

# **EIC Resource Review Board (RRB)**

## **Meeting Minutes of the EIC RRB Meeting**

**May 6-7, 2023**

**Borgognoni Hotel, Rome, Italy**

**Hosted by INFN**

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### **Hosts:**

Diego Bettoni, Co-Chair, Vice President, INFN

Haiyan Gao, Co-Chair, Associate Laboratory Director, Nuclear and Particle Physics, BNL

David Dean, Deputy Director for Science, TJNAF

Jim Yeck, EIC Project Director, Associate Laboratory Director, BNL

### **EIC RRB Participants:**

Pietro Antonioli, Research Director, INFN

Jaroslav Bielcik, Professor of Physics, Czech Technical University in Prague

Francesco Bossù, Head of the Nucleon Structure Laboratory, CEA- Saclay

Carlos Munoz Camacho, Staff Scientist, IN2P3, CNRS

Gianpaolo Carlino, Director of Research, INFN

Kai-Feng Chen, Professor, National Taiwan University

Zvi Citron, Associate Professor, Ben Gurion University of the Negev

Paolo Guibellino, President of Third Scientific Committee, INFN

Yuji Goto, Senior Scientist, RIKEN

Marcella Grasso, Scientific Director for Nuclear Physics, IN2P3, CNRS

Taku Gunji, Professor, University of Tokyo

Peter Jones, Professor, University of Birmingham

Kyungseon Joo, Professor, University of Connecticut

Rajiv Kumar, Scientist-F, Department of Science & Technology, Govt. of India

Kyounglim Lee, Director, Division of International Cooperation with Americas and Asian Countries, Ministry of Science and ICT

Chia Ming Kuo, Professor, National Central University

Arnaud Lucotte, Scientific Director for Accelerator and Technologies, IN2P3, CNRS

Rosario Nania, Director of Research, Chair of Commission for Nuclear Physics Experiments, INFN

Nigel Smith, Executive Director, TRIUMF

Praveenkumar Somasundaram, International Cooperation Head, Department of S&T

Marek Vyšinka, Head of Unit, Ministry of Education, Youth and Sports

Hwidong Yoo, Professor, Yonsei University

### **EIC Project, BNL & TJNAF Participants:**

Elke Aschenauer, Co-Associate Director for the Experimental Program, BNL

Paolo Berrutti, In-Kind Contributions Engineer, BNL

Maria Chamizo-Llatas, Deputy Associate Lab Director for Engagement & Development, Nuclear and Particle Physics, BNL

Abhay Deshpande, Distinguished Professor, SBU & EIC Science Director, Nuclear and Particle Physics, BNL

Rolf Ent, Co-Associate Director for the Experimental Program, TJNAF

James Fast, EIC Associate Project Manager, TJNAF

Alexei Klimentov, Interim SDCC Director, speaker, BNL

Luisella Lari, EIC Project Manager, BNL

Alyssa Petrone, EIC Chief of Staff, BNL

#### **U.S. Department of Energy Participants:**

Harriet Kung, Acting Director, Office of Science

Michael Famiano, International Cooperation & Outreach, Office of Nuclear Physics

Paul Mantica, Facilities & Project Management Division Director, Office of Nuclear Physics

#### **Other Attendees:**

Amber Boehnlein, Chief Information Officer, TJNAF

Silvia Dalla Torre, ePIC Deputy Spokesperson and Technical Coordinator, Associate Scientist, INFN

Markus Diefenthaler, ePIC Computing Coordinator, Staff Scientist, TJNAF

Stuart Henderson, Director, TJNAF

JoAnne Hewett, Director, BNL

John Hill, Deputy Director for Science and Technology, BNL

John Lajoie, ePIC Collaboration Spokesperson, RNP Group Leader, ORNL

Rachel Montgomery, Research Fellow, University of Glasgow

### **Day 1- Monday, May 6, 2023**

#### **Welcoming Remarks: Diego Bettoni**

The RRB participants were welcomed to Rome on behalf of the National Institute of Nuclear Physics (INFN) President, Antonio Zoccoli. INFN is the first international host of the EIC RRB meeting.

#### **Meeting Goals and Approval of the December 2023 Meeting Minutes- Haiyan Gao**

The December 2023 meeting minutes were unanimously approved. A discussion followed about RRB membership. It was agreed that at this point in time, it is best to be as flexible as possible and inclusive in discussions.

The goals of the May 2024 meeting were presented:

- Address questions/requests from the December 2023 meeting
- Next EIC major EIC milestone CD-3B
  - In-Kind contributions
  - Agreements and timelines
- International engagement and contributions
- Proposal for common funds
- Draft proposal for computing (in-kind) contribution
- RRB: members and observers (continuing topic)
- Emerging topics
- Next RRB Meeting: dates and location

### **EIC Science: Rachel Montgomery**

Rachel presented an engaging science overview talk titled: "Glimpse into the vast EIC science: Exploring the glue that binds us all."

