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Development of a 197 MHz crab cavity cryomodule for the electron-ion collider

Monday 22 September 2025 14:30 (3 hours)

Thomas Jefferson National Accelerator Facility (JLab) is leading the design and fabrication of all superconducting radiofrequency (SRF) cryomodules for the Electron-Ion Collider (EIC), to be built at Brookhaven National Laboratory (BNL). To achieve head-on luminosity at the interaction point, the EIC will employ SRF Radiofrequency Dipole (RFD) crab cavity cryomodules to compensate for the 25 mrad crossing angle. The hadron and electron storage rings (HSR and ESR) will utilize RFD cavities operating at 197 MHz and 394 MHz, respectively, with both frequencies used in the Hadron Storage Ring (HSR) and 394 MHz in the Electron Storage Ring (ESR). JLab is presently developing the 197 MHz cavity and associated cryomodule design. Each cavity is required to deliver a deflecting voltage of 11 MV, pushing the current limits of deflecting cavity performance and fabrication. This paper presents the key challenges in achieving these performance targets and highlights the innovative design solutions implemented for both the cavity and cryomodule systems.

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Yes

Footnotes

Funding Agency

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