
IPAC24
EIC Accelerator Collaboration
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Carsten P Welsch, U Liverpool/Cockcroft Institute, UK
co-chairs of
EIC Accelerator Collaboration
21st May 2024
Electron-Ion Collider
BROOKHAVEN NATIONAL LABORATORY
Jefferson Lab
U.S. DEPARTMENT OF ENERGY
Office of Science

EIC Accelerator Collaboration

- The EIC design, construction, and future upgrades offer exciting scientific and technical challenges, creating opportunities for closely connected **worldwide accelerator R&D**.

- The **EIC Accelerator Collaboration** will help realize the full potential of these opportunities

- This will benefit the EIC project, collaboration partners, and the wider accelerator community. It will also help maximize the ultimate performance of the EIC facility on the long-term.

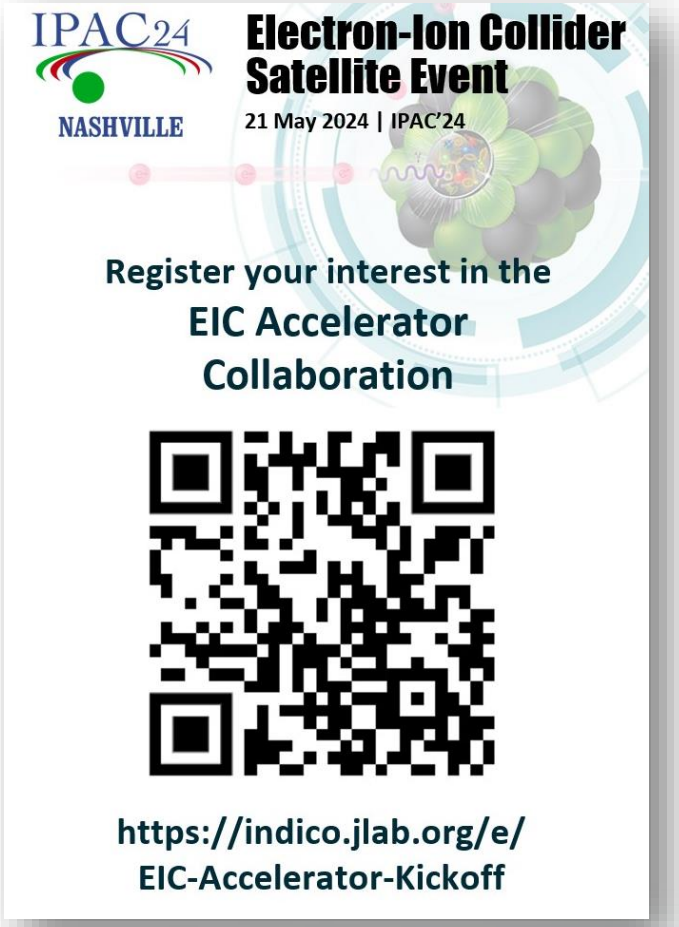
So far…

- Co-Chairs identified in 2023; have met several times to discuss initial actions
- Reached out to +400 colleagues:
  - Received many enthusiastic responses
  - Updated recipient list
  - Started listing area/s of interest
- Prepared this kick-off meeting
- Started discussions with potential partner institutions on R&D focus areas and on lessons learned from previous and ongoing projects
- Started regular meetings with Technical Director
- Developed Charter and MoU for the EIC Accelerator Collaboration

Today

- Find out about the status of the EIC project
- Discuss **your** potential contribution/s
- Network with others interested in this exciting project

Let us know by registering your interest!



