



Contribution ID: 208

Type: Oral contribution

Direct reactions probed in inverse kinematics with the ISOLDE Solenoidal Spectrometer - recent highlights

Tuesday 28 June 2022 09:00 (20 minutes)

The ISOLDE Solenoidal Spectrometer (ISS) has been developed to study direct reactions with exotic beams produced at the ISOLDE facility, CERN and is based on the solenoid concept successfully deployed in the HELIOS spectrometer at Argonne National Laboratory [1,2] and now also SOLARIS at FRIB. ISS was successfully fully commissioned during 2021 and the first physics campaign took place using the new position-sensitive silicon array constructed by the University of Liverpool. This talk will present a technical overview of ISS. A number of preliminary highlights from the physics campaign will also be presented. These include a measurement to probe changing shell structure in to the $N = 20$ island of inversion via a measurement of the $d(^{30}\text{Mg}, p)^{31}\text{Mg}$ reaction. Also, at the other end of the nuclear chart, a measurement of the $d(^{212}\text{Rn}, p)^{213}\text{Rn}$ reaction identified excited states outside $N=127$. This measurement provides the first spectroscopy of low-lying, single-particle levels in ^{213}Rn . These data will contribute to our understanding of the evolution of single-particle structure outside the $N=126$ closed neutron shell.

[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).

Topic

Technical

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Session Classification: TUE1