

Comments from DOE ARDAP

Eric R. Colby*

Director, Office of Accelerator R&D and Production (ARDAP, SC-24.2)

Office of Science, U.S. Department of Energy

January 18, 2022

Eric.Colby@science.doe.gov

(301)-903-5475



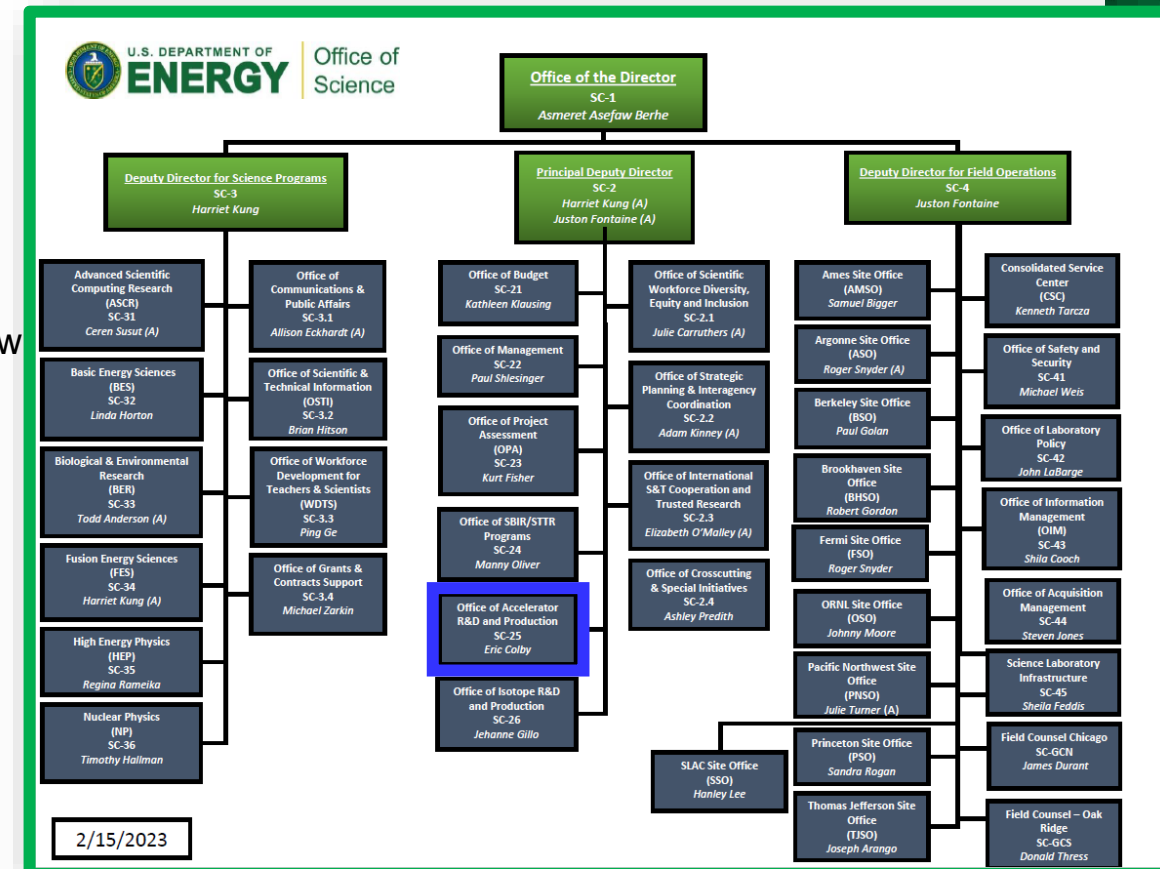
U.S. DEPARTMENT OF
ENERGY

Office of
Science

Accelerator R&D and Production (ARDAP) SC-25 At-a-Glance

Mission: Ensure a robust pipeline of next-generation Accelerator Science & Technology to support physical sciences research while providing technology advances and industrial strength that position the U.S. to lead the world for decades to come.

