26th National Symposium on Cryogenics and Superconductivity

Contribution ID : 73

Design and development of 2 Kelvin J-T heat exchanger

Content :

Advanced accelerators use Superconducting Radio Frequency (SCRF) cavities for acceleration of charged particles. These SCRF cavities operate at 2K and are housed in a cryostat called cryomodule. Operation of these cryomodules require liquid helium to be transferred over large distances, which is finally expanded to 2K. Enthalpy of outgoing 2K helium vapours can be used to precool the in-coming helium through an heat exchanger. This method increases the liquid fraction considerably. Each standalone cryomodule will have one such heat exchanger. As helium has peculiar thermal properties around 2K, therefore design of such heat exchanger poses number of engineering challenges. Present work reports the basic design studies for the development of 2K heat exchangers.

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Session classification : --not yet classified--

Track classification : --not yet classified--

Type : --not specified--