### **EIC Project Status: Jim Yeck**

The EIC project achieved CD-3A Long-Lead Procurement (LLP) in March 2024 and is working on planning for CD-3B LLP in 2025. The in-kind goals for the project remain at 5% for the Machine and 30% for the Detector. The US President's Budget Request was much less than anticipated, at \$113M and requires the funding plan to be reevaluated. The \$138M funds from the Inflation Reduction Act (IRA) will support CD-3A and the future CD-3B. The DOE is working with the project on its plans. As of today, there is a total commitment of ~\$500M between DOE, NYS, and IRA funds. Project priorities this year include: the execution of the CD-3A scope; clarifying the technical baseline, cost, schedule, partnerships and project organization; preparing the CD-3B procurements for approval; and, preliminary design (final design for CD-3A) and preparation for CD-2.

### **EIC Project Detector Overview: Rolf Ent & Elke Aschenauer**

EIC science continues to receive worldwide endorsement including, but not limited to the Canada Long-Range Plan, NSAC Long-Range Plan, India MegaScience Vision Plan, and NuPECC recommendation. There has been a successful transition to the ePIC detector collaboration which exhibits an excellent working mode. Project detector research and development (R&D) started in Q3/FY22 and benefits from a large in-kind component. The R&D milestones have been defined and included in P6. The Detector Advisory Committee reviews annual progress. Nearly all the FY24 contracts are in place and all non-Si/ASICs related detector R&D are on track to be completed in FY24. DOE initiated generic EIC detector R&D program in FY22, which is hosted by JLab. In regard to Project Engineering and Design (PED), there has been excellent progress and designs are maturing with help from our many domestic and international collaborators. This constitutes approximately \$5M in-kind non-DOE PED contribution. The detector is technically baselined with the central detector baseline technologies chosen in July 2023 and the far-forward/far-backward baseline technologies chosen in February 2024. Recent focus is on CD-3A, CD-3B, and the path to CD-2 which includes preparing for detector CD-3A long-lead procurement contracts. Additionally, CD-3B for detector encompasses a phase continuation for CD-3A scope and select other items. We are on track to reach CD-2 and required design maturity in 2025.

### **Remarks by Acting Director, Office of Science: Harriet Kung**

The EIC is a very high priority within the Office of Science (SC). The SC is paying close attention to the schedule and coordinating with domestic and international partners to ensure we can uphold commitments. The SC appreciates the RRB participants' efforts to secure funding for their contributions and is thrilled to have them as partners. The SC is committed to delivering the EIC. The EIC will become a model for international collaboration within the Office of Science. Partner input was encouraged. A thank you was given to the EIC team for the exciting progress achieved as of today.

### **Report from the EIC Advisory Board (AB): Stuart Henderson**

The AB closely coordinates with the RRB and has some overlap in membership. The AB reports to the BNL Director, JoAnne Hewett. A charter was recently approved in June 2023. The focus is on providing guidance and advice on the construction of the EIC facility and domestic and international partnerships for the accelerator. The AB is setup to naturally evolve from focusing on collaboration opportunities to the actual execution of the project. At the January meeting, a report was given by the new Technical Director, Sergei Nagaitsev. Plans to form an Accelerator Collaboration were presented. This came from a previous action item from the AB. The purpose of the collaboration is to attract experts worldwide on accelerator topics. There will be a satellite Kick Off Meeting held at IPAC'24. The collaboration is led by co-chairs Andrei Seryi (JLAB) and Carsten Welsch (Liverpool). The next AB meeting is being planned for July.

### **Update on the NuPECC Long Range Plan (LRP) 2024: Diego Bettoni**

An in-person LRP2024 Town Meeting was held on April 15-17, 2024 in Bucharest. The draft LRP2024 report and recommendations were presented and discussed. Collaboration with EIC was included as a recommendation, particularly on the construction of ePIC. The LRP approval will be announced in June 2024 at the Lund meeting. The official presentation will take place in November 2024.

### **Status of International Agreements and Engagement: Luisella Lari**

Before CD-2, both binding agreements and non-legally binding agreements such as Project Planning Documents (PPDs), must be signed. This is important to ensure IKCs delivered to us by partners can be used in the machine. DOE high-level agreements do not include all the scope. iCRADAs are laboratory level binding agreements for all IKC items for which PPDs are requested. Canada, France, Italy, and the UK are in the first phase of developing draft iCRADAs and PPDs.

### **In-Kind Documentation Path Forward: Paolo Berrutti**

In general, lab-level agreements contain all project-level and technical details and are most important in the project execution phase. The target dates for PPDs shifted to March 2025 in accordance with the updated plans for CD-2 plus an additional six months to account for required DOE approvals. Each PPD requires four supplementary documents: Quality Assurance Plan, Acceptance Criteria, Acceptance Plan, and Risk Management Plan. Technical Representatives should be identified as soon as possible.

