

*EIC*日本グループ
*Expression of Interest (EOI)*の議論

2020年9月3日(木)

後藤雄二 (理研)

Call for Expression of Interest

Electron-Ion Collider GOALS THE MACHINE BENEFITS SCIENCE NEWS IMAGES

<https://www.bnl.gov/eic/EOI.php>

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



Brookhaven National Laboratory (BNL), in association with Thomas Jefferson National Accelerator Facility (TJNAF), 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 uranium ions. <https://www.bnl.gov/eic/EOI.php> provides more information on the potential EIC experimental equipment scope.

Instructions

Deadline for submission is November 1, 2020.

Download the following template questionnaire(s) for your document. The document can be at most 10 pages long, in this style, font and font size, but you can add appendices and do not have to include the tables in the page count. There is no prescribed format of the document, but you are asked to address the questions in the Questionnaire. It is understood that maybe not all questions can be answered precisely, everybody is asked to fill the questions as good as currently possible. All submitted public Questionnaires will be [viewable here](#). You can also submit a separate private Questionnaire with certain information you would like to be viewable only by the EIC Project. Questionnaires are in Microsoft Word docx format. When you have completed the Questionnaire(s), submit using the upload button below.

In case of questions please contact Dr. Elke-Caroline Aschenauer and Dr. Rolf Ent.

Public EOI Questionnaire Private EOI Questionnaire Upload Questionnaires

Call for Expression of Interest



大学
University

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. 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). The "Call for Expressions of Interest" for cooperation on the EIC experimental program is in phase with the assumed timeline for completion of the Yellow Report.

The EOI will give the EIC Project guidance on current interest for participating 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. EOIs should detail if potential contributions are for full material purchases or cost reductions, are for contributed labor, or for any combination of the two. Please also indicate what if any assumptions are made receiving support for the discussed cooperation from the EIC Project or both labs.

An EOI is non-binding, and its main purpose is guide expectations and to better understand the potential EIC experimental equipment scope.

Timeline

- 2020.5-11 Call for Expression of Interest
 - <https://www.bnl.gov/eic/EOI.php>
- 2020.9.16-18 3rd Yellow Report workshop “at CUA” (online)
- 2020.11.1 EOI deadline 2020.11.1
- 2020.11.19-21 4th Yellow Report workshop “at UCB” (online)
- 2021.2 2nd-IR workshop
- 2021.3 Call for detector proposal

Public LOI Questionnaire

- Please indicate the name of the contact person for this submission:
 - (we ask for one main contact person per submission. You can as needed provide further contacts, but there should be one primary contact)

Public LOI Questionnaire

- Please indicate all institutions collectively involved in this submission of interest:
 - (even if institutions can submit on their own, it is highly encouraged to form groups to work together within their country, their geographical region, or as a general consortium)
 - EICUG参加者（実験）
 - 神戸大、理研、信州大、東工大、山形大
 - EICUG参加者（理論）
 - 順天堂大、KEK、杏林大、京都大、新潟大、理研、東北大、東京理科大
 - eRD27
 - 東大ICRR、原研、名古屋大、日本大、筑波大、筑波技術大
 - 勉強会
 - KEK、九州大
 - シリコン検出器
 - KEK、筑波大、都立産業技術高専

Public LOI Questionnaire

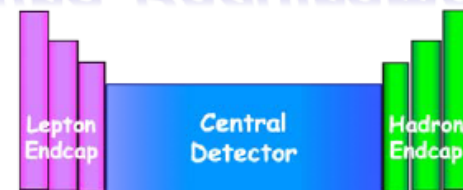
- Please indicate the items of interest for **potential equipment cooperation**:
 - (indicate experimental equipment components, including those integrated in the interaction regions, each separately)
 - 前方・後方検出器、特にカロリメータ
 - シリコン検出器
 - 加速器？

Public LOI Questionnaire

- Please indicate what the **level of potential contributions** are for each item of interest:
 - (e.g. indicate if contributions are for full in-kind experimental equipment components – we have provided a rough direct **cost estimate** for many components in an appendix (see slide 10 & 11 at <https://indico.bnl.gov/event/7449/contributions/35863/attachments/27277/41597/EIC.Comp.Det.032020.ca.pptx>, if contributions are for partial in-kind experimental equipment components, if contributions are for in-kind labor contributions, etc.)
 - ZDC (EM+ハドロン)
 - \$650K
 - Endcapカロリメータ？
 - Endcap ECal: \$665K
 - Endcap HCal: \$7.3M
 - シリコン検出器
 - Central vertex: \$5.8M

Funding Requirements

	Cost End 2019	Assumptions
Central Detector		
Magnet	\$25,000,000.00	
ECal	\$6,142,559.00	reuse large fraction of sPHENIX ECal
HCal	\$150,000.00	use sPHENIX HCal integrated to Magnet
TPC or MM-Barrel	\$3,220,000.00	
μ-Vertex	\$5,798,263.00	
RICH / DIRC	\$10,602,500.00	
Total	\$50,913,322.00	
Hadron Endcap		
RICH	\$10,200,000.00	
ECal	\$665,411.00	use existing ECal similar to PHENIX sandwich towers
HCal	\$7,316,000.00	
Tracking	\$470,000.00	
Tracking behind RICH	\$1,206,300.00	
Low-rapidity tracking	\$5,239,429.00	
Total	\$25,097,140.00	
Lepton Endcap		
RICH	\$4,241,000.00	
ECal	\$5,073,524.00	
HCal	\$7,316,000.00	
Tracking	\$470,000.00	
Low-rapidity tracking	\$5,239,429.00	
Total	\$22,339,953.00	
Electronics		
DAQ / Trigger	\$6,000,000.00	
Infrastructure		
Integration	\$12,768,743.44	
Auxiliary Detectors		
ZDC	\$650,000.00	
Roman Pots & B0-Detectors	\$1,500,000.00	
Low Q ₂ -Tagger	\$500,000.00	
Total	\$2,650,000.00	
Complete Total:	\$119,769,158.44	
Cost to Project:	\$59,246,800.44	



