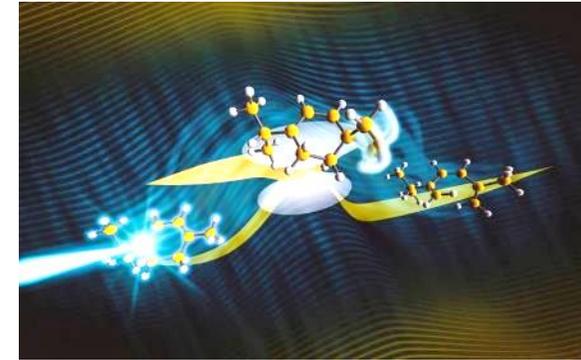
- Supports single investigators (~\$170K+/year) & small groups (\$500K-\$2M/yr, 3-yr).
- Fundamental materials & chemical sciences research.
- Includes SC Early Career Research Program awards (5-yr awards, separate FOA).

Energy Frontier (EFRC) & Energy Earthshot Research Centers (EERC), Computational Science Centers (CMS/CCS)

- Supports larger teams (\$2-5M/yr, 4-yr).
- Fundamental, use-inspired research per Basic Research Needs Workshop reports.

Energy Storage & Fuels from Sunlight Energy Innovation Hubs; Quantum Information Sciences Centers

- Large-team research awards (\$8-25M/yr, 5-yr).
- Fundamental research on topics that have proven challenging for traditional funding modalities.
- Defined research goals, milestones, and management.



Increasing scope and size

BES Participates in SC Programs to Broaden Participation



RENEW

Reaching a New Energy Sciences Workforce

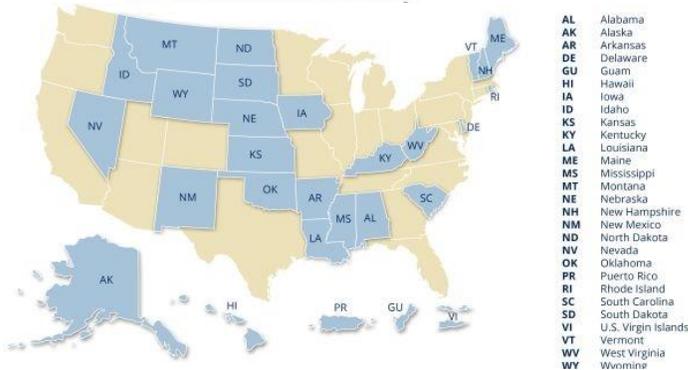
FOA issued
3/12/24



FAIR

Funding for Accelerated, Inclusive Research

FOA issued
3/12/24



EPSCoR

DOE Established Program to Stimulate Competitive Research (EPSCoR)

FOA closed

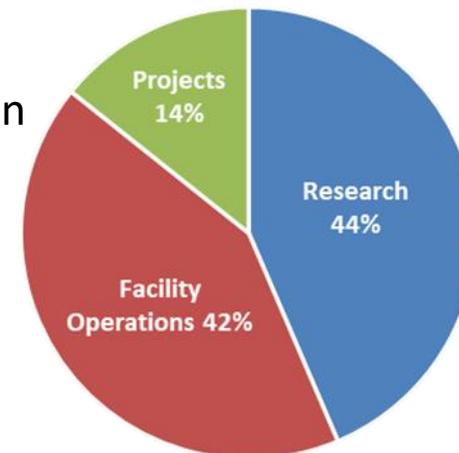
<https://science.osti.gov/bes/Funding-Opportunities>

Office of Science FAIR and RENEW Initiatives

- FAIR
 - Build research capacity, infrastructure, and expertise at institutions historically underrepresented in the SC portfolio by funding fundamental research relevant to the SC mission.
- Reaching a New Energy Sciences Workforce (RENEW)
 - Leverage SC's national laboratories, user facilities, and other research infrastructures to support traineeships for students and postdoctoral researchers at institutions underrepresented in the SC portfolio.
 - Applications to RENEW must include training activities beyond conduct of research.
- Both initiatives aim to:
 - Increase the diversity of institutions participating in SC research (focus on non-R1 minority serving institutions and non-R1 emerging research institutions).
 - Build relationships with institutions historically underrepresented in the SC research portfolio.