Joint statement with CERN

Brookhaven National Laboratory

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Contact: Karen McNulty Walsh, (631) 344-8350, or Peter Genzer, (631) 344-3174

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French and U.S. Science Agencies Take First Step to Collaborate on Electron-Ion Collider (EIC)

U.S. Department of Energy and French Alternative Energies and Atomic Energy Commission sign "Statement of Interest" on EIC

November 13, 2023

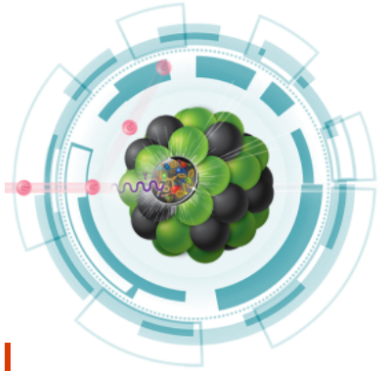

Image : Electron Ion Collider (EIC)

IN2P3 and the Department of Energy Sign "Statement of Interest" on EIC Collaboration

01 February 2024

PRESS RELE

100M$ from NY

Brookhaven National Laboratory

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Contact: Peter Genzer, (631) 344-3174

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Governor Hochul Launches $100 Million Investment in Brookhaven National Lab for Transformative Electron-Ion Collider Project

April 9, 2024

~£60M from UKRI

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Press release

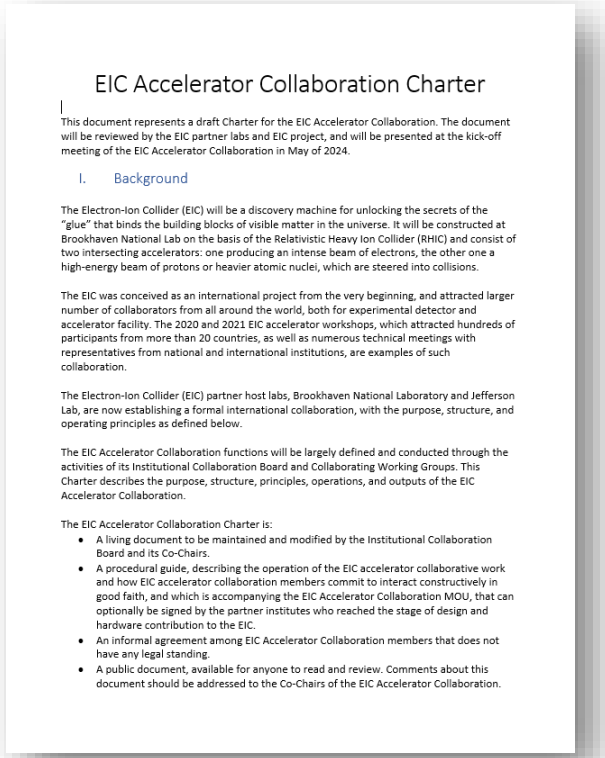
Major funding unveiled for cutting-edge research tools that could halt future pandemics and protect the planet

Researchers around the world will soon be able to access millions of the natural, historic specimens found in UK museums at the click of a button as part of a £473 million UK fund to enhance key research infrastructure.

UK Research and Innovation

- The EIC will give scientists crucial information about the forces and interactions inside protons and atomic nuclei as the smallest particles interact by colliding beams against each other.
- UK scientists will have access to the groundbreaking new facility following their frontline role in developing this international project.

Charter



EIC Accelerator Collaboration Charter

This document represents a draft Charter for the EIC Accelerator Collaboration. The document will be reviewed by the EIC partner labs and EIC project, and will be presented at the kick-off meeting of the EIC Accelerator Collaboration in May of 2024.

I. Background

The Electron-Ion Collider (EIC) will be a discovery machine for unlocking the secrets of the "glue" that binds the building blocks of visible matter in the universe. It will be constructed at Brookhaven National Lab on the basis of the Relativistic Heavy Ion Collider (RHIC) and consist of two intersecting accelerators: one producing an intense beam of electrons, the other one a high-energy beam of protons or heavier atomic nuclei, which are steered into collisions.

