Basic Research Needs Update

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BES Workshops/Roundtables – History & Guiding Principles

BES Workshops and Roundtables provide strategic input for BES-supported research.

- Diverse participation that crosses disciplines, research institutions, industry, and federal staff
- Factual reference document to summarize current status of field
- Highly structured to engage the community and ensure participants meet the stated goals
- Produce reports that guide BES research strategies and serve as resources for the community in high-priority topical areas

The first "Basic Research Needs" (BRN) Workshop held in 2002

- In response to a BESAC charge
- Survey of science needs across the energy technology landscape
- Established the model for future BRNs
- Provided foundation for the first cadre of BES topical BRN workshops, and subsequently the BESAC "Grand Challenge" report

BES Workshops/Roundtables – History & Guiding Principles

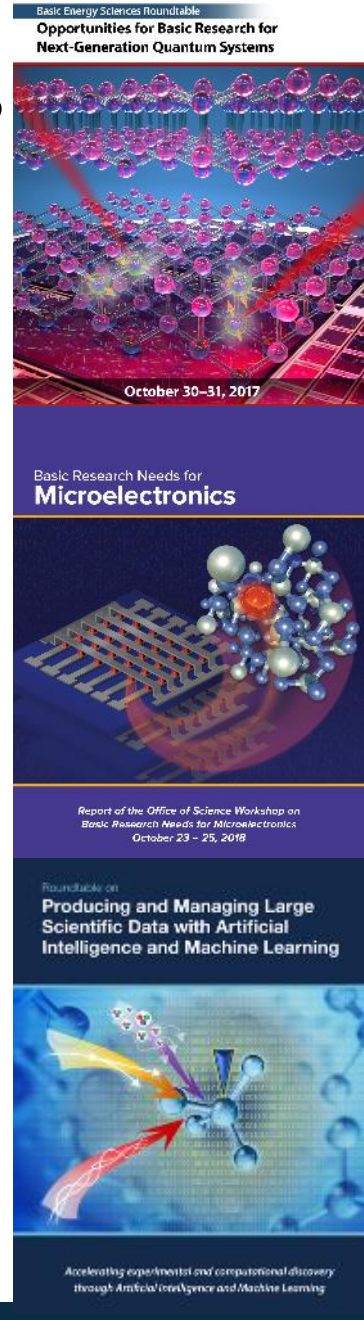
Over 20 years, BES has organized dozens of workshops and roundtables with topics based on scientific opportunity and DOE mission needs, BESAC input, and programmatic assessments

Workshops and roundtables cover the breadth of the BES portfolio, engaging other SC programs and DOE technology offices as appropriate:

- Science for Discovery
- Science for Energy Technologies and National Needs
- Scientific User Facilities

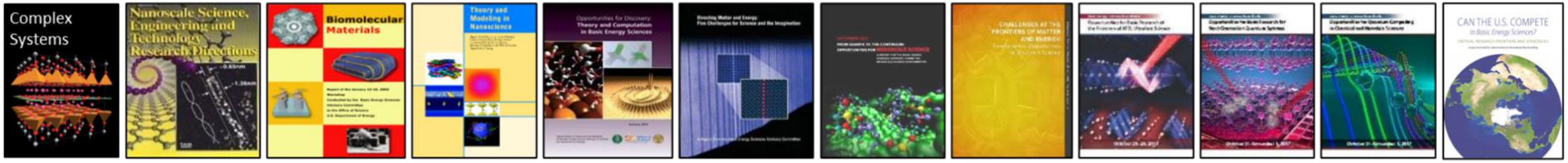
BRN workshops and roundtables, along with other reports, inform BES' strategy for discovery and use-inspired research

- Engagement of participants: A few dozen (roundtables) to 75 or more (workshops)
- Scope: Focused topics (roundtables) to broader research fields (workshops)
- Communication: Full reports, plus brochures to rapidly disseminate outcomes