Basic Energy Sciences – Organization

FY 2023
Appropriation
\$2.5B



Office of Basic Energy Sciences
Linda Horton
Associate Director

Materials Sciences and Engineering Division
Andy Schwartz,
Director

- Materials Discovery, Design and Synthesis
- Condensed Matter and Materials Physics
- Scattering and Instrumentation Sciences

Scientific User Facilities Division
Linda Horton,
Acting Director

- X-ray and Neutron Scattering Facilities
- Nanoscale Science Research Centers
- Accelerator and Detector Research
- Construction & Major Item of Equipment Projects

Chemical Sciences, Geosciences and Biosciences Division
Gail McLean, Acting Director

- Fundamental Interactions
- Photochemistry and Biochemistry
- Chemical Transformations

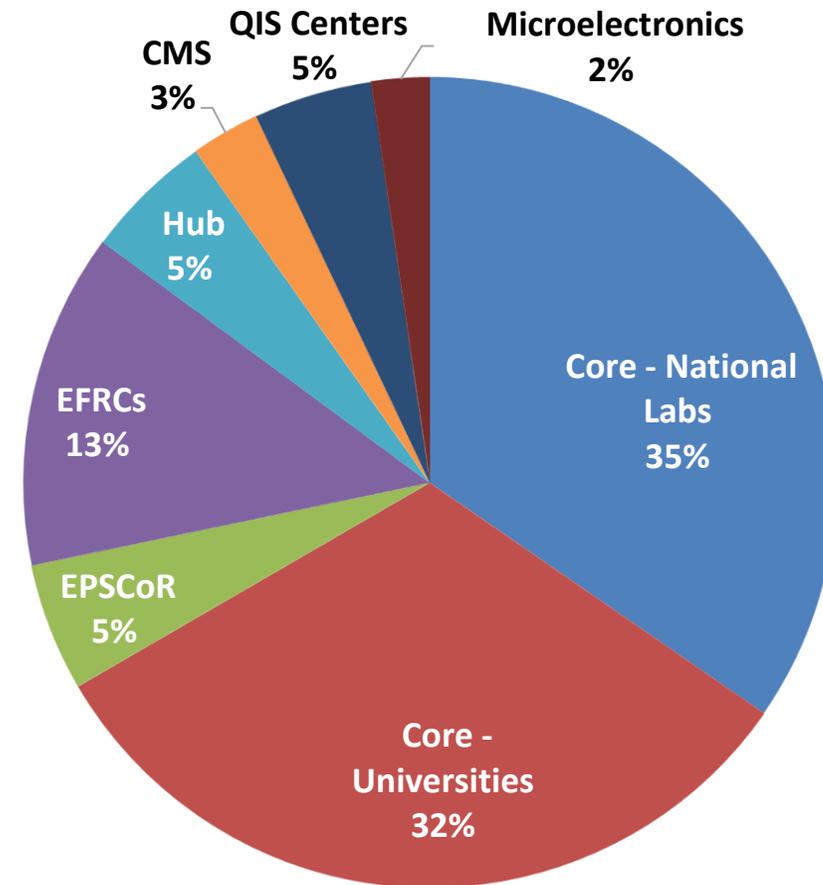
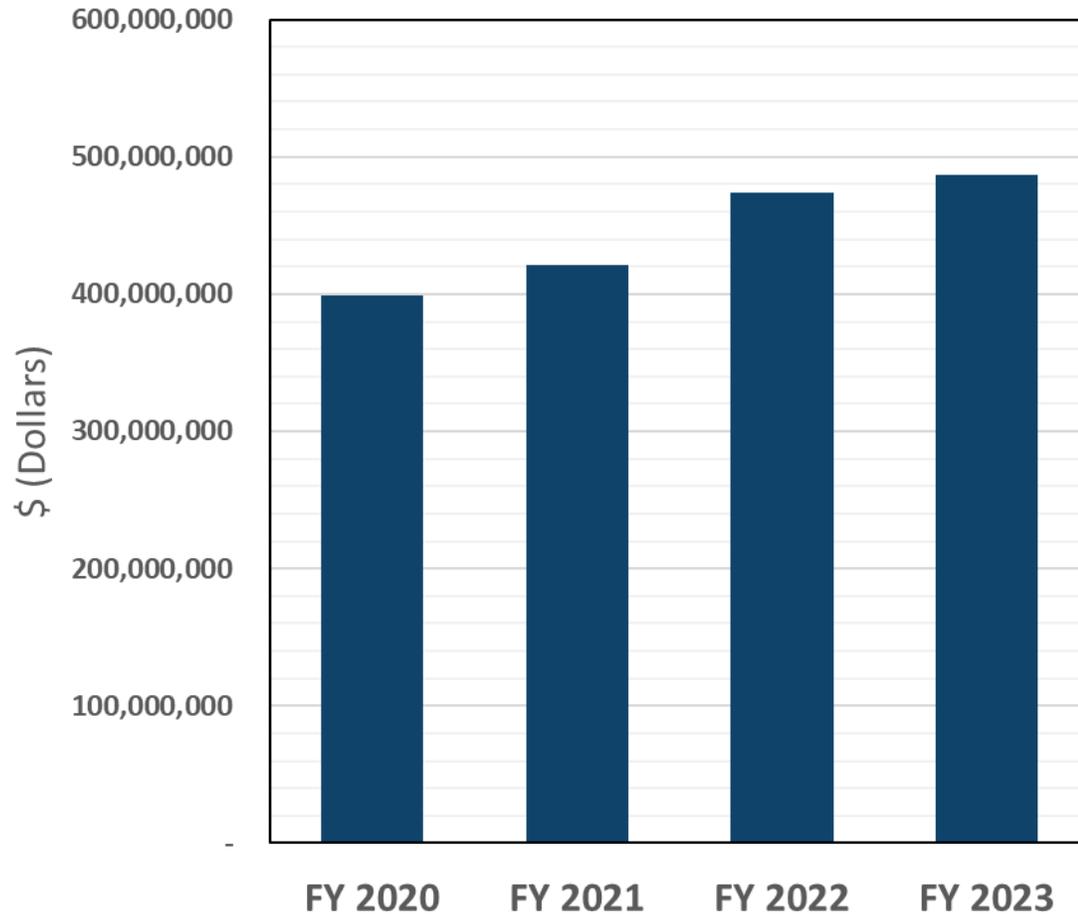
* Established April 2023; staffing underway

