*Expression of Interest*のコールについて

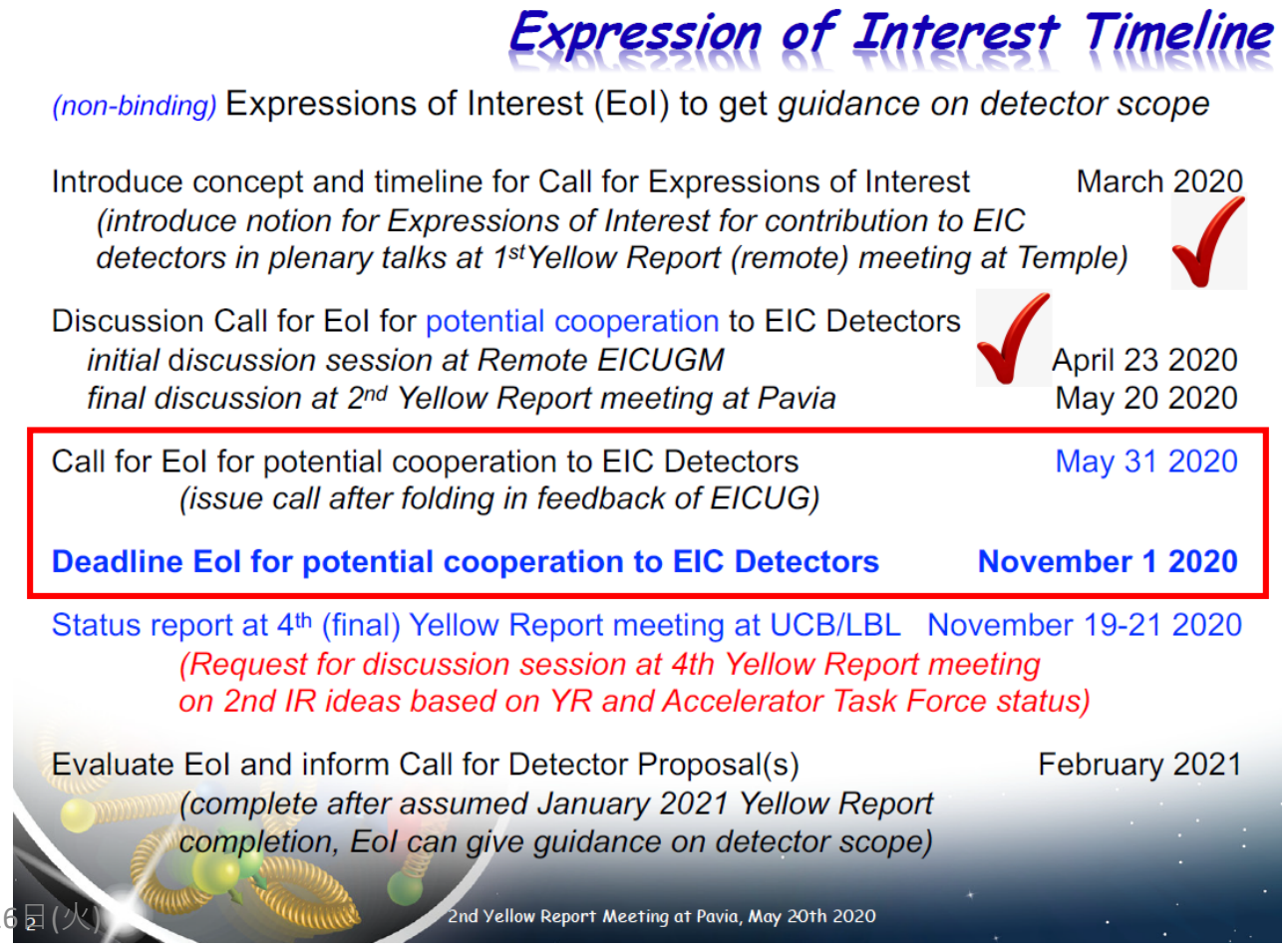
LHC-EICミーティング

2020年6月16日

後藤雄二（理研）

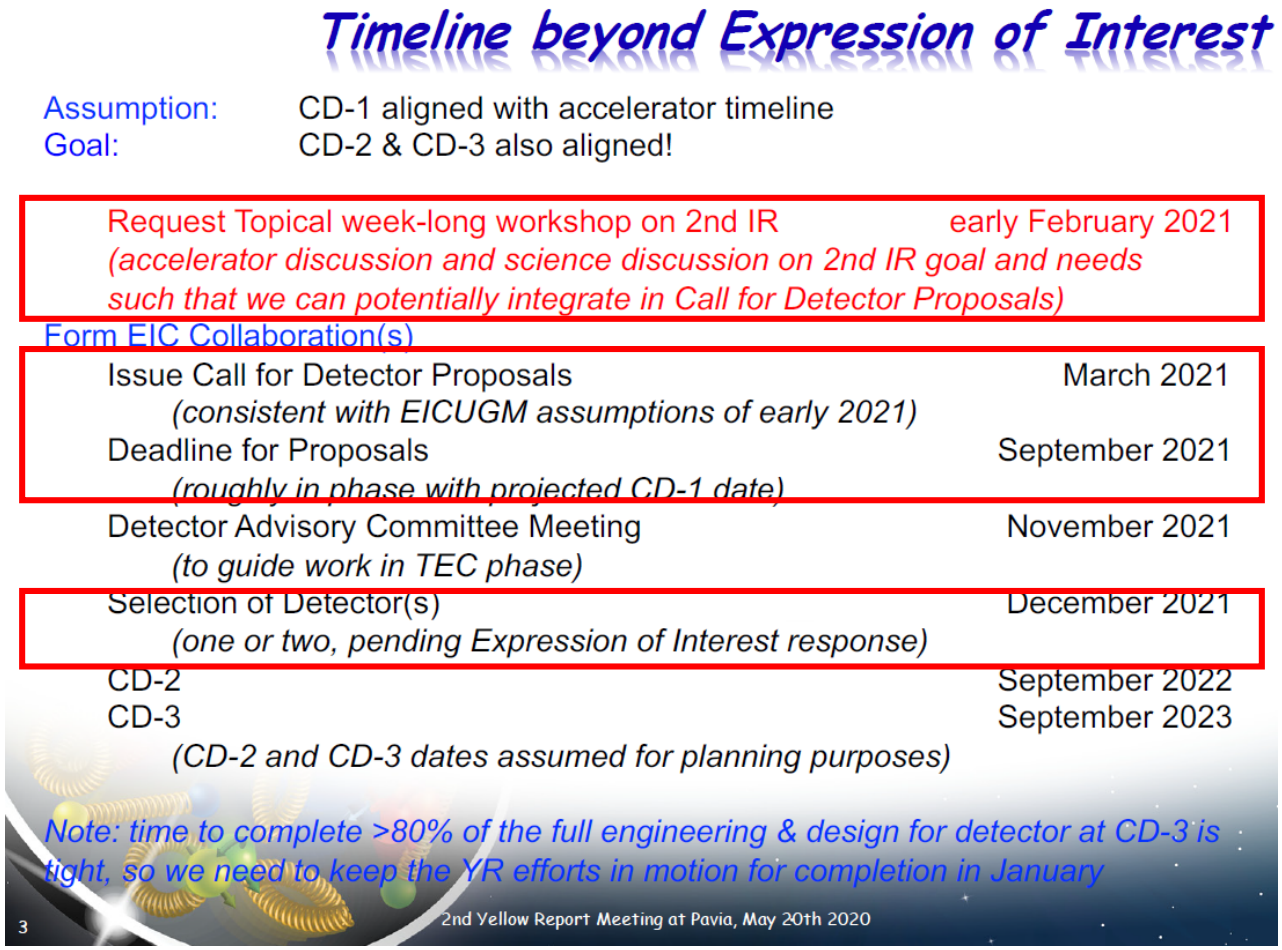
EIC Yellow Report "Pavia" meeting より

- https://indico.bnl.gov/event/8231/
- Expression of Interest Process and more Information
  - E.C. Aschenaure (BNL) and R. Ent (JLab)
  - https://indico.bnl.gov/event/8231/contributions/37061/attachments/28226/43393/EOI_Discussion_EICUGM_052020.pdf



