Abstract Submitted
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Determination of the ^{60}Zn Level Density from Neutron Evaporation Spectra[1] DOUG SOLTESZ, Ohio University — Nuclear reactions of interest for astrophysics often rely on statistical model calculations for nuclear reaction rates, particularly for nuclei far from β-stability. However, statistical model parameters are often poorly constrained, where experimental constraints are particularly sparse for exotic nuclides. Our understanding of the breakout from the NiCu cycle in the astrophysical rp-process is currently limited by uncertainties in the statistical properties of the proton-rich nucleus ^{60}Zn. We have determined the nuclear level density of ^{60}Zn using neutron evaporation spectra from ^{58}Ni(^{3}He,n) measured at the Edwards Accelerator Laboratory. We compared this level density to theoretical predictions, including phenomenological, microscopic, and shell model based approaches. We find that the ^{60}Zn level density is somewhat lower than expected for excitation energies under rp-process conditions. This includes a plateau within the level density from roughly 5-6 MeV excitation energy, which is in disagreement with the usual expectation of exponential growth and all theoretical predictions we explored. A determination of the spin distribution at relevant energies in ^{60}Zn is needed to confirm that the Hauser-Feshbach formalism is appropriate.

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