

GAMMA-ELECTRON COINCIDENCE SPECTROSCOPY WITH SOLENOGAM: FIRST MEASUREMENTS WITH A ^{182}RE SOURCE

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Solenogam is a recoil spectrometer for gamma-ray and electron spectroscopy that has been designed and constructed at the Heavy-Ion Accelerator Facility (HIAF) of the Australian National University. The device will be used to fully characterise the structure of nuclear excitations populated in the decay of long-lived states, either excited isomers or ground-state decays. Solenogam is comprised of high-sensitivity γ -ray and electron detectors coupled to a new 8T solenoid. During installation of the 8T solenoid, off-line measurements have been made to characterise Solenogam's performance for future γ - e^- coincidence spectroscopy.

Internal conversion coefficients and γ - e^- angular correlations were measured for the electron capture decay of ^{182}Re into ^{182}W . The $^{176}\text{Yb}(^{11}\text{B},5n)^{182}\text{Re}$ reaction was used with 60 MeV ^{11}B ions from the HIAF to produce a ^{182}Re source with an activity of between 1-3 μCi . The source was manually transferred to Solenogam and the decay was observed over approximately 10 days (4 half-lives). The measured conversion coefficients showed good agreement with theoretical calculations and have been used to extract $E0/E2$ mixing ratios for a number of $J \rightarrow J$ transitions. The angular correlations measured by the array are in qualitative agreement with theoretical calculations, however, the magnitudes of the correlations are attenuated by approximately 40% for reasons unknown at present. These results and plans for future measurements will be presented.