### **Report from the ePIC Collaboration Spokesperson: John Lajoie.**

The ePIC Collaboration is growing and active. Leadership is focused on welcoming new institutions and improving engagement. The overall structures of the ePIC Collaboration, ePIC Working Group Structure, and Detector Subsystems were discussed. The Collaboration Committees are fully formed. Membership and Conference and Talks policies expected to be approved at the July 2024 Collaboration Meeting. Draft policies on Code of Conduct and Publication are in development. There will be an election for a new Spokesperson in February 2025. The CERN Research Board made their recommendation for EIC to be a recognized experiment at the March 2024 CERN Council Meeting. ePIC leadership is working on the next steps. There was strong participation at the January 2024 ePIC Collaboration Meeting, with 175 in-person members in attendance. The goal is to make the Technical Design Report (TDR) available by CD-2.

## **Report from the ePIC Technical Coordinator: Silvia Dalla Torre**

The structure of the Detector Subsystem Collaboration is established and the subsystems are progressing thanks to the expertise and efforts of the collaboration institutions. The technology selection is functional to the required performance as resulting from the physics scope.

## **Report on ePIC Software and Computing by the Computing Coordinator: Markus Diefenthaler.**

An ePIC Software and Computing Review took place in October 2023. The outcome was positive. Two meetings were held since the December 2023 RRB meeting to enable software progress, advance review preparations, and inform planning. ePIC aims for rapid data turnaround to maximize and accelerate science. The ePIC Streaming Computer Model is comprised of four tiers:

- Echelon 0: ePIC experiment and its streaming readout.
- Echelon 1: Crucial and innovative partnership between host labs.
- Echelon 2: Essential global contributions.
- Echelon 3: Full support of the analysis community.

Continuous Integration (CI) driven benchmarks and timeline-based prioritization are in place to ensure the timely completion of simulation studies needed for the TDR.

## **Discussion on the ePIC Streaming Computing Model and the Host Lab Computing Support Status: Amber Boehnlein and Alexei Klimentov.**

BNL and JLAB established the EIC Computing and Software Joint Institute (ECSJI) in 2023. The ECSJI will administer the EIC International Computing Organization (EICO), which will include all the contributors to the EIC computing efforts. The proposed EIC Computing Organization and Governance organization chart were presented. This includes a Computing Council (ECC), Institute Management, Computing and Software Advisory Committee (ECSAC), and the International Computing Organization (EICO). The ePIC Streaming Computing Model is the primary document for preparing agreements with international partners. External partners will be included in drafting the EICO charter. Discussions with WLCG are in progress. The first version of the ePIC Streaming Computing Model will be reviewed by the ECSJI Computing and Advisory Committee in Fall 2024. Discussions are ongoing with international partners including Italy, Canada and UK.

## **Day 2- Friday, December 8, 2023**

Further discussion took place on common computing projects and resources. Action items were discussed that are included at the end of these minutes.

## **Common Funds Proposal: Rosario Nania**

The draft proposal is based on past experience at CERN and DOE requirements. It includes a draft list of Maintenance and Operation (M&O) costs to operate the ePIC experiment. Another revision is expected at the end of 2024 which will include the preliminary estimates. It is assumed the document will be valid starting in 2028. The costs in 2025-2027 can be handled informally. The governance model and cost categories were presented.

## **Draft Proposal for Global Strategy: Elke Aschenauer**

This proposal included input from the EICUG and ePIC. The main ideas are to expand the experimental community, create a STEM pipeline, provide opportunities for early career scientists in developing countries, and develop a truly diverse workforce. An estimated 10% of the Common Fund money will be dedicated to outreach activities.

### **Updates were given by funding agencies and/or PIs for the following countries:**

- Canada there will be a proposal for accelerator and detector from all Canadian universities.
- Czech Republic
  - Proposed to be the next international host for the RRB meeting in 2025
- France
- India-
- Israel
- Italy
- Japan
- South Korea
- Taiwan
- United Kingdom
- United States

### **Next RRB Meeting**

It was unanimously decided that the 4<sup>th</sup> RRB Meeting will be held in the USA at Brookhaven National Laboratory on November 12-13, 2024.

### **Action Items:**

1. Echelon 1 is funded by DOE-NP; Echelon 2 & 3 are extraordinary and IKC. Develop mechanism to determine needs and what the pledges will be.
2. International Funding agencies will look into their existing computing infrastructure and its alignment with EIC Echelon 2.
3. RRB develops its vision for EIC computing and governance.
4. Clarify the relationships with the RRB, EICO, and EICJI.
5. Establish EICO by next RRB.
6. Review of ePIC computing model will be scheduled by next fall before the next RRB.
7. Further development of an overall governance structure (RRB, EICJI, computing, experiment, EIC project).
8. Develop task force to prioritize outreach action proposals and working group to develop communication strategies.

Meeting adjourned.

Minutes reported by Alyssa Petrone, [apetrone@bnl.gov](mailto:apetrone@bnl.gov).

**Approved on November 12, 2024**