

Thermalisation of HTS-based current leads using a single-stage GM cryocooler

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Cryocooler-based cooling technology promises compactness and modularity. Moreover, it allows for avoiding investment costs related to building large cryogenic plants. This makes it particularly attractive in the context of cooling future detector magnets for HEP experiments. Nevertheless, this technology features a modest cooling capacity which requires a dedicated design to reduce heat inleaks to the cold system.

Current lead is a crucial component of a superconducting magnet because it connects it to the powering system but also transfers heat from ambient temperature to the cold mass. Therefore, a significant part of the heat has to be intercepted at an intermediate temperature level. This poster presents the design of 3kA HTS-based current leads for a Low-Temperature Superconductor detector magnet and the dedicated cooling system with a cryocooler. The leads are thermalized at 50K by helium gas circulating in a closed loop that operates with a single-stage Gifford-McMahon cryocooler and a cold circulator. Following the design and construction phases of the thermal exchangers, the demonstrator is currently being assembled and instrumented before the testing campaign starting next summer

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