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Reactions with radioactive ion beams at the ISOLDE Solenoidal Spectrometer

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The ISOLDE Solenoidal Spectrometer (ISS) at CERN was commissioned fully in 2021, following the second long shutdown at CERN, to take advantage of the exotic beams delivered from the HIE-ISOLDE facility at energies up to 10 MeV/u. It is designed to study direct reactions based on the solenoidal spectrometer concept developed in the HELIOS spectrometer at Argonne National Laboratory [1,2]. The on-axis position-sensitive silicon array at the heart of the spectrometer was constructed at the University of Liverpool and uses 24 DSSSD wafers arranged into a hexagonal structure. The readout of 1800 individual detector channels is performed with the use of on-board ASICs. It is coupled to a series of ancillary systems for recoil detection, beam diagnostics and monitoring.

This talk will present a technical overview of the setup followed by a selection of physics experiments from the past 4 successful years as we enter the third long shutdown at CERN and a hiatus from radioactive beams. New developments, such as those to study fission, are also being presented elsewhere in this workshop. Finally, I will summarise future ideas under consideration for the return of ISS in 2028 and welcome further discussion for new possibilities.

[1] A. H. Wuosmaa et al. Nucl. Instrum. Methods Phys. Res., Sect. A 580, 1290 (2007).
[2] J. C. Lighthall et al. Nucl. Instrum. Methods Phys. Res., Sect. A 622, 97 (2010).

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