EIC RIKEN / U-Tokyo Collaboration Meeting

Host: Jim Yeck

February 3, 2025

U-Tokyo/IQPN Branches in BNL and JLab and U-Tokyo – (RIKEN-) BNL collaboration in EIC and technologies

TAKU GUNJI (EIC-JAPAN REPRESENTATIVE)

RIKEN RNC (VISITING SCIENTIST)
QUARK-NUCLEAR SCIENCE INSTITUTE, CENTER FOR NUCLEAR STUDY, THE UNIVERSITY OF TOKYO

東京大学 大学院
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SCHOOL OF SCIENCE, THE UNIVERSITY OF TOKYO

IQPN

IQPN: International Quantum Physics Network

2025: Started with U-Tokyo and U-Osaka

2026: Strengthening inter-university collaboration, expanding IQPN by establishing a leadership framework for EIC experiments through partnerships between domestic key institutions, and developing both domestic and international hubs for advanced research and technology development

U-Tokyo, Quark-Nuclear Science Institute

EIC, US

- Lead international experiments such as EIC
- Establishment of international research and education centers at BNL and JLab
- Standardization of streaming computing and advanced semiconductor technologies

SCHOOL OF SCIENCE THE UNIVERSITY OF TOKYO

QNSI The University of Tokyo

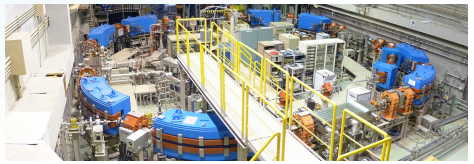
University

Tohoku University, Research Center for Accelerator and Radioisotope Science

Infra, Application

- Quantum measurement technology development base using accelerator beams
- Application of cutting-edge quantum measurement technology to different fields

RARiS Tohoku University



University

Hiroshima University

Infra

- Advanced semiconductor technology development base based on a highly advanced large clean room

HIROSHIMA UNIVERSITY

U-Osaka, Research Center for Nuclear Physics

- standardization of advanced streaming data acquisition systems
- High-precision quantum beam technology and application development using AI control
- Domestic community contact point

