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Mirror Symmetry in the f7/2 Shell Below 56Ni, Excited States and Electromagnetic Transition Rates in 55Ni and 55Co

Experiment S1758 aims to explore the charge dependence of the strong nuclear interaction by probing 55Ni and 55Co near the doubly magic 56Ni. This will be achieved by impinging beams of radioactive 20Na and stable 20Ne upon 40Ca targets to produce 55Ni and 55Co, 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 $\chi 2$ 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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