20+ Years of Community-driven Input

Science for Discovery

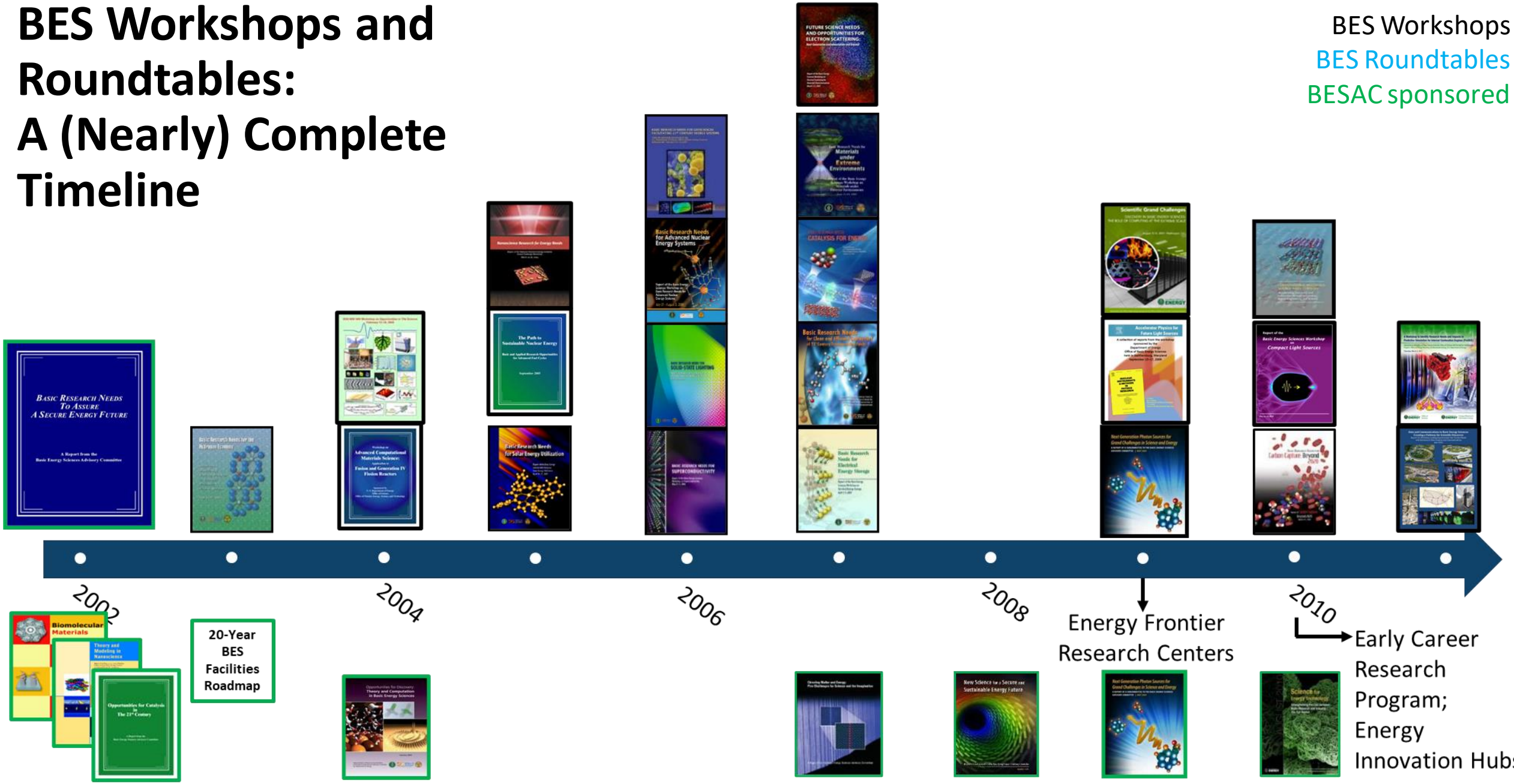


Science for National Needs

National Scientific User Facilities, the 21st century tools of science

BES Workshops and Roundtables: A (Nearly) Complete Timeline

BES Workshops
BES Roundtables
BESAC sponsored



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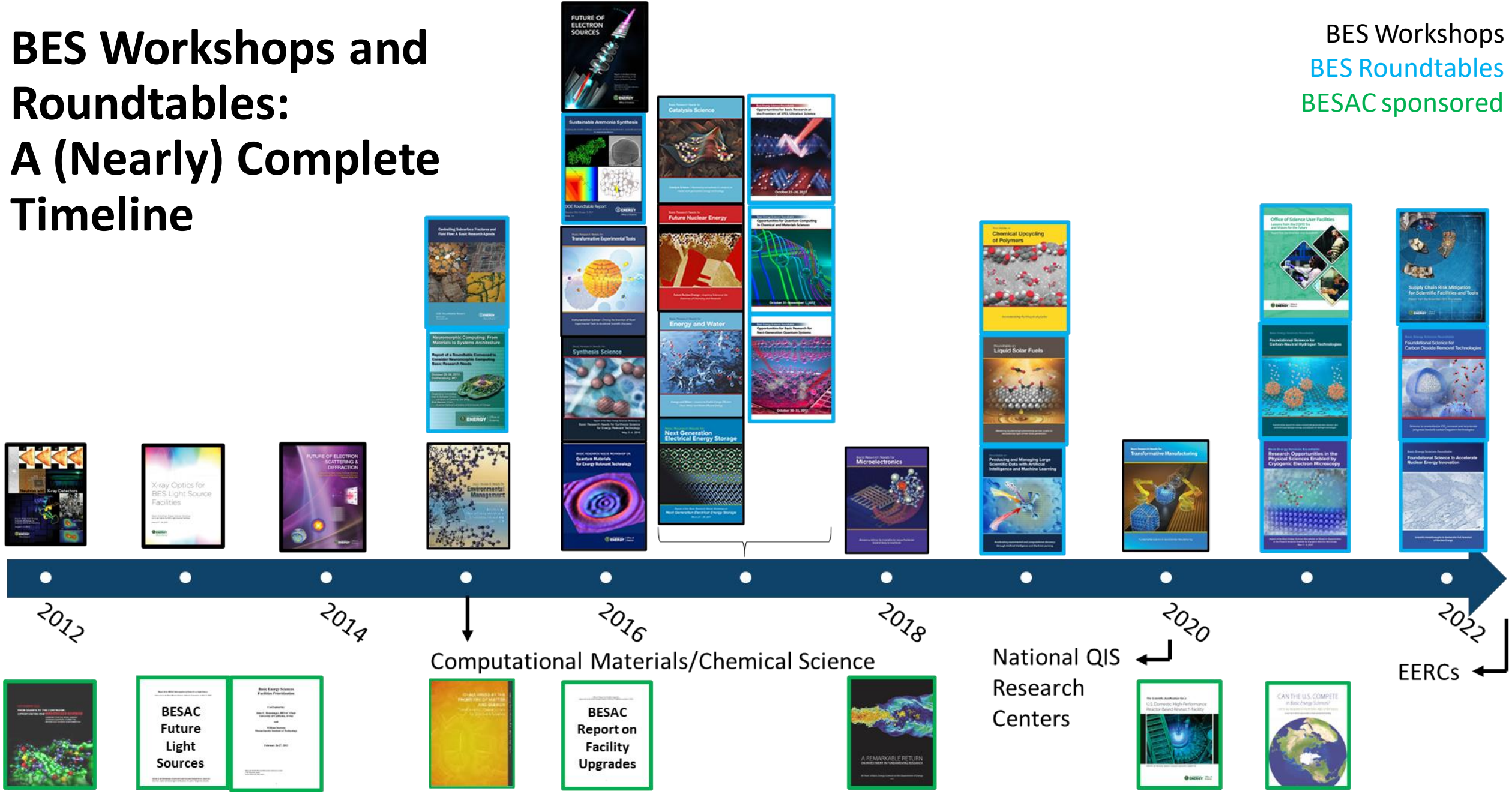

Planned BRN Workshop: Accelerator-based Beam Instrumentation

Motivation: The increasing brightness of next-generation synchrotron and XFEL light sources and higher intensity neutron sources will enable new measurements with the potential for a revolutionary impact across science. Realizing the potential of these capabilities requires commensurate advances in enabling accelerator-based beam controls and instrumentation – improved undulators and targets/moderator assemblies, detectors suited to higher intensities, and high-quality beam optics.

Scope: Explore the frontiers of instrumentation that will advance accelerator-based technologies with the goal of identifying PRDs for:

- Novel beam instrumentation
- Transformational advances in beam-based characterization tools, detectors, and optics
- Cross-cutting topics

Format: Virtual – synchronous plenary, asynchronous panels

Panels (5):

- Accelerator components and associated instrumentation – X-rays and Neutrons
- Detectors and Optics – X-rays and Neutrons
- Crosscutting Issues

Chair: Laurent Chapon, Director, Advanced Photon Source (ANL)

Co-Chair: Richard Ibberson Director, Neutron Technologies Division (ORNL)

Possible Future Workshops and/or Roundtables: 2024 and Beyond

(in no particular order)

- Science Foundations for Critical Materials Sustainability
- Next-generation Fabrication for Microelectronics and QIS
- Basic Research Needs for the Subsurface
- Future BES Computational Sciences: Theory, Data, and AI/ML for Exascale and Beyond
- Bioinspired Chemical and Materials Sciences for Sustainable Energy and Products
- Materials and Chemistry in Extreme Environments (not radiation): Renewable Energy, Manufacturing, and End Use

Feedback from BESAC

- Do the proposed topics align with scientific opportunities, BES mission, and national priorities?
- What is missing?

- Which topics need a broad workshop? Which topics would benefit from a smaller, more focused roundtable?