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Mirror Symmetry in the $f_{7/2}$ Shell Below ^{56}Ni , Excited States and Electromagnetic Transition Rates in ^{55}Ni and ^{55}Co

Experiment S1758 aims to explore the charge dependence of the strong nuclear interaction by probing ^{55}Ni and ^{55}Co near the doubly magic ^{56}Ni . This will be achieved by impinging beams of radioactive ^{20}Na and stable ^{20}Ne upon ^{40}Ca targets to produce ^{55}Ni and ^{55}Co , respectively. Charged particles and γ -rays will be detected by combining the TRIUMF-ISAC Gamma-Ray Escape Suppressed Spectrometer (TIGRESS), the TIGRESS Integrated Plunger (TIP) and the CsI Ball. This trio allows for a higher degree of sensitivity when in unison. Data analysis will involve: transition rate reconstruction using the Doppler-Shift Attenuation Method (DSAM), Doppler-shift lineshape profile extraction from Monte Carlo simulations via the GEANT4 framework, and lifetime extraction from minimizing a χ^2 goodness-of-fit between the measured and simulated lineshapes. The results will paint a clearer picture of the charge dependence of the strong nuclear interaction.

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