



Contribution ID: 41

Type: **Oral presentation (15min)**

DESIGN, PROJECT EXECUTION, CONSTRUCTION AND COMMISSIONING OF THE 1.8K SUPERFLUID HELIUM REFRIGERATION SYSTEM FOR SRF CRYOMODULE TESTING

Wednesday, 9 July 2014 18:00 (15 minutes)

The Fermilab Cryomodule Test Facility (CMTF) provides a test bed to measure the performance of superconducting radiofrequency (SRF) cryomodules (CM). These SRF components form the basic building blocks of future high intensity accelerators such as Project X, International Linear Collider (ILC), and a Muon Collider. Linde Kryotechnik AG and Linde Cryogenics have designed, constructed and commissioned the superfluid helium refrigerator needed to support SRF component testing at the CMTF Facility. The hybrid refrigerator is designed to operate in a variety of modes under a wide range of boundary conditions down to 1.8 Kelvin set by CM design. Special features of the refrigerator include the use of warm and cold compression and high efficiency turbo expanders.

This paper gives an overview on the wide range of the challenging cooling requirements, the design, fabrication and the commissioning of the installed cryogenic system.

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Session Classification: Wed-Af-Orals Session 10