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C1Or1B-03: Cryogenic system design for the electron-ion collider at Brookhaven National Laboratory

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Brookhaven National Laboratory operates the only functioning collider in the United States –the Relativistic Heavy Ion Collider (RHIC). The electron-ion collider (eRHIC) at Brookhaven National Laboratory (BNL) is a proposed large scale upgrade to the existing RHIC facility and is currently in its R&D phase. The new machine involves the use of superconducting technology for accelerating and steering beams of charged particles. This study focuses on the design of local cryogenic system that will supply cooling to these SRF cryomodules located at interaction point (IP) 10. Several system configuration options are given depending on the energy level at which the new collider operates, and hence the level of SRF cryogenic loads. In addition to this, the study also explores challenges in integrating all these brand-new subsystems to the existing RHIC cryogenic system.

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