

# Low Level RF Workshop 2022



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## Electron-Ion Collider RF Systems

*Monday, October 10, 2022 3:45 PM (30 minutes)*

The Electron-Ion Collider (EIC), to be constructed at Brookhaven National Laboratory (BNL), is a roughly 10 year project to design and construct a facility to collide polarized high energy electron beams with polarized proton and heavy ion beams at center of mass energies from 20 GeV to 140 GeV and luminosity up to  $10^{34} \text{ cm}^{-2}\text{s}^{-1}$ . The project is a partnership between BNL and the Thomas Jefferson National Accelerator Facility (Jefferson Lab, JLAB). The facility requires generation and storage of Ampere-class beams of hadrons and electrons in the collider rings, cold high-current electron beam in the strong hadron cooler (SHC), and precise high-gradient crabbing of electrons and hadrons in the interaction region. To achieve this, a diverse and challenging set of RF systems is needed comprising approximately 50 SRF and 20 NCRF cavities. Challenges include heavy beam loading, very high RF power, ultra-low-noise operation of the crab cavities, extremely low noise operation of a 100mA, 150 MeV SHC ERL, bunch merging and splitting gymnastics, and operation over a wide range of energies. This talk will provide an overview of the machine parameters and RF systems.

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