Timeline

- Deadline EoI, November 1, 2020



Call for Expression of Interest

- https://www.bnl.gov/eic/EOI.php

EoI Preamble

Call for Expressions of Interest
for Potential Cooperation to the EIC Experimental Program

Brookhaven National Laboratory (BNL) in association with Jefferson Lab (JLab) calls for an Expression of Interest (EOI) for potential cooperation to 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 to 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 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.

Who issues the call:
The EIC Project (BNL together with JLab)

What is the goal:
Gauging the interest of national and international groups/consortia in cooperation to the EIC exp. equipment

Why now:
Information is needed to inform the project on the scope of the experimental equipment for the EIC program and the call for Proposals

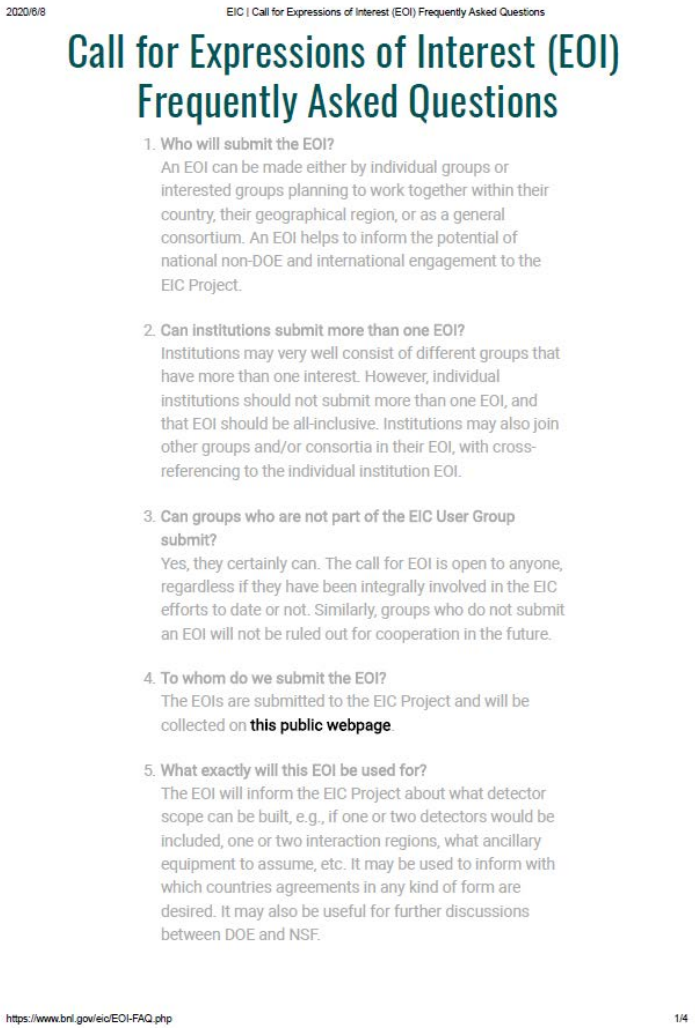
What we need to know:
who wants to contribute
what do you want to contribute
what are your assumptions

All set up on one webpage
let's have a look

4 2nd Yellow Report Meeting at Pavia, May 20th 2020

FAQ

- https://www.bnl.gov/eic/EOI-FAQ.php



2020/6/8 EIC | Call for Expressions of Interest (EOI) Frequently Asked Questions

Call for Expressions of Interest (EOI) Frequently Asked Questions

1. **Who will submit the EOI?**
   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 of national non-DOE and international engagement to the EIC Project.

