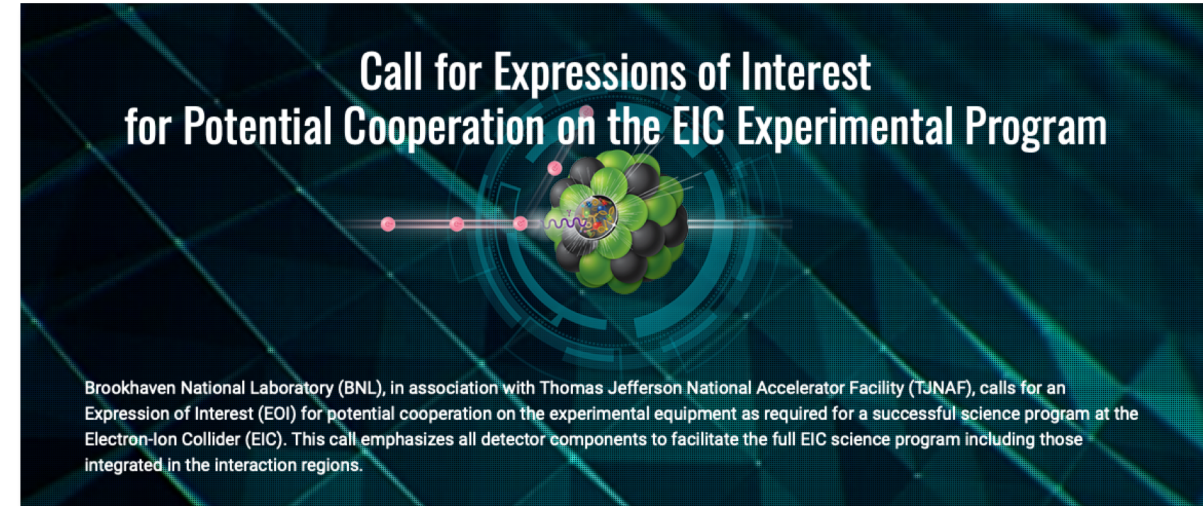


Discussion of YR content: Software

11.10 Software, Data Analysis and Data Preservation

This section will describe the computing needs for the reference detector at the EIC and discuss the foreseen software developments.

Aside from possible contribution of machine backgrounds, the reconstruction of events at the EIC will be easier than the same task at present LHC or RHIC hadron machines, and, in perspective, much easier than for the high luminosity LHC (HL-LHC), which will start



Status of SWG contribution

Expression of Interest for EIC Software

Andrea Bressan (Trieste), Markus Diefenthaler (JLAB), Torre Wenaus (BNL)



YR sections related to software

11.9 Data Acquisition

11.10 Software, Data Analysis and Data Preservation

11.11 Scientific Computing, Artificial Intelligence and Machine Learning

14.6.2 Readout Software Architecture, Orchestration and Online Analysis

Status of 11.10 CDR version written by Andrea

- Reconstruction time of DIS events
- Importance of software design, development, and planning for success of the EIC
- **Growing software effort**
 - EIC Software Consortium (eRD20)
 - SWG
- **Overview**
 - Activities of SWG **Add** tools used for YR, common projects from EoI
 - Software Tools **Add** role of AI/ML: cross reference to 11.11
- **Discussion**
 - simulations for detector optimization
 - Monte Carlo event generators for the EIC

Community input for Expression of Interest

Software Needs

Requirements What software needs for EIC Software would you like to highlight now, in a few years, and for the completion of the EIC project?

Technologies & Techniques What software technologies and techniques should be considered for the EIC?

Meeting Software Needs

What resources can your group contribute?

Expression of Interest for Software

1

Expression of Interest (EOI) for Software

Please indicate the name of the contact person for this submission:

Conveners of the Software Working Group:

- A. Bressan, M. Diefenthaler, and T. Wenaus
- eicug-software-conveners@eicug.org

Please indicate all institutions collectively involved in this submission of interest:

| | | |
|----------------------|--|------------------------|
| ANL | Argonne National Laboratory | 29 institutions |
| BNL | Brookhaven National Laboratory | |
| CEA/Irfu | IRFU at CEA /Saclay institute | |
| EIC-India | Akal University, Central University of Karnataka, DAV College Chandigarh, Goa University, Indian Institute of Technology Bombay, Indian Institute of Technology Delhi, Indian Institute of Technology Indore, Indian Institute of Technology Patna, Indian Institute of Technology Madras, Malaviya National Institute of Technology Jaipur, Panjab University, Ramkrishna Mission Residential College Kolkata | |
| IMP-CAS | Institute of Modern Physics - Chinese Academy of Sciences | |
| INFN | Istituto Nazionale di Fisica Nucleare | |
| JLab | Thomas Jefferson National Accelerator Facility | |
| LANL | Los Alamos National Laboratory | |
| LBNL and UC Berkeley | Lawrence Berkeley National Laboratory and University of California, Berkeley | |
| NCBJ | National Centre for Nuclear Research | |
| OhioU | Ohio University | |
| ORNL | Oak Ridge National Laboratory | |
| SBU | Stony Brook University | |
| SLAC | SLAC National Accelerator Laboratory | |
| SU | Shandong University | |

<https://indico.bnl.gov/event/8552/contributions/43221/>

Common Projects

- **Software Tools for Simulations and Reconstruction**
 - Monte Carlo Event Generators
 - Detector Simulations
 - Reconstruction
- **Middleware and Preservation**
 - Workflows
 - Data and Analysis Preservation
- **Interaction with the Software Tools**
 - Explore User-Centered Design
 - Discoverable Software
 - Data Model

Future Technologies

- Artificial Intelligence
- Heterogeneous computing
- New languages and tools
- Collaborative software