The EIC was conceived as an international project from the very beginning, and attracted larger number of collaborators from all around the world, both for experimental detector and accelerator facility. The 2020 and 2021 EIC accelerator workshops, which attracted hundreds of participants from more than 20 countries, as well as numerous technical meetings with representatives from national and international institutions, are examples of such collaboration.

The Electron-Ion Collider (EIC) partner host labs, Brookhaven National Laboratory and Jefferson Lab, are now establishing a formal international collaboration, with the purpose, structure, and operating principles as defined below.

The EIC Accelerator Collaboration functions will be largely defined and conducted through the activities of its Institutional Collaboration Board and Collaborating Working Groups. This Charter describes the purpose, structure, principles, operations, and outputs of the EIC Accelerator Collaboration.

The EIC Accelerator Collaboration Charter is:

- A living document to be maintained and modified by the Institutional Collaboration Board and its Co-Chairs.
- A procedural guide, describing the operation of the EIC accelerator collaborative work and how EIC accelerator collaboration members commit to interact constructively in good faith, and which is accompanying the EIC Accelerator Collaboration MOU, that can optionally be signed by the partner institutes who reached the stage of design and hardware contribution to the EIC.
- An informal agreement among EIC Accelerator Collaboration members that does not have any legal standing.
- A public document, available for anyone to read and review. Comments about this document should be addressed to the Co-Chairs of the EIC Accelerator Collaboration.

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- **Co-Chairs** of Accelerator Collaboration were initially appointed, at the formation of the collaboration, for a period of one year.

- Once the Collaboration and ICB are established, they will be elected by ICB for a period of 2 years (staggered appointment to ensure overlap).

Could you be one of the next co-chairs?

Working Groups (examples)

1. Beam dynamics, beam optics
2. Beam-beam effects
3. Beam cooling at collisions
4. Beam polarization generation, preservation and diagnostics
5. Second IR
6. EIC commissioning
7. EIC upgrades
8. In-kind accelerator contributions
9. Synergies with other projects (e.g. FCC, MC)

Expression of Mutual Interest

EXPRESSION OF MUTUAL INTEREST

between

XXXX

and

YYYY

concerning

COLLABORATION ON ELECTRON ION COLLIDER ACCELERATOR SCIENCE AND TECHNOLOGIES

2024

...

Annex 1

Potential Topics of collaboration between XXXX and YYYY (Article III of the Agreement)

- **Joint Research Activities**
  - Normal and superconducting accelerator techniques
  - Beam instrumentation and sensors
  - Accelerator design, control and optimisation
  - etc
- **Teaching**
  - Undergraduate and postgraduate teaching and training opportunities for students in the above areas, including joint PhD projects with shared funding
  - Summer schools, joint workshops
  - Sabbaticals for academic and research staff
  - etc
- **Collaborative Exchanges**
  - Short-term exchange of researchers and technical staff for joint research and training activities
  - Exchange of scientific publications, information and participation in international conferences related to the subjects of the cooperative agreement
  - Joint staff appointments
  - Honorary affiliations
  - etc

Best EIC-related student poster @ IPAC

BAGELS: A General Method for Minimizing the Rate of Radiative Depolarization in Electron Storage Rings

- A novel method for minimizing the effects of radiative depolarization in electron storage rings by use of vertical orbit bumps in the arcs
- A singular value decomposition of the response matrix of the spin-orbit coupling function is used with each coil to define a minimal number of most effective groups of coils
- The "Best Adjustment Groups for ELectron Spin" (BAGELS) method is used to minimize depolarizing effects in an ideal lattice, and to obtain fine-tuning knobs to restore the minimization in rings with realistic closed orbit distortions.
- BAGELS has significantly increased the polarization in simulations of the 18 GeV ESR, beyond what can be achieved with established methods.

Congrats to Matthew Signorelli!

Next steps

- Discuss your ideas with us, engage with the project!
- Formation of Working Groups and Institutional Board
- Consider applying for role of Co-chair

Benefit from networking opportunities during IPAC'24!