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Design study of a reaction chamber for the ISOLDE Superconducting Recoil Separator

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The ISOLDE Superconducting Fragment Separator (ISRS) [1, 2] is an innovative high-resolution spectrometer foreseen to study the structure and dynamics of radioactive nuclei at HIE-ISOLDE. The scientific program requires the use of a variety of nuclear reactions including Coulomb breakup/dissociation, fusion-evaporation, and transfer reactions in direct and inverse kinematics. Part of the foreseen reactions involve the rotation of ISRS to analyse heavy fragments ejected at angles as large as 70 degree. The chamber should be also suitable to be used in combination with neutron and gamma arrays, and for hosting light-ion solid-state detectors. The design of the ISRS scattering chamber is therefore a very challenging part of the project as it has to accomplish several detector constraints as well as those of the ISRS particle spectrometer itself. We present and discuss the design study of an innovative reaction chamber able to rotate and accommodate most of the requirements of the physics program. The reaction chamber will be installed at the MAGDEM ion-test bench for in-beam experiments.

References

- [1] I. Martel et al, Letter of Intent “Design study of a Superconducting Recoil Separator for HIE-ISOLDE”, INTC-I-228, 2021.
- [2] ISRS project web site, www.uhu.es/isrs/
- [3] D. Gómez-Domínguez et al., An ion-beam test bench for the CCT magnet prototype (MAGDEM) of the ISOLDE Superconducting Recoil Separator, poster contribution to this workshop.

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