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Study of the ^{61}Zn$(d,p)^{62}$Zn reaction with the ISS

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We propose to study the ^{61}Zn$(d,p)^{62}$Zn reaction in inverse kinematics for the first time, using the ISOL Solenoidal Spectrometer currently being installed at ISOLDE. This measurement represents the mirror analog of the astrophysically important ^{61}Ga$(p,\gamma)^{62}$Ge process (a reaction that cannot be presently studied with conventional means) and will allow for the first ever constraints to be placed on the stellar reaction rate. In particular, the energies and spectroscopic factors obtained for excited states in ^{62}Zn will be used to determine the resonant properties of proton-unbound levels in the nucleus ^{62}Ge, which are expected to dominate the ^{61}Ga$(p,\gamma)^{62}$Ge reaction in X-ray bursts. This study is very timely as the ^{61}Ga$(p,\gamma)^{62}$Ge reaction directly affects astronomical observables that are currently being obtained by the latest generation of space-based telescopes with unprecedented precision. Moreover, it complements previous work with the ISOL Solenoidal Spectrometer by extending the programme to studies relevant for nuclear astrophysics.

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