Collaborative Research Division*
Andy Schwartz,
Acting Director

- Energy Frontier Research Centers
- Energy Earthshot Research Centers
- Energy Innovation Hubs
- Cross-SC Coordination

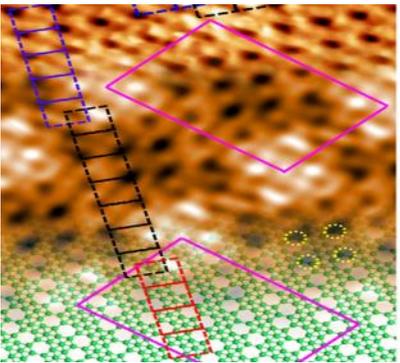
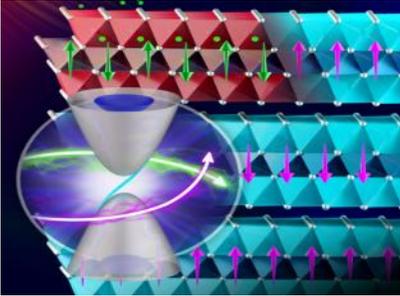
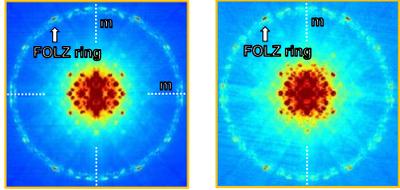
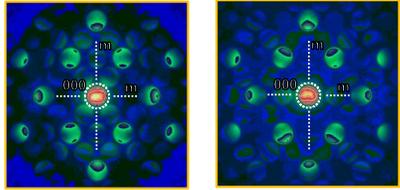
Research grouped by scientific topics, each impacting many energy technologies

BES-MSE Budget



Materials Sciences and Engineering Research

Broad Portfolio of Grand Challenge and Energy Use-Inspired Fundamental Research



Scattering and Instrumentation Sciences (SIS)

Investigation of photon, neutron, and electron interactions with matter to characterize structures, dynamics, and functionality

Condensed Matter and Materials Physics (CMMP)

Exploration of phenomena in condensed matter, such as quantum behavior and response to environmental stimuli

Materials Discovery, Design, and Synthesis (MDDS)

Understanding synthesis and dynamics to discover/design new materials via innovative physical, chemical, and bio-molecular routes

Division-wide Themes

- Clean energy materials research
- Quantum materials
- Theory, computation and data science
- Materials synthesis
- Science across length and time scales
- Non-equilibrium dynamics
- In-situ, operando, and multi-modal characterization

