

SEMINAIRE SACM

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14 H 00 Nobuhiro Kimura
High Energy Accelerator Research Organization
KEK, Tsukuba, Ibaraki 305-0801, Japan
Bât.123 Pièce 311

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Recent Status on Cryogenics for J- PARC Neutrino SC Magnet



A neutrino experiment facility using the J-PARC 50 GeV 0.75 kW proton beam is now under construction at Tokai campus of KEK. In this project, a superconducting magnet system, which consists of 28 superconducting combined-function magnets, will be installed in an arc section of the primary proton beam line to bend the beam to Kamioka. To simplify the system and optimize the cost, "Two-in-One structure" cryostat, where two magnets are installed into one cryostat, has been designed. Dimensions of cryostat are 0.94 m in outer diameter, 10m in length and it weighs 23 tons. In addition, the cryostat has a mechanical bending angle of 2.88 degree at the center for the beam bending. The magnets in the cryostat are cooled by forced supercritical helium (SHe) flow. Heat loads of the cryostat are designed to be 4.4 W to 4.5 K SHe flow and 46 W to 60 K shield. For the superconducting magnet system, a refrigerator system, which has cooling capacity of 410 W at 4.5 K for SHe and 1710 W for 60 K thermal shield in the cryostat, were designed. The refrigerator system are equipped with SHe pump, which has circulation capacity of 300g/s, to make forced flow of the circulation loop consisting of the cryostat and refrigerator. In addition, a new type of pressure relief valve for magnet quench and an elastomer seal material were developed for a counter measure of the radiation damage by 50 GeV proton beam. Recent status on the cryogenics for J-PARC Neutrino SC magnet and special components to the radiation damage of the system will be introduced in this seminar.



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