Infra, DAQ

RCNP 大阪大学 核物理研究センター

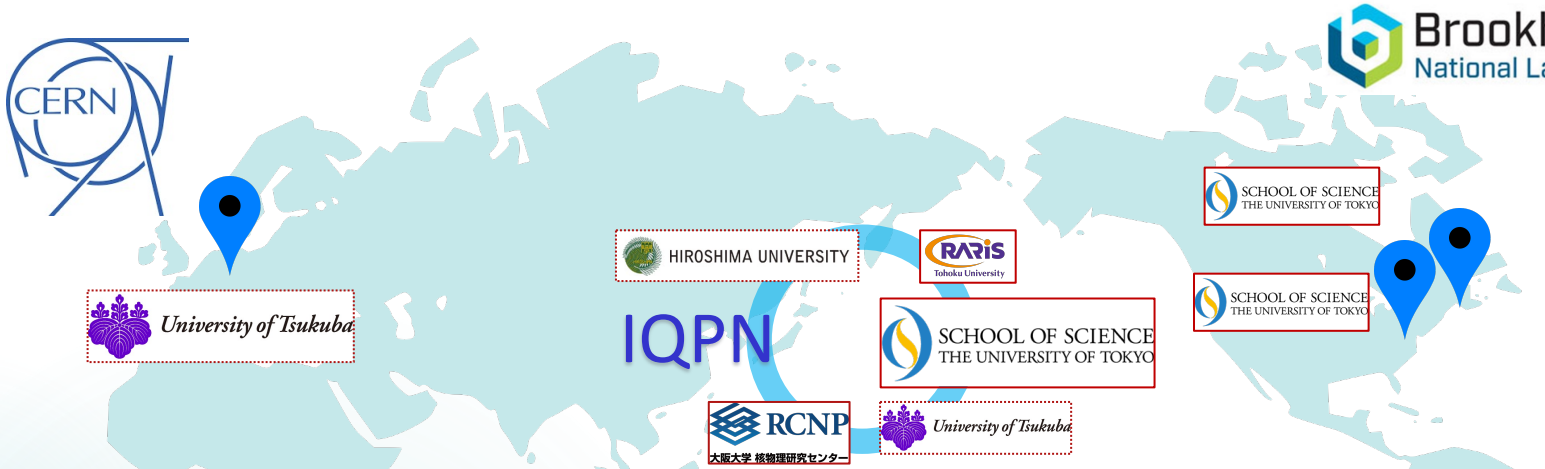
Tsukuba University

CERN, Europe

- Establishment of international research and education center at CERN in Europe
- Point of contact for quantum research and technology development with Europe

University of Tsukuba

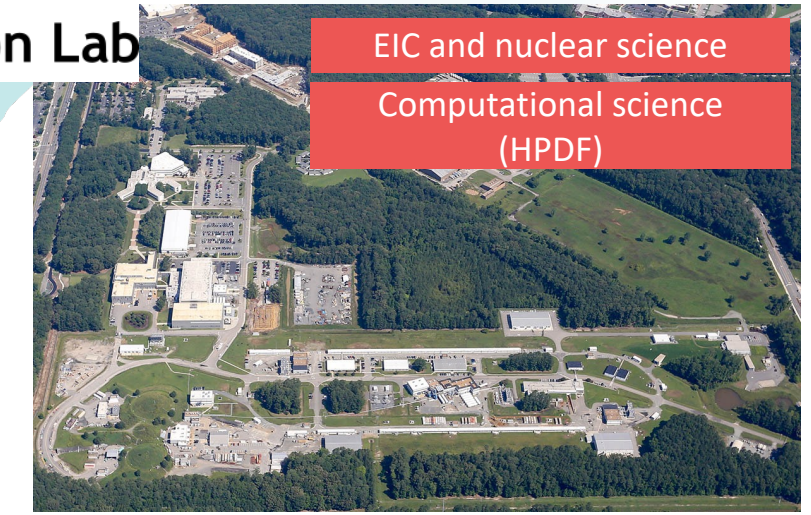
IQPN/U-Tokyo branches in BNL/JLab



Brookhaven National Laboratory

- EIC and nuclear science
- Technologies (Quantum, AI)
- Computational science (AI)
- Energy & Photon science

Jefferson Lab



- EIC and nuclear science
- Computational science (HPDF)

Building IQPN-BNL base and IQPN-JLab base

Education Hub

- Develop international quantum science talent
- Provide EIC-centered training programs
- Foster US-Japan researcher exchanges

International Project Collaboration

- Data collection and semiconductor sensor standardization
- Establishing advanced analysis methods for large-scale EIC experimental data
- Developing quantum science research tools using AI/ML