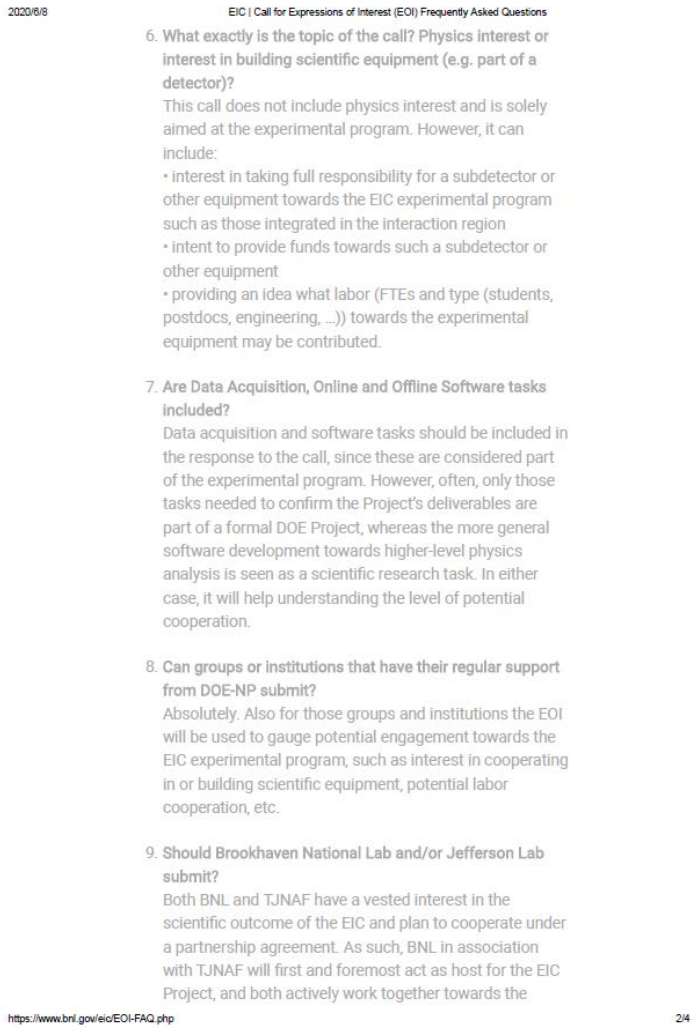
2. **Can institutions submit more than one EOI?**
   Institutions may very well consist of different groups that have more than one interest. However, individual institutions should not submit more than one EOI, and that EOI should be all-inclusive. Institutions may also join other groups and/or consortia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

3. **Can groups who are not part of the EIC User Group submit?**
   Yes, they certainly 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, groups who do not submit an EOI will not be ruled out for cooperation in the future.

4. **To whom do we submit the EOI?**
   The EOIs are submitted to the EIC Project and will be collected on **this public webpage**.

5. **What exactly will this EOI be used for?**
   The EOI will 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.

https://www.bnl.gov/eic/EOI-FAQ.php 1/4



2020/6/8 EIC | Call for Expressions of Interest (EOI) Frequently Asked Questions

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. However, 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
   - intent to provide funds towards such a subdetector or other equipment
   - providing 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, since these are considered part of the experimental program. However, 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 a scientific research task. In either case, it will help understanding the level of 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, such as interest in cooperating in or building scientific equipment, potential labor cooperation, etc.

9. **Should Brookhaven National Lab and/or Jefferson Lab submit?**
   Both BNL and TJNAF 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 TJNAF will first and foremost act as host for the EIC Project, and both actively work together towards the

https://www.bnl.gov/eic/EOI-FAQ.php 2/4

One detector/IR or two?