Estimated 315 FTEs over a period of 9 years amounts to \$88 M using BNL labor bands

Assumptions:

reuse existing equipment

- ECal towers in Hadron Arm
- HCal towers in Central Det.
- some ECal towers in Central Det.
- Reuse an existing Solenoid
- In-kind contributions: in the order of \$35M

マスタープラン2020

- 実施内容

- EIC第一期検出器の前方・後方検出器の設計を行い、特にカロリメータ検出器を建設することにより、前方・最前方物理の探索をリードする

- 所要経費

- 前方ハドロンカロリメータ8.3億円
- 最前方カロリメータ1億円
- 陽子スペクトロメータ1億円
- データ収集及びトリガー装置1.5億円
- 実験装置の設置2.5億円
- 人件費（エンジニア12FTE+テクニシャン12FTE）6.6億円
- ポスドク4名（2020-2026）雇用+旅費2.1億円
- 理論研究ポスドク4名（2020-2026）雇用+旅費2.1億円
- 合計25.1億円

Public LOI Questionnaire

- Please indicate what, if any, assumptions you made as coming from the EIC Project or the labs for your items of interest:
 - (e.g., indicate if you include engineering and design activities or assume those to come from the EIC Project, if you assume certain material costs to be covered by the EIC Project, if you rely on existing capabilities at the labs, etc. Try to be as inclusive as you can be.)
 - (例えば、エンジニアリングや設計活動を含むか、あるいは EIC プロジェクトからのものと仮定しているか、特定の材料費を EIC プロジェクトで賄うと仮定しているか、研究室の既存の能力に依存しているか、などを示す。できるだけ包括的に記載するようにしてください。)

Public LOI Questionnaire

- Please indicate the **labor contribution** for the EIC experimental equipment activities:
 - (e.g., for each cooperation and/or institution list the number of senior staff, the number of postdocs, and the number of graduate and undergraduate students that you plan to dedicate to the EIC experimental equipment activities. Similarly, please list the number of engineers, designers and technicians included in your potential cooperation.)
 - (例：各協力機関ごとに、EIC実験装置活動に従事する予定の上級スタッフの数、ポストクの数、大学院生と学部生の数を記載してください。同様に、協力の可能性のある機関に含まれるエンジニア、設計者、テクニシャンの数も記載してください。)

Public LOI Questionnaire

- Please indicate if there are **timing constraints** to your submission:
 - (e.g., indicate any known or anticipated timing profile assumed in your EOI. This can include anticipated time frames folding in constraints due to ongoing commitments, due to ongoing R&D and its anticipated completion date, etc.)
 - (例：EOIで想定される既知または予測されるタイミングプロファイルを示してください。これには、進行中のコミットメント、進行中の研究開発とその予想完了日などによる制約の折り返しの予想時間枠を含めることができます。)

Public LOI Questionnaire

- Please indicate any other information you feel will be helpful:
 - (e.g., this could be things like assembly and storage space at your institute, clean rooms and class, special skills or machine shops, or perhaps some pointers to past accomplishments – you can expand on those in an appendix. If you could make existing engineering, design or technician labor available to the EIC experimental equipment but would rely on funds coming from the EIC Project you can also list those here.)
 - (例えば、あなたの研究所の組立スペースや保管スペース、クリーンルームやクラス、特別なスキルや機械工場、過去の業績を示すものなどが考えられますが、これらについては付録で詳しく説明してください。既存の工学、設計、技術者の労働力をEIC実験装置に利用できるが、EICプロジェクトからの資金に依存している場合は、ここに記載しても構いません。)
 - KEK測定器開発プラットフォーム
 - https://rd.kek.jp/platform/platform_index.html
 - シリコン検出器開発プラットフォーム
 - <https://research.kek.jp/people/togawa/RD-platform-Si/>

Volunteers?

- Conveners
 - Calorimeter
 - Silicon detector
 - Accelerator?
- Mailing list
- Web page?

Backup Slides

Expression of Interest (EOI)

- <https://www.bnl.gov/eic/EOI.php>
- Non-binding and mainly used to guide expectations and to better understand the potential EIC experimental equipment scope and interest



The image is a screenshot of the Electron-Ion Collider (EIC) website. At the top, there is a dark teal navigation bar with the text "Electron-Ion Collider" on the left and several menu items: "GOALS", "THE MACHINE", "BENEFITS", "SCIENCE", "NEWS", and "IMAGES". Below the navigation bar, the main content area has a dark background with a glowing green and blue geometric pattern. In the center, there is a large, stylized graphic of a particle collision, showing a central nucleus-like structure with a wavy line representing a photon or electron interacting with it. The text "Call for Expressions of Interest for Potential Cooperation on the EIC Experimental Program" is prominently displayed in white, bold font. Below this graphic, there is a paragraph of text in a smaller white font.

Electron-Ion Collider

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