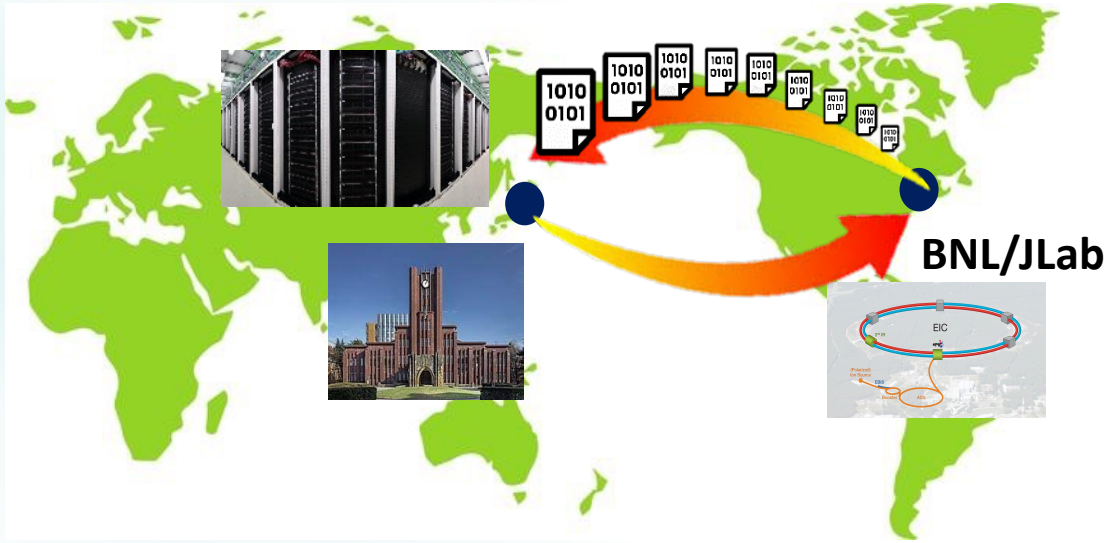
Research Collaboration Expansion

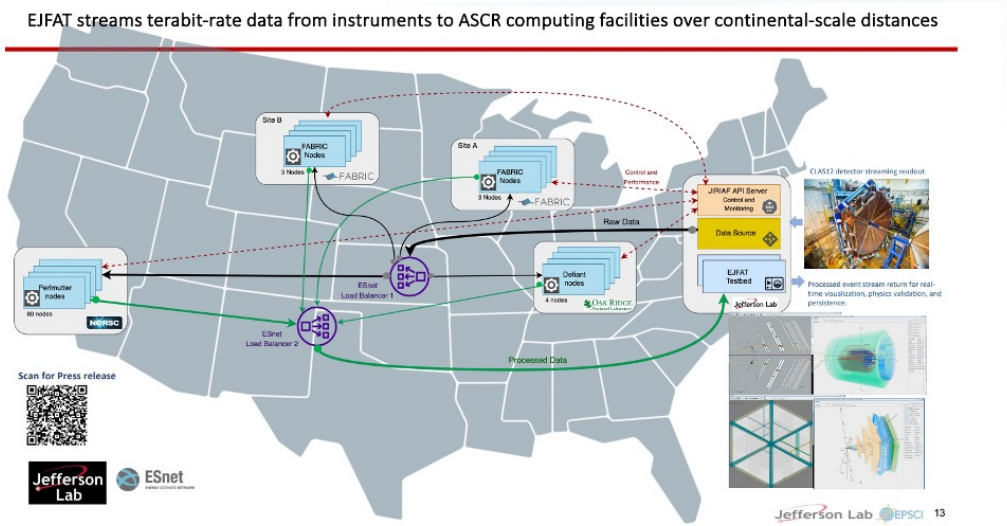
- Broaden research with BNL and JLab beyond nuclear physics (quantum, AI, computational science, optical science)
- Collaborate with RIKEN RBRC
- Establish multi-scale quantum dynamics network and Build global research community

Example of associated projects

Building streaming large-scale data analysis system through implementation in EIC

- Develop ERSAP framework for real-time processing of unprecedented data streams
- Join US FABRIC network for global real-time data analysis
- Implement AI and computational accelerator-driven high-speed processing
- Create architecture to control massive processing and computational hierarchies
- Establish international big data technology standards and next-generation scientific infrastructure





https://portal.fabric-testbed.net/about/about-fabric

FABRIC

International infrastructure for cutting-edge research in the areas of networking, storage, distributed computing, machine learning, science applications, etc.

Other examples:

- **Instrumentation (MAPS, AC-LGAD, AI chip, Quantum)**
- **AI/ML researches with Ai/ML working group**

What to be discussed

- Feedback about this proposal?
- Having a base in BNL and JLab possible?
  - Lab and office space
  - Mentors
  - Exchange program
  - Budget execution in US
- How to move forward if agreed?
  - MoU (starting from cooperation in QCD physics)?
  - Relation to RBRC/RIKEN?