Workshop Series on IR2 & Detector EIC

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Jefferson Lab

EICUG-YR Meeting (remote) LBNL, 11/19-21, 2020

Workshop Series on IR2 & Detector EIC

- **The initiative**
- **Organization, activities and milestones**
- **Preparatory meeting agenda (12/15/2020)**
- **Summary**

Workshop series on IR2@EIC Organization

Co-PI's: V. Burkert (JLab), L. Elouadrhiri (JLab)

OC: M. Contalbrigo (Ferrara), A. Deshpande (Stony Brook), H. Gao (Duke), B. Jacak (LBL), R. Milner (MIT), F. Sabatie (Saclay/CEA)

Volker Burkert

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Richard Milner

Franck Sabatie

Todd Satogata

Bernd Surrow

Goals of the Initiative

Motivation: Optimize the science output and impact of the EIC Facility. Work with the EICUG/YR and the EIC Project to achieve this optimization as the ideas for the IR1/Detector are finalized.

Performance of the EIC when operating two differently optimized interaction regions and detectors in terms of scientific impact and its timely delivery

- **The EIC is designed to have two interaction regions that are suitable for the installation of large-scale detector systems for breakthrough nuclear physics experiments.**
- **Primary interaction region optimized for high luminosity operation at high center-of-mass energy (> 80GeV). Significantly lower luminosity in the medium and low energy range (< 80 GeV).**
- **A second interaction region can be optimized to operate in modes that emphasize high interaction rates and high luminosities at the lower center-of-mass energies.**

Scientific Output:

- **Evaluate the evolving landscape of the science underlying the need for the EIC.**
- **Review complementary approaches towards the overall optimization and the execution of the science program.**
- **Assess required performance of detection systems by drawing on the results of the Yellow Report initiative and of the EoI results.**
- **Prepare summary report with a detailed discussion of the conclusions reached.**

Major Design Activities Interaction Region Design

- **The EIC IR design is quite mature:**
  - IR beam optics with the desired strong focusing is integrated into the two accelerator lattices,
  - conceptual design of IR magnets and vacuum system are well underway,
  - IR synchrotron radiation and impedance are optimized and manageable, mask and collimation systems is in progress
  - Forward detector acceptance of collision events made good progress and look quite satisfactory
- **2nd IR and 2nd detector are not in the project scope but we unanimously agree that the EIC should have 2 detectors (and IR s)**

The layout of a second IR is being studied under the assumption that more luminosity can be achieved at lower center of mass energy if more bunches are used in collisions.

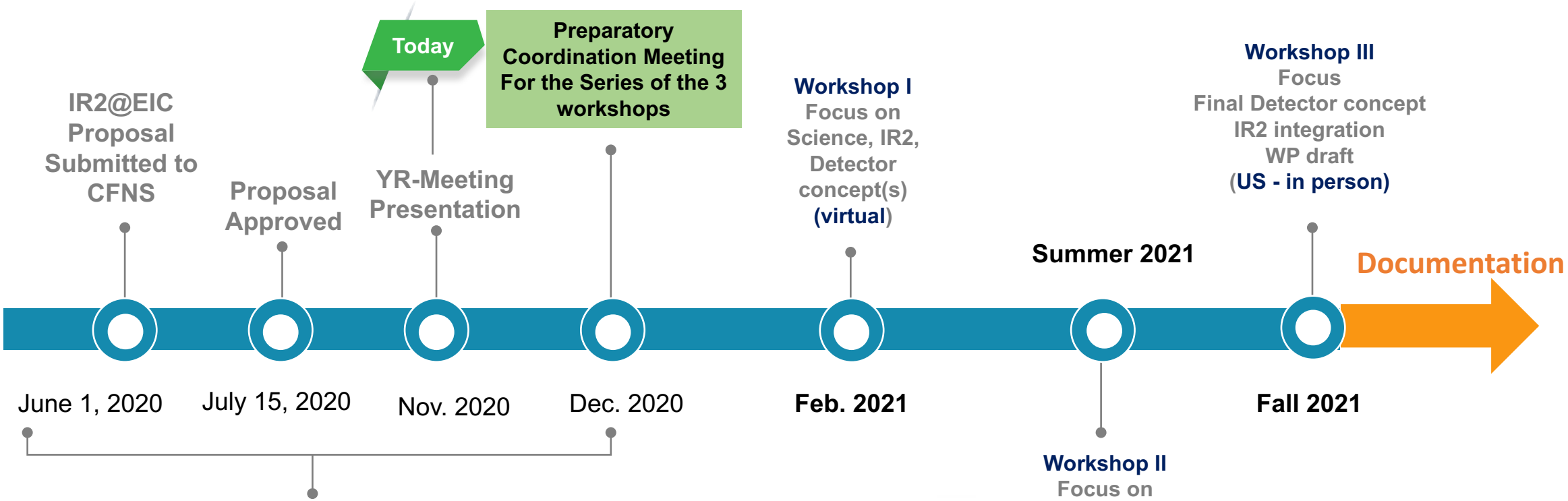
➢ **Design of IR2 and its detector must be done in the context of the IR1 design and detector so that the major scientific goals of EIC are accomplished. It is part of this initiative to support these goals.**