Further detector planning

- The DOE-NP supported **EIC Project includes one detector and one Interaction Region** in the reference costing. Reference cost is the BNL estimate prepared for the DOE CD-0 Independent Cost Review (ICR).

  See various talks at the 1st Yellow Report Workshop at Temple University (https://indico.bnl.gov/event/7449/timetable/#20200319)

  Comprehensive general-purpose detector: rough costs (US project accounting) = ~$300M

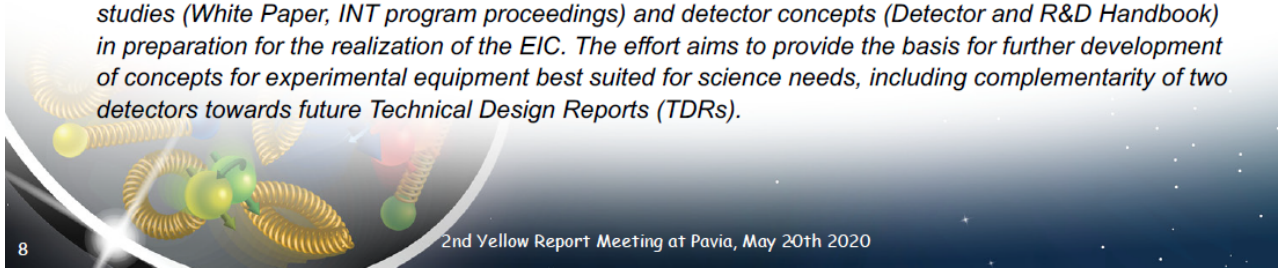
  This assumed in-kind contributions (non-DOE or reused equipment) of order $100M

  Costs for one Interaction Region included in accelerator scope (US accounting) = ~$200M

- The **EIC is capable of supporting a science program that includes two detectors and two interaction regions**.

  See the Yellow Report Initiative as spearheaded by the EIC User Group (http://www.eicug.org/web/content/yellow-report-initiative)

The purpose of the Yellow Report Initiative is to advance the state and detail of the documented physics studies (White Paper, INT program proceedings) and detector concepts (Detector and R&D Handbook) in preparation for the realization of the EIC. The effort aims to provide the basis for further development of concepts for experimental equipment best suited for science needs, including complementarity of two detectors towards future Technical Design Reports (TDRs).



One detector/IR or two?

Further detector planning

The **EIC is capable of supporting a science program that includes two detectors and two interaction regions**.

This is also the reason we asked for a separate workshop to discuss 2nd IR concepts early February 2021.

Ground rules:

- A deliverable of the EIC is the possibility for a 2nd Interaction Region (IR) and detector.
- Present EIC plans and budgets support only one IR and detector.
- All stakeholders agree that a second IR and detector within the same timeline is desirable. Routes to make this possible are being explored.
- The topic of the second detector is investigated by the US/DOE and EIC project in cooperation with the EICUG and may be handled as a separate project.

Ansatz:

Goals and schedule are driven by keeping open a possibility of a 2nd IR from day-one, and how it can be integrated into the EIC Project. If the realization of a 2nd IR would shift to a later time, a time-line to account for this would need to be developed. At this moment it seems the best strategy is to assume realization of the 2nd IR, be it significantly different or similar to the 1st IR, consistent with the EIC project schedule and to revisit the situation in a year from now.

日本グループからのEoI

- マスタープラン2020
  - 山形大、理研、神戸大、日本大、KEK、…
  - 第一期検出器の前方・後方検出器の設計を行い、特にカロリメータの開発、建設、設置を行う（経費25.1億円）
- 原子核物理領域と高エネルギー物理領域と、加速器実験業界として協力ができるとよい
  - 核子構造、重イオン衝突の系統的理解により、高エネルギー実験の精度向上にも寄与する
- 現在、EIC-ZDC R&D proposal や ALICE-FoCal との協力により、超前方領域の検出器開発を開始している