Contribution ID: **598** Type: **Poster Presentation (120m)**

Development of a cryogen-free test cryostat for a superconducting CCT short magnet

Thursday 25 July 2024 14:00 (2 hours)

In the framework of the ISOLDE Superconducting Recoil Separator (ISRS) project, a short and straight CCT magnet demonstrator (MAGDEM) has been designed, comprising a dipole and a quadrupole. The final ISRS spectrometer is intended to consist of 12 units of this CCT magnet arranged in a ring configuration. Additionally, this type of magnet could potentially be used for proton therapy gantry systems. A cryogen-free test cryostat has been developed for the MAGDEM, taking into account the space constraints related to the installation of the spectrometer at ISOLDE. The magnet will be conduction cooled using cryocoolers in order to be independent of any liquid Helium supply. In order to speed up the cool down time, a liquid nitrogen pre-cooling system has been included. This work mainly focuses on the design of the cryostat, encompassing descriptions of the different components, an optimization study of the current leads, and an analysis of the cool down time. A prototype of the MAGDEM and its cryostat will be built and tested at Huelva University in the forthcoming years.

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Session Classification: Thu-Po-3.5

Track Classification: Tracks ICEC 29 Geneva 2024: ICEC 04: Cryogenic applications: cryocoolers