Contribution ID: **242** Type: **Contributed Oral**

C1Or4B-07: 2 Kelvin helium distribution system for the Electron Ion Collider's 10 o'clock satellite refrigerator

Monday 19 May 2025 17:45 (15 minutes)

The Electron-Ion Collider (EIC) at Brookhaven National Laboratory (BNL) will involve superfluid helium cooling of superconducting magnets and Superconducting Radio Frequency (SRF) cavities at several sites around the existing Relativistic Heavy Ion Collider (RHIC) accelerator tunnel. While the majority of the cooling power for these loads is provided by BNL's central cryogenic plant, Jefferson Lab is designing satellite equipment which augments the central plant and enables 2 Kelvin operation. The 2K cryogenic distribution system for the collider's 10 o'clock location (Interaction Region 10 or IR10) includes all necessary interfaces to the IR10 Satellite Refrigerator, to the overall EIC cryogenic distribution system, and to as many as 22 SRF cryomodules for the electron and hadron storage rings. In addition to providing the required cooling capacities in all operating modes, the IR10 2K cryogenic distribution system also stabilizes the supply temperature and enables safe connection and disconnection of individual IR10 cryomodules. Moreover, the layout of the IR10 2K cryogenic distribution system copes with challenging spatial constraints and adapts to the process configuration and routing of existing RHIC cryogenic distribution components which will be re-used for EIC. This paper gives a full overview of the IR10 satellite cryogenic distribution system design, and highlights some of the challenges encountered.

Authors: RIZZATO, A. (Thomas Jefferson National accelerator facility); WISSLER, B. (Thomas Jefferson National accelerator facility); TSCHIRHART, J. (Thomas Jefferson National accelerator facility); YANG, S. (Thomas Jefferson National accelerator facility); LAVERDURE, N. (Thomas Jefferson National accelerator facility)

Presenters: RIZZATO, A. (Thomas Jefferson National accelerator facility); LAVERDURE, N. (Thomas Jefferson National accelerator facility)

Session Classification: C1Or4B - Large Scale Cryogenic Systems II: Operation & Design II