Success of this initiative requires

- **Drawing on the EICUG and EIC project activities and initiatives such as:**
  - **Results and conclusion of the Yellow Report initiative (to be completed end of 2020)**
  - **Results of the EoI initiative (November 2020)**
  - **Software development and simulations/reconstruction tools**
  - **R&D work plan**
- **Drawing on development and advancement of science within CFNS, INT, CNF, and other International Institutions…**
- **Taking into account the project milestones**

➡ **This perspective sets a timeline when these workshops should get underway, the dates, goals and the preparatory work needed.**

IR2@EIC Series of Workshops - Timeline



Preparatory work OC/EICUG/EIC Project

Organizational Plan IR2@EIC

- ✓ Presentation & Discussion at the YR Meeting – September 2020
- ✓ Discussions with the Steering Committee and the project leadership
- Presentation at the YR Meeting – November 2020 (Today)
- **Preparatory Meeting for Workshop series- December 15-16, 2020**
  - Day 1 – Broad reviews of
    - IR1@EIC science focus and reference detector plans
    - YR results and analysis
    - EoI results and analysis
    - What is new and emerging/evolving science for the EIC
    - Status of IR2@EIC design and expected performance
  - Day 2 – Working meeting - Goals and schedules of the series of 3 workshops
    - Strategic planning – dates and venues of workshops, documentation, final report, reviews
    - Draft circular and draft agenda for WS-1 of the series

Draft Agenda of Preparatory Meeting – 12/15

- 10:00 Welcome & Introduction **- A. Deshpande & V. Burkert**
- 10:10 Recent developments in nuclear science at EIC - **G. Sterman**
- 10:50 Recent developments in exclusive nucleon science at EIC - **C. Lorce, C. Mezrag, B. Pasquini, B. Pire**
- 11:30 **Break**
- 11:45 Recent developments in SIDIS & Jets science at EIC - **F. Yuan**
- 12:25 IR1@EIC Detector concept/implementation – **Elke/Rolf** (TBC)
- 12:55 **Break**
- 13:55 Expression of Interest (EoI) – **Elke/Rolf** (TBC)
- 14:25 Call for Detector Proposal - **R. Mckeown/Maria Ilatas - Chamizo (**TBC)
- 14:40 IR2@EIC design status, luminosity vs cm energy, polarization - **T. Satogata**
- 15:10 YR results & analysis - **A. Metz** (science)
- 15:30 **Break**
- 15:40 YR results & analysis - **K. Barish** (detector)
- 16:00 Software developments towards a high luminosity medium energy 2nd IR – **M. Diefenthaler**
- 16:25 Discussion (Plans for WS1 date/agenda on Science, IR2, Detectors)
- 17:00 **End**

Summary

- **Initiative aimed at defining and promoting a scientific program and instrumentation of the EIC with the goal to maximize its science output.**

- **Optimization for luminosity vs. CM energy implies significant tradeoffs, and could be an important guiding principle for design of the two experiments and IR's.**

- **The community engagement is essential to the success of this initiative. The series of workshops of IR2@EIC are also intended to attract new interests and collaborators to the EIC project.**