- Established: April 12, 2020
 - in recognition of the central importance of accelerators and related technologies to the current and future scientific capabilities stewarded by SC programs
- Budget in FY 2023: \$27.4M (+\$9.4M)
 - Mostly Accelerator Stewardship program but shifting focus to new Accelerator Development program
 - ARDAP's first dedicated Appropriation occurred in FY2022
- Staff: ~3.9 FTE plus more coming
 - Director – Eric R. Colby, 100% time
 - Deputy Director – Camille Ginsburg, 100% time**
 - Physicist – Marion White (detailee) ~40% time [end: 7/23]
 - Physicist – Roark Marsh (detailee) ~50% time [end: 6/24]
 - Physicist – Christine Clarke (detailee) 100% time [end: 3/25]**
 - Budget Support – Chandra Hopkins, 100% time [contractor]
 - Chief Systems Engineer – search underway



Office of Accelerator R&D and Production Missions

- **Stewardship Mission**

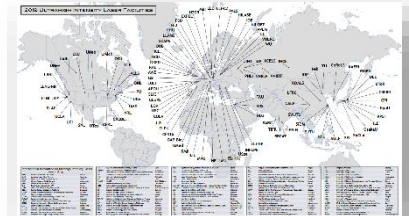
Support fundamental accelerator science and technology development of relevance to industry, medical treatment, and national security, and to disseminate accelerator knowledge and training to the broad community of accelerator users and providers.

- **Development Mission**

Coordinate and make accelerator R&D and production investments that are aimed at addressing accelerator science and technology gaps to help ensure that future U.S. accelerator-based physical science R&D priorities will be met.

- **ARDAP will fulfill these missions by**

- Identifying and investing in use-inspired R&D technology areas that enable new accelerator applications in industry, medical treatment, and national security,
- Maintaining a strategic picture of AS&T* needs and worldwide competition,
- Facilitating coordination of Programmatic AS&T R&D investments across SC,
- Investing in selected cross-cutting AS&T areas,
- Providing a system engineering perspective for SC facility projects,
- Supporting workforce development, when needed,
- Maturing key AS&T technology and developing capable U.S. vendors,
- Transitioning accelerator technology to broader uses.



*AS&T = Accelerator Science & Technology

ARDAP Programs are aimed at building domestic supply chains to ensure SC's competitiveness

- **SC long-term AS&T R&D often focuses on low-TRL development of mission-specific technologies**
 - ARDAP helps technologies cross the “Valley of Death”, identifying common needs across SC programs
- **ARDAP Accelerator Research**
 - TRL 1 through TRL 4: Accelerator Stewardship program (red rectangle)
- **ARDAP Accelerator Development**
 - MRL 1 through MRL 7: Accelerator Technology Production sub-program (yellow rectangle)
 - (Future) TRL 5 through TRL 7: Accelerator Technology Maturation sub-program (green rectangle)

ACCELERATOR RESEARCH

TRL 1	Basic principles observed and reported
TRL 2	Technology concept and/or application formulated
TRL 3	Analytical and experimental critical function and/or characteristic proof of concept
TRL 4	Component and/or breadboard validation in a laboratory environment

ACCELERATOR TECHNOLOGY MATURATION

TRL 5	Component or breadboard validation in a relevant environment
TRL 6	System/subsystem model or prototype demonstration in a relevant environment
TRL 7	System prototype demonstration in an operational environment

ACCELERATOR DEVELOPMENT

MRL 1	Manufacturing feasibility assessed
MRL 2	Manufacturing concepts defined
MRL 3	Manufacturing concepts developed
MRL 4	Capability to produce the technology in a laboratory environment
MRL 5	Capability to produce prototype components in a production relevant environment
MRL 6	Capability to produce prototype system or subsystem in a production relevant environment
MRL 7	Capability to produce systems, subsystems or components in a production relevant environment
MRL 8	Pilot line capability demonstrated; Ready to begin Low Rate Initial Production
MRL 9	Low rate production demonstrated; Capability in place to begin Full Rate Production

From Technology Readiness Assessment Deskbook, July 2009,

http://www.skatelescope.org/public/2011-11-18_WBS-SOW_Development_Reference_Documents/DoD_TRA_July_2009_Read_Version.pdf

FY 2023 Funding Opportunity Announcement Webinar



U.S. DEPARTMENT OF **ENERGY** | Office of Science

FY 2023 Accelerator Stewardship and Accelerator Development Programs

FY 2023 Research Opportunities in Accelerator Stewardship and Accelerator Development DE-FOA-0002951

FOA Issue Date:	January 10, 2023
Submission Deadline for Pre-Applications:	February 7, 2023, at 5 PM Eastern Time A Pre-Application is required
Pre-Application Response Date:	February 21, 2023
Submission Deadline for Applications:	March 21, 2023, at 11:59pm Eastern Time

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.

