



U.S. DEPARTMENT OF
ENERGY

Office of
Science

Informational Webinar: Accelerate Innovations in Emerging Technologies

LAB 23-3010

SC Offices: ASCR, BES, BER, FES, HEP, NP, and IP

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Important Deadlines

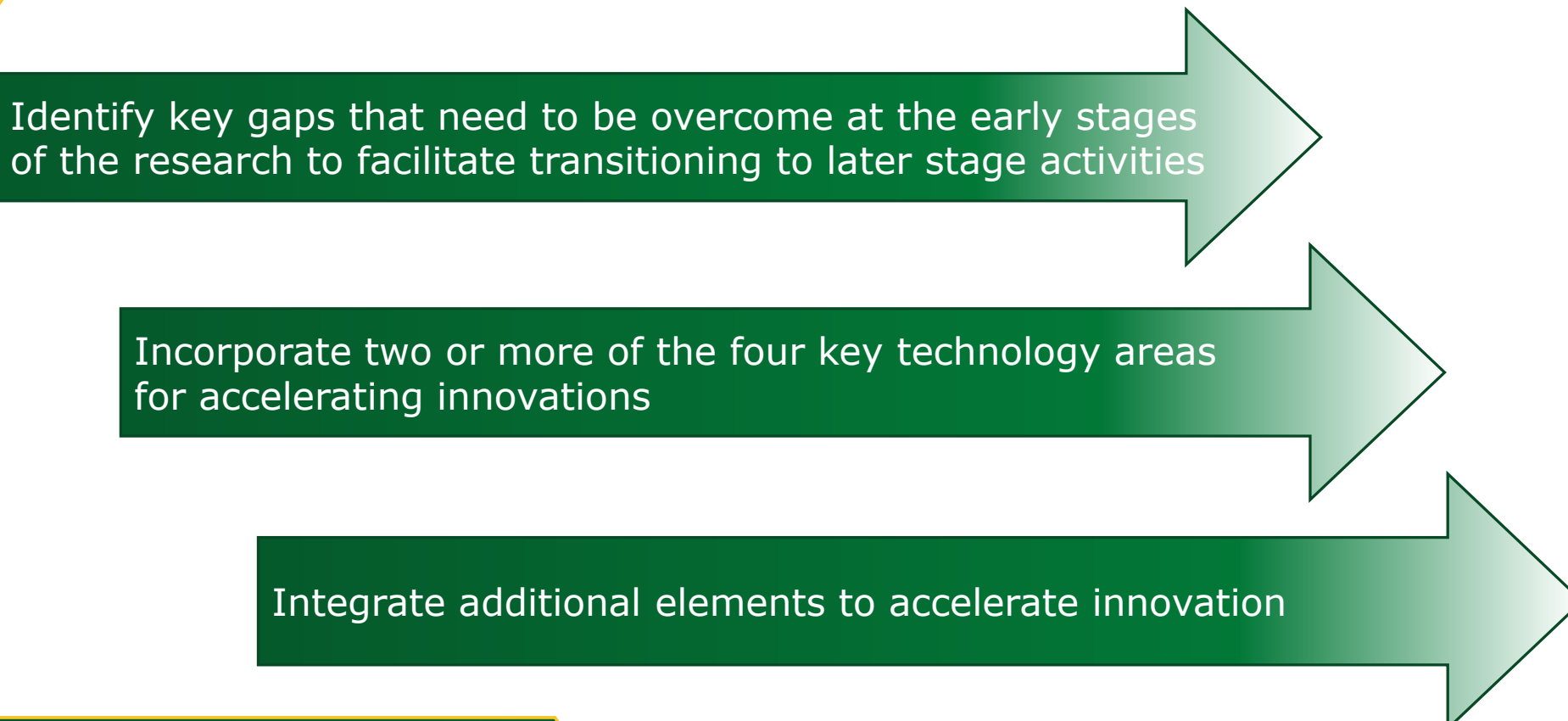
- ▶ Pre-Proposal Submission:
March 29, 2023, at 5:00 PM Eastern
- ▶ Pre-Proposal Response:
April 26, 2023, at 5:00 PM Eastern
- ▶ Proposal Submission:
June 7, 2023, at 5:00 PM Eastern

Must identify two or more key technology areas and SC office(s) to which preproposal/proposal is being submitted on cover page, with most relevant listed first.