Administrative Staff

Teresa Crockett



Andy Schwartz
Director

Materials Science and Engineering Division

PM – Shawn Chen



Contact info for all PMs is on the BES-MSE Website



Materials Discovery, Design, and Synthesis Team

Acting Team Lead – Craig Henderson



Materials Chemistry

PMs – Craig Henderson and Chris Chervin



Biomolecular Materials

PM – Aura Gimm



Synthesis and Processing Science

PM – James Dorman



Batteries and Energy Storage Hub & Integrated Energy Research

PMs – Craig Henderson and John Vetrano



Condensed Matter and Materials Physics

Team Lead – Mick Pechan



Experimental Condensed Matter Physics

PM – Claudia Cantoni and Tim Mewes



Theoretical Condensed Matter Physics

PMs – Claudia Mewes and Matthias Graf



Physical Behavior of Materials

PM – Refik Kortan



Mechanical Behavior and Radiation Effects

PM – John Vetrano



Quantum Information Science

PM – Athena Sefat



Scattering and Instrumentation Sciences

Team Lead – Helen Kerch



X-Ray Scattering

PM – Lane Wilson



Neutron Scattering

PM – Mike Fitzsimmons



Electron and Scanning Probe Microscopies

PM – Jane Zhu



Experimental Program to Stimulate Competitive Research (DOE EPSCoR)

PM – Tim Fitzsimmons

Updated January 2024

BES Funding Opportunities

Continuation of Solicitation for the Office of Science Financial Assistance Program (annual “Open Call”)

The annual, broad, open solicitation that covers all research areas in the Office of Science and is open throughout the Fiscal Year

For BES, the solicitation includes brief descriptions of 24 core research areas, with current priorities/areas of interest and contact information for program managers (contacting program managers is encouraged)

BES identifies the following “**overarching research priorities**” relevant to multiple core research areas for the Open Call:

- Fundamental Science to Enable Clean Energy
- Critical Materials/Minerals
- Fundamental Science to Transform Processing and Fabrication
- Artificial Intelligence and Machine Learning (AI/ML)

DEPARTMENT OF ENERGY (DOE)
OFFICE OF SCIENCE (SC)



FY 2024 CONTINUATION OF SOLICITATION FOR THE OFFICE OF SCIENCE FINANCIAL ASSISTANCE PROGRAM

FUNDING OPPORTUNITY ANNOUNCEMENT (FOA) NUMBER:
DE-FOA-0003177

FOA TYPE: AMENDMENT 000001
CFDA NUMBER: 81.049

Amendment 000001 is issued with a number of minor edits, detailed on the next page

FOA Issue Date:	September 29, 2023
Submission Deadline for Pre-Applications:	A Pre-Application is optional/encouraged
Submission Deadline for Applications:	Not Applicable This FOA will remain open until September 30, 2024, or until replaced by a successor FOA. Applications may be submitted any time during that period. Individual topics in this FOA may have scheduled review panels. Applications submitted after the panel's acceptance date may be held until the next review panel.

<https://science.osti.gov/bes/-/media/grants/pdf/foas/2023/DE-FOA-0003177-000001.pdf>

FOA: Annual SC Early Career Research Program

- FOA Scope:

- Support the development of individual research programs of outstanding scientists early in their careers and to stimulate research careers in the areas supported by SC.
- All BES core research areas participate, including scientific user facilities
- Topics alternate to maintain reasonable applicant pool, ease reviewer burden, and improve success statistics.

- FOA Details:

- Eligible Applicants: Untenured university professors on tenure track and DOE Lab Scientists, both within 12 years of PhD (likely reverting to 10 years in future); each applicant may apply a maximum of three times; extensions may be granted for major life events of at least 3 months
- Typical funding: University: \$175K/yr for 5 years; DOE Lab: \$550K/yr for 5 years
- FY 2024 Timeline:
 - FOA published on Dec. 15, 2023
 - ~~Pre-application due January 30, 2024~~
 - Applications (for those encouraged) due by April 25, 2024
 - Recorded Webinar Available Online.



<https://science.osti.gov/early-career>

Where to find more information



BES Materials Sciences and Engineering Division Webpage



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Materials Sciences and Engineering (MSE) Division

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[Research Areas](#)

[Reports and Activities](#)

[Science Highlights](#)

[Principal Investigators'
Meetings](#)

Materials Sciences and Engineering (MSE) Division

- Descriptions of all core research areas (funding programs)
- Abstract books from Principal Investigator Meetings
- Contact information for Program Managers

<https://science.osti.gov/BES/MSE>

BES Funding Opportunity Announcements



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Funding Opportunities

- [New Grant Applications from Universities and Other Research Institutions](#)

[Office of Science Guidance](#) on [Accommodating Interruptions to Applications and Awardees due to COVID-19](#)

Funding Opportunity Announcements (FOAs)

May be open to one or more institution types. For assistance with the Office of Science's Portfolio Analysis and Management System (PAMS) at <https://pamspublic.science.energy.gov>, please contact the Helpdesk at (855) 818-1846 (toll-free), (301) 903-9610, or sc.pams-helpdesk@science.doe.gov.