Dr. Eric R. Colby
Eric.Colby@science.doe.gov
Dr. Camille M. Ginsburg
Camille.Ginsburg@science.doe.gov

FY 2023 Research Opportunities in Accelerator Stewardship and Accelerator Development

Announcement Number: DE-FOA-0002951

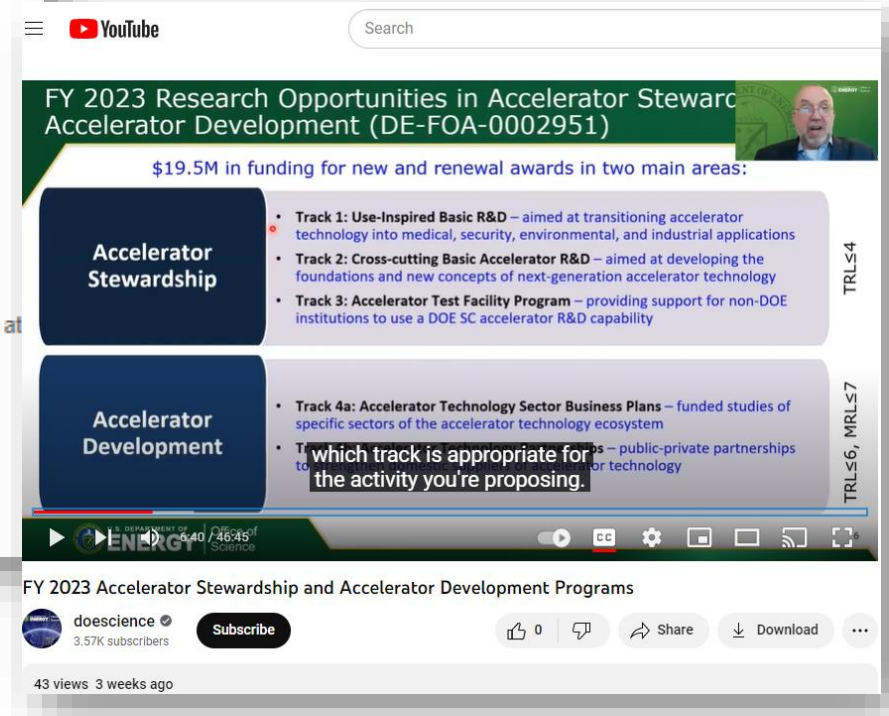
Post Date: Tuesday, January 10, 2023

Close Date: Tuesday, March 21, 2023

- Submission Deadline for Pre-Applications: February 7, 2023, at 5 PM Eastern Time
 - A Pre-Application is required
- Pre-Application Response Date: February 21, 2023
- Submission Deadline for Applications: March 21, 2023, at 11:59pm Eastern Time

Frequently Asked Questions (FAQs) for the Research Opportunities in Accelerator Stewardship and Accelerator Development.

[View Webinar Video](#)



YouTube

Search

FY 2023 Research Opportunities in Accelerator Stewardship and Accelerator Development (DE-FOA-0002951)

\$19.5M in funding for new and renewal awards in two main areas:

- Accelerator Stewardship**
 - Track 1: Use-Inspired Basic R&D – aimed at transitioning accelerator technology into medical, security, environmental, and industrial applications
 - Track 2: Cross-cutting Basic Accelerator R&D – aimed at developing the foundations and new concepts of next-generation accelerator technology
 - Track 3: Accelerator Test Facility Program – providing support for non-DOE institutions to use a DOE SC accelerator R&D capability
- Accelerator Development**
 - Track 4a: Accelerator Technology Sector Business Plans – funded studies of specific sectors of the accelerator technology ecosystem
 - Track 4b: Accelerator Technology Sector Partnerships – public-private partnerships to develop and commercialize accelerator technology

which track is appropriate for the activity you're proposing.

