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## **C3Po1G-02 [38]: Helium Transfer Line with Conduction-Cooled Nb-Ti Superconducting Wires for COMET Muon Transport Solenoid.**

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Cryogenic system of the superconducting magnet for COMET experiments has been constructed in the J-PARC. There are three kinds of superconducting magnets such as capture solenoid, transport solenoid and detector solenoid. Former two superconducting magnets are cooled down by two phase flow helium which is supplied from helium refrigerator manufactured by Linde (Sulzer) to overcome required heat load. Cooling capacity of the helium refrigerator is 140 W at 4.5 K in case of 500 W shield heat load. On the contrary, the detector solenoid will be cooled down by GM refrigerator. It is necessary to prepare two transfer lines to cool down capture solenoid and transport solenoid at 4.5 K. Both transfer lines have adiabatic vacuum layer with four inner pipes for the shield gas and two phase flow of helium. In addition, superconducting cables are also laid through the two phase flow lines. These superconducting wires were mainly cooled down by thermal conduction from the two phase flow helium line. The transfer line of the transport solenoid was fabricated in the FY2018. Before fabrication process, we studied the cooling structure for cooling down the superconducting cable. In this paper, cool down test results of the superconducting cable and the detail structure of the transfer line will be discussed.

**Primary author:** Dr OKAMURA, Takahiro (KEK)

**Co-authors:** Dr YOSHIDA, Makoto (KEK); Mr OONAKA, Masaya (KEK); Mr OHHATA, Hirokatsu (KEK); Prof. MAKIDA, yasuihiro (KEK); Dr SASAKI, Ken-ichi (KEK); Mr IIDA, Masahisa (KEK); Mr TAEKYUNG, Ki (IBS); Ms TATENO, Akiko (JECC Torisha Co., Ltd.); Mr MATSUO, Masahiro (JECC Torisha Co., Ltd.); Mr AOKI, Itsuo (JECC Torisha Co., Ltd.)

**Presenter:** Dr OKAMURA, Takahiro (KEK)

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