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Design study of the ISRS CCT Magnet Demonstrator MAGDEM

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The ISOLDE Superconducting Recoil Separator (ISRS) at CERN [1-3] is a high-resolution spectrometer for analysing the heavy fragments produced in reactions induced by ISOLDE's exotic beams. ISRS design is based on a compact FFAG particle storage ring composed of short straight multifunction superconducting magnets able to accommodate a wide range of momentum and energy spread. The team has developed a magnet prototype MAGDEM, a very compact, low current, large aperture Nb-Ti CCT superconducting magnet with both dipole and quadrupole functions. It features an innovative cryogen-free cooling system based on GM cryocoolers and a LN₂ pre-cooling system [4].

References

- [1] I. Martel et al. Letter of Intent to the ISOLDE and Neutron Time-of-Flight Committee “ Design study of a Superconducting Recoil Separator for HIE-ISOLDE”, INTC -I-228, 2021.
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- [3] I. Martel et.al. An innovative superconducting recoil separator for hie-isolde. NIMB 541:176–179, 2023.
- [4] G. Kirby, et al., “Design and Optimization of a 4 Tesla 200 mm Aperture Helium-Free Nb-Ti Nested CCT Quadrupole / Dipole Superconducting Magnet”, ASC2024 ID 4070214/1LOr1B-07, in press.

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