doescience 3,57K subscribers

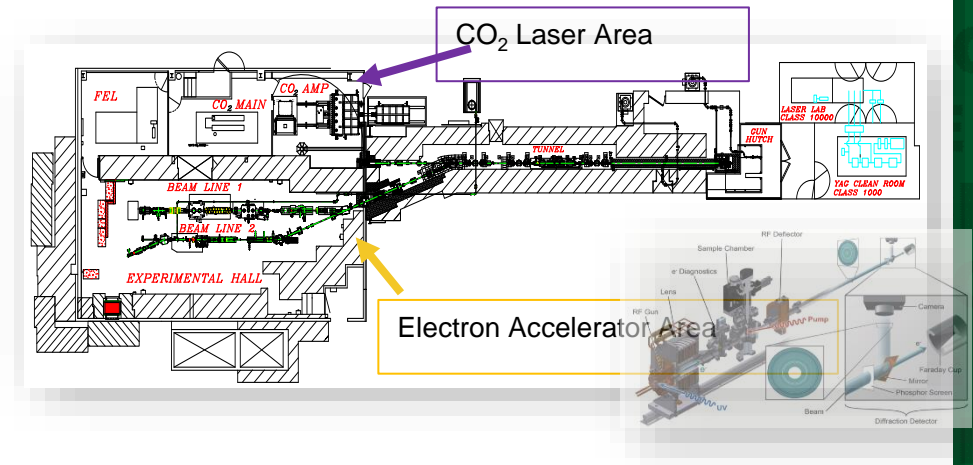
43 views 3 weeks ago

<https://science.osti.gov/Leaving-Office-of-Science?url=https%3a%2f%2fwww.youtube.com%2fwatch%3fv%3dLQWmwLDJfrk&external=true>

Facilitating Access to Accelerator R&D Facilities

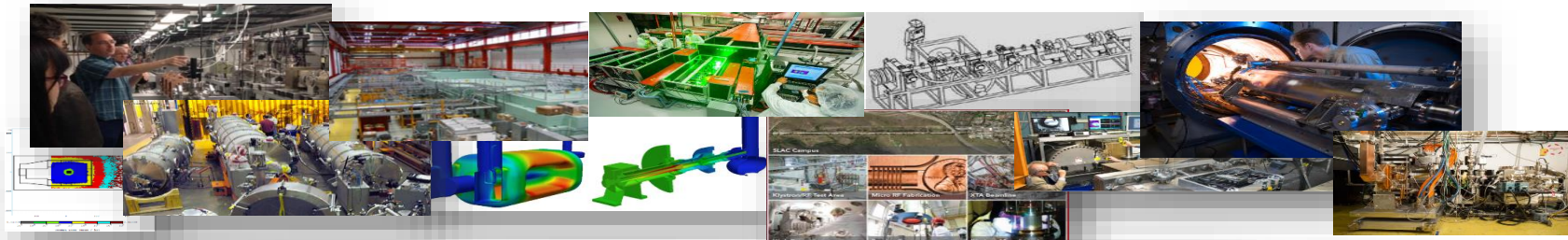
- **Brookhaven Accelerator Test Facility (“ATF”)** is operated as a dedicated National User Facility

- 65 MeV high brightness electrons
- Multi-TW CO₂ laser pulses
- TW-class NIR laser pulses
- femtosecond diagnostics
- Ultrafast Electron Diffraction Facility (until 4/1/23)



- **Accelerator Stewardship Test Facility Program (“ASTFP”)** facilitates access to a wide array of DOE National Laboratory Accelerator R&D capabilities

- By merit-reviewed proposals to “Track 3” of the Accelerator Stewardship FOA (next call is early 2024)
- Up to \$300k and 12 months to complete a collaborative R&D task at a DOE lab

