



Contribution ID: 1234 Contribution code: MOPC75

Type: **Poster Presentation**

Progress on the design of the interaction region of the Electron-Ion Collider EIC

Monday, 20 May 2024 16:00 (2 hours)

We present an update on the design of the Interaction Region (IR) for the the Electron Ion Collider (EIC) being built at Brookhaven National Laboratory (BNL). The EIC will collide high energy and highly polarized hadron and electron beams with a center of mass energy up to 140 GeV with luminosities of up to 10^{34} /cm²/s. The IR, located at RHIC's IR6, is designed to meet the requirements of the nuclear physics community as outlined in [1]. A second IR is technically feasible but not part of the project.

The magnet apertures are sufficiently large to allow desired collision products to reach the far-forward detectors; the electron magnet apertures in the rear direction are chosen to be large enough to pass the synchrotron radiation fan. In the forward direction the electron apertures are large enough for non-Gaussian tails.

The paper discusses a number of recent recent changes to the design. The machine free region was recently increased from 9 to 9.5 m to allow for more space in the forward direction for the detector. The superconducting magnets on the forward side now operate at 1.9 K, which helps crosstalk and space issues.

Footnotes

[1] An Assessment of U.S.-Based Electron-Ion Collider Science. (2018). Washington, D.C.: National Academies Press. <https://doi.org/10.17226/25171>

Funding Agency

Work supported by Brookhaven Science Associates, LLC under Contract No. DE-SC0012704 with the US Department of Energy.

Paper preparation format

LaTeX

Region represented

North America

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Session Classification: Monday Poster Session

Track Classification: MC1: Colliders and other Particle and Nuclear and Physics Accelerators: MC1.A19 Electron-Hadron Colliders