FY 2024 Continuation of Solicitation for the Office of Science Financial Assistance Program

Announcement Number: DE-FOA-0003177, Amendment
000001

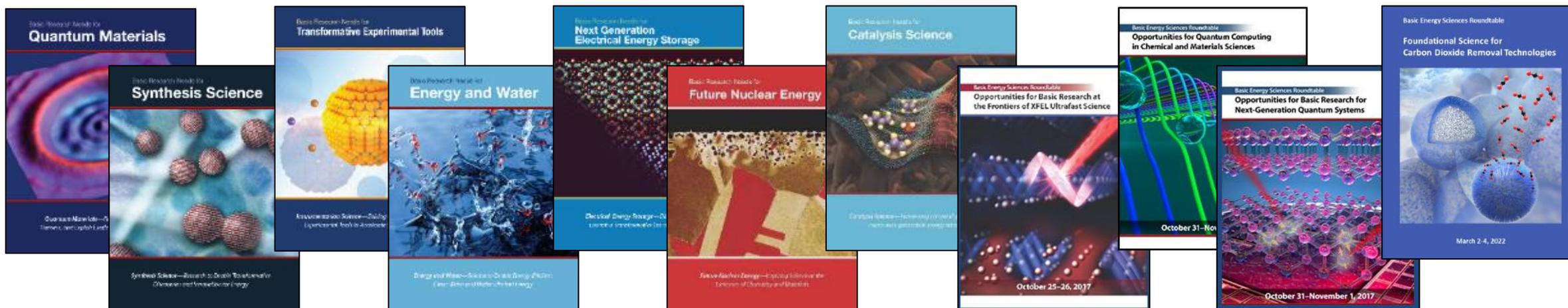
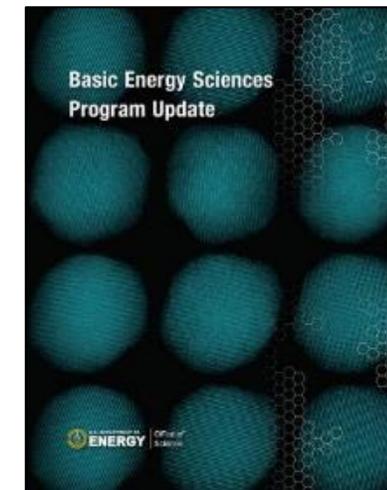
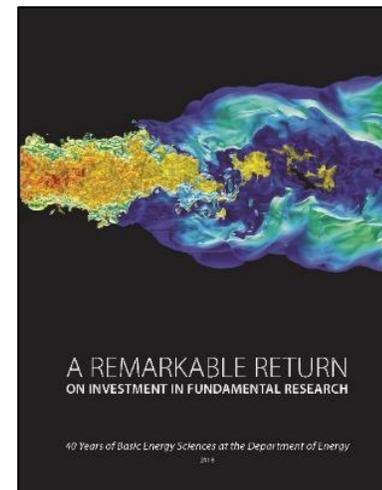
Post Date: Friday, September 29, 2023

Close Date: Monday, September 30, 2024

<https://science.osti.gov/bes/Funding-Opportunities>

Other Online Resources

- BRN Workshop and Roundtable Reports
 - Topical Reports identifying priority research directions and opportunities



<https://science.osti.gov/bes/Community-Resources>

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Future BES Office Hours

- Upcoming dates/topics:
 - Thursday, April 18, 2024 at 2pm ET –
*Introduction to **BES Scientific User Facilities Division** – Capabilities and Access*
 - Thursday, May 16, 2024 at 2pm ET –
*Introduction to **BES Chemical Sciences, Geosciences, and Biosciences Division** - Organization, priorities, and funding opportunities*
- Additional information and registration links here:
<https://science.osti.gov/bes/officehours> (inc. this slide deck)
- Zoom Poll
 - How did you hear about these BES office hours?
 - What additional office hours topics would interest you?

Q&A in Zoom Breakout Rooms

- Three Breakout Rooms for Q&A, organized by MSE Team:
 - CMMP – Condensed Matter and Materials Physics
 - MDDS – Materials Discovery, Design, and Synthesis
 - SIS – Scattering and Instrumentation Sciences

Thank you

Andy Schwartz

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