Background

- Goal is to accelerate the transition from discovery to commercialization of new technologies that will form the basis of future industries
- To complete this transition, a technology must bridge the gap between new discoveries and applied research and development
 - Often, basic research does not consider all the factors required to drive innovations to sustainable production
 - Applied research teams and industry often find it difficult to transform early-stage discoveries to mature, deployable technologies.
- Bridging this gap requires use-inspired basic research to be conducted with an eye to an innovation's end application
- Must consider discovery, creation, and production of materials and products with approaches that can be scaled and readily transitioned into new products and capabilities to support the economic health and security of the nation

Distinctive aspect of Accelerate: Incorporation of approaches to accelerate innovation



Identify key gaps that need to be overcome at the early stages of the research to facilitate transitioning to later stage activities

Incorporate two or more of the four key technology areas for accelerating innovations

Integrate additional elements to accelerate innovation

1. Identifying Gaps and Challenges Early in the Innovation Cycle

- ▶ Use-inspired basic research requires consideration of multiple factors as innovations are optimized and refined in the laboratory
- ▶ Consideration of the full cycle of innovation, from discovery to end use, can identify key gaps that need to be overcome at the early stages of the research to facilitate transitioning
- ▶ Research should include innovative ways to address these challenges
- ▶ Strategically structure teams to span the innovation gap



2. Including 2 or more key technology areas

Area 1: Computing and Data	Area 2: Physics and Engineering	Area 3: Biology	Area 4: Materials and Chemistry
High Performance Computing Data storage, management, and communications AI/ML	Advanced Manufacturing and Robotics Microelectronics Sensors	Biotechnology Bio-inspired processes	Energy Production, Storage, and Conversion Materials and Chemical Processes

Proposed research must fall within the topics listed under the four key technology areas

Examples of Combining Key Technology Areas

Producing fuels, chemicals, and materials from waste synthetic polymers to advance a circular economy

Integrating catalytic, biochemical, and/or biological manufacturing with AI/ML approaches
(Areas 1, 2, 3, 4)

Enabling next generation microelectronics

Integrating advances in materials science, scalable synthesis, device architectures, and algorithms to transition emergent quantum materials for use in computing and quantum technologies
(Areas 1, 2, 4)

Novel particle detector sensor arrays

Integrating AI-enabled on-chip processors and 6G wireless communication for data transfer
(Areas 1, 2, 4)

Edge computing and/or operational controls for scientific infrastructure

Combining AI/ML, communications, and sensors
(Areas 1, 2)

Area 1: Computing and Data	Area 2: Physics and Engineering	Area 3: Biology	Area 4: Materials and Chemistry
High Performance Computing	Advanced Manufacturing and Robotics	Biotechnology	Energy Production, Storage, and Conversion
Data storage, management, and communications	Microelectronics	Bio-inspired processes	Materials and Chemical Processes
AI/ML	Sensors		



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3. Integrating Additional Elements to Accelerate Innovation

As a research project is planned, initiated, and conducted, additional elements can be integrated into the project to both accelerate the innovation cycle and provide impact on local research ecosystem

Examples might include:

- Defining industry needs, requirements, restrictions, and other factors
- Identifying new capabilities needed at DOE user facilities
- Training a diverse next generation workforce
- Communicating discoveries to industry, including new and existing companies
- Catalyzing spin-off companies and supporting entrepreneurs
- Leveraging and building regional expertise and resources
- Providing impact to underserved communities
- Supporting principles of environmental justice
- Establishing specific metrics and assessments to ensure success

Solicitation Overview

- This solicitation provides up to a total of approximately \$80M over 2 years
- A total of 10-20 projects are planned to be funded (\$2-4M/project annually)
- Eligible Institutions: DOE laboratories (lead) and collaborators
- Preproposals are required

Highly integrated research teams to accelerate the discovery, creation, production, and commercialization of new technologies to form the basis of future industries with public and economic impact

Solicitation Scope

- National Laboratories leading a multi-institution collaboration involving national laboratories, universities, industry, other research institutions
- Must focus on basic research
 - Applied research is out of scope
- Applicants are strongly encouraged to include emerging research institutions, including MSIs and HBCUs
- Each Lab is limited to four preproposals, with no more than two to any one SC office as the most relevant office

Summary

- A distinctive emphasis: basic research to be conducted with an eye to an innovation's end application
- Highly multi-disciplinary, multi-program approach
- Requires devising approaches to gain insight from end-users
- Requires novel concepts to be incorporated to utilize and impact local/regional resources, including training next generation workforce