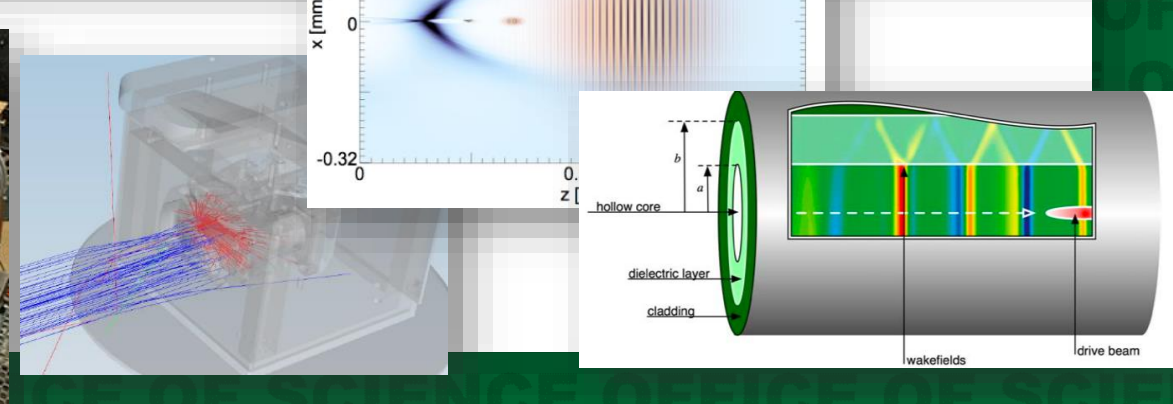
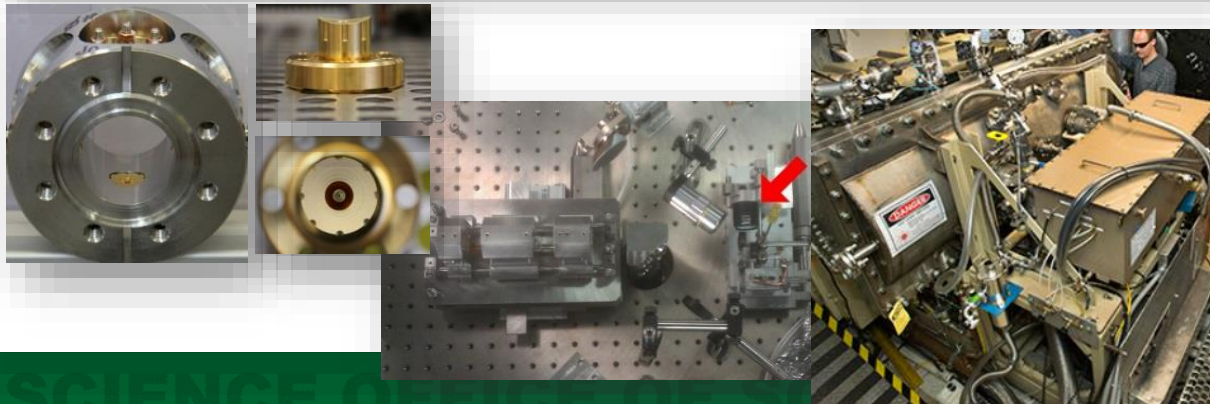
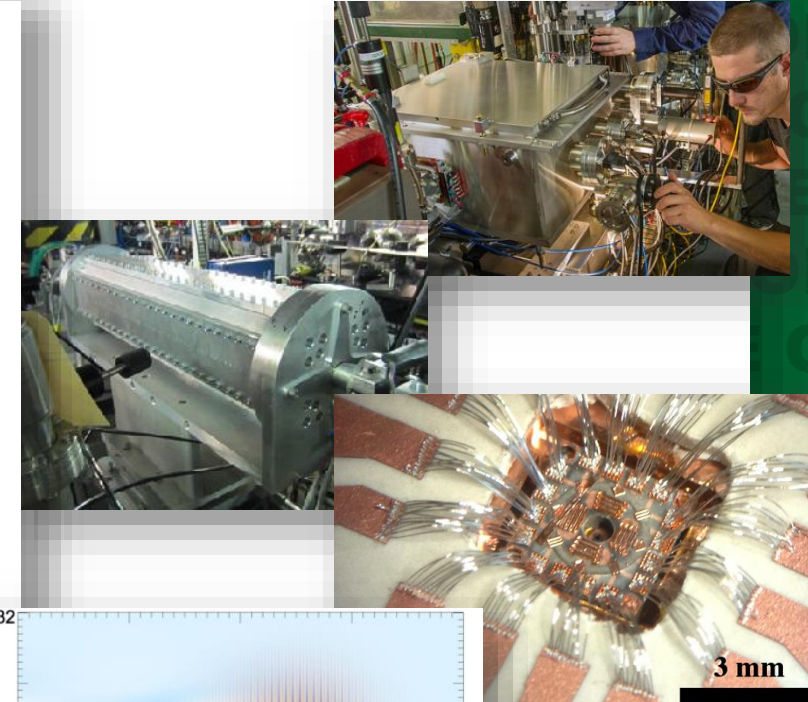


