

## **Call for Expressions of Interest for Potential Cooperation on the EIC Experimental Program**

Brookhaven National Laboratory (BNL) in association with Jefferson Lab (JLab) calls for an Expression of Interest (EOI) for potential cooperation on the experimental equipment as required for a successful science program at the Electron-Ion Collider (EIC). This call emphasizes all detector components to facilitate the full EIC science program including those integrated in the interaction regions.

The Electron-Ion Collider will be a powerful new facility in the United States that is constructed with the aim of studying the particles, gluons, which bind all the observable matter in the world around us. The EIC facility will collide intense beams of spin-polarized electrons with intense beams of either spin-polarized protons, deuterons, and helium-3 or unpolarized nuclei up to uranium. Detector concepts are now being developed to detect the high-energy scattered particles as well as the low-energy debris as a means to definitively understand how the matter we are all made of is bound together.

The Electron-Ion Collider User Group, which currently has more than 1000 members from over 200 laboratories and universities around the world, initiated a Yellow Report Initiative with its purpose to advance the state and detail of the documented physics studies and detector concepts to prepare for the realization of the EIC (see <http://www.eicug.org/web/content/yellow-report-initiative>). The effort aims to provide the basis for further development of concepts for experimental equipment best suited for science needs, including the possible complementarity of two detectors towards future Technical Design Reports (TDRs).

This “Call for Expressions of Interest” for cooperation on the EIC experimental program is in phase with the assumed timeline for the Yellow Report completion. The EOI will give the EIC Project guidance on current interest in participation in the EIC experimental program, including an initial understanding of the full scope of the experimental equipment that might be available for the expedient start of science operations at the time of EIC project completion.

We encourage interested groups to work together within their country, their geographical region, or as a general consortium, to submit their interest for potential EIC equipment cooperation. Please differentiate if the EOI is for in-kind detector components or those integrated in the interaction regions, and detail if contributions are for full material purchases or cost reductions, are for contributed labor, or for any combination of these. Please also indicate what if any assumptions are made to receive support for the discussed cooperation from the EIC Project or the labs.

To facilitate this process, we have added a listing of “Frequently Asked Questions” below, and also provide a template for a questionnaire that may guide you to what information is useful.

An EOI is non-binding, and will mainly be used to guide expectations and to better understand the potential EIC experimental equipment scope.

## **Frequently Asked Questions Call for Expressions of Interest (EOI)**

**1. Who will submit the EOI? Is it one EOI from each institution?**

An EOI can be made either by individual groups or interested groups planning to work together within their country, their geographical region, or as a general consortium. An EOI helps to inform the potential national non-DOE and international engagement to the EIC Project.

**2. Can institutions submit more than one EOI?**

Institutions may very well consist of different groups that have more than one interest. However, any individual institution should not submit more than one EOI, and that EOI should be all-inclusive. Institutions may also join other groups and/or consortia in their Expressions of Interest, with cross-referencing to the individual institution EOI.

**3. Can groups who are not part of the EIC User Group submit?**

Yes, certainly they can. The call for EOI is open to anyone, regardless if they have been integrally involved in the EIC efforts to date or not. Similarly, not submitting to the EOI will not rule new interested groups out.

**4. To whom do we submit the EOI?**

The EIC Project. We will collect all submitted EOIs at <https://indico.bnl.gov/event/8552/>.

**5. What exactly will this expression of interest be used for?**

To inform the EIC Project about what detector scope can be built, e.g., if one or two detectors would be included, one or two interaction regions, what ancillary equipment to assume, etc. It may be used to inform with which countries agreements in any kind of form are desired. It may also be useful for further discussions between DOE and NSF.

**6. What exactly is the topic of the call? Physics interest or interest in building scientific equipment, e.g. part of a detector?**

This call does not include physics interest and is solely aimed at the experimental program. It can include interest in taking full responsibility for a subdetector or other equipment towards the EIC experimental program such as those integrated in the interaction region, it can include intent to provide funds towards such a subdetector or other equipment, or it can give an idea what labor (FTEs and type (students, postdocs, engineering, ...)) towards the experimental equipment may be contributed.

**7. Are Data Acquisition, Online and Offline Software tasks included?**

Data acquisition and software tasks should be included in the response to the call, these are considered part of the experimental program. Often, only those tasks needed to confirm the Project's deliverables are part of a formal DOE Project, whereas the more general software development towards higher-level physics analysis is seen as scientific research task. In either case it will help understanding towards potential cooperation.

**8. Can groups or institutions that have their regular support from DOE-NP submit?**

Absolutely. Also for those groups and institutions the EOI will be used to gauge potential engagement towards the EIC experimental program, be it through interest in cooperating in or building scientific equipment, potential labor cooperation, etc.

**9. Should Brookhaven National Lab and/or Jefferson Lab submit?**

Both Brookhaven National Lab and Jefferson Lab have a vested interest in the scientific outcome of the EIC and plan to cooperate under a partnership agreement. As such, BNL in association with JLab first and foremost will act as host for the EIC Project, and both actively work together towards the timely and successful completion of the EIC Project, its Experimental Equipment, and the implementation of the EIC experimental program. As such, individual EOIs of BNL and JLab should instead detail the resources and expertise available to the EIC project. However, it is expected that BNL and/or JLab may join other institutions and/or consortia in their Expressions of Interest.

**10. What is exactly meant with assumptions from the DOE-NP Project or the labs?**

When you submit your expression of interest there likely will be need for laboratory or EIC Project support. For example, for in-kind experimental equipment cooperation you may need storage space at the lab(s), or access to test equipment. Or you or your group cannot provide engineering and design activities and rely on those from the EIC Project. Or you need those only for the integration activities. Or your expression of interest relies on certain material costs to be covered by the EIC Project, etc.

**11. Is there a financial/funding context to this?**

No, in the sense that the submission to this Call for Expression of Interest is non-binding. Yes, in the sense that it will be used to guide experimental equipment scope of the EIC.

**12. What will the information submitted be used for?**

The information will be used to gauge potential engagement in the EIC experimental program. This includes DOE-NP EIC Project, DOE non-Project, national non-DOE-NP, and international engagement to the EIC equipment, be it experimental equipment or cooperation in the Interaction Regions. Such information can be used to evaluate the scope of the EIC experimental equipment potentially available and the possibility of two fully instrumented interaction regions and their detectors.

**13. Where does this step lie on the path to build collaborations that propose detectors?**

The call for detector proposals will come after an evaluation of the EOI submissions. The evaluation will guide the call for detector proposals.