U.S. DEPARTMENT OF
ENERGY

Office of
Science

Brookhaven Accelerator Test Facility

- The ATF is an Office of Science User Facility, providing beam time free of charge to non-proprietary users.
 - Three decades of R&D for science and industry
 - ATF currently supporting 25 experiments and feasibility studies, roughly half support long-term R&D that is predominantly of interest to BES, NP, DOD, DHS & others
 - Serves a broad user population: laboratory, university, industry
 - Rich tradition of training accelerator physicists
- The ATF is an Accelerator Stewardship facility
 - Use is free to non-proprietary users
 - Time awarded by scientific and/or technical merit
 - Significant facility upgrades are underway; more are planned



ATF In the Next Year

- **Recovering from COVID-induced issues**
 - Experimental schedule backlog
 - Supply chain delayed delivery of key components
- **Fixing aging technical systems**
 - Gun klystron replaced
 - New klystron, new multichannel power supplies, new controls components, and other significant procurements underway
- **Preparing for a high-stakes Accelerator Readiness Review in late summer/early fall**
 - DOE O 420.2D Accelerator Readiness Review for a *legacy* facility
 - Very significant verification, validation, documentation, discovery, and remediation
 - Visible: Cable tray cleanout/rework/reinstall
 - Less visible: High-fidelity radiation shielding modeling and optimization
 - Not visible: Corrections to decades-old premises wiring to bring it up to modern code
 - **End result will be an ATF that is modernized, well documented, easier to maintain, and safer**
- **After April 1, the UED facility will no longer be part of the ATF User Facility**
 - Inclusion in SC User Facility was linked to an Early Career Award that has finished
 - BES and BNL EPS Directorates have been and are clear they do not consider the facility element important enough to support
 - Will revert to a “Non-Designated User Facility”, meaning that Brookhaven can:
 - Establish scheduling and allocation mechanisms for the UED facility as it sees fit
 - Charge users Full Cost Recovery when appropriate
- **B820 Upgrade activities will continue as resources allow**

ATF In the Future

Pass the Accelerator Readiness Review

- Likely to take some time after the review to address a punch list of items

Plan for ATF's future

- Continue to modernize the facility
 - Triage and upgrade aging technical systems, focusing on reliability
- Plan for the future
 - Identify and implement upgrades that keep the facility productive and world-unique
 - What is the most productive path for the facility in 5 years? In 10 years?
 - **Community input is crucial**
 - Science Needs Workshops
 - ATF Program Advisory Committee
 - Advice from the stakeholder federal agencies
- Engage the community
 - Position ATF to be complementary to other test facilities
 - Foster the development of domestic accelerator technology suppliers
 - Find and connect with new investigators and new institutions
 - Pursue the needs of multiple federal programs synergistically
 - Contribute to a highly skilled and diverse workforce

Take home message

- **ARDAP supports accelerator R&D of broad use to many sciences and applications by:**
 - Funding basic and applied R&D through the annual FOA
 - Making the Brookhaven ATF available as a User Facility
 - Facilitating access to >50 accelerator capabilities across the DOE complex
 - Sponsoring workshops, RFIs, and studies to bring together the accelerator community
- **ARDAP's focus is shifting to higher-TRL and higher-MRL investments**
 - Technology Maturation and Accelerator Development will increase in priority
- **ATF plays an important role in the Stewardship program by providing support for accelerator science, first-of-kind technical demonstrations, and workforce training**
 - I and the ATF staff always welcome your feedback on ways to improve
 - We count on you to do world-class science and report your findings (and please tell us about it!)
 - We count on you to suggest new facility capabilities



Discussion