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Development of (p,p' γ) detection capabilities at iThemba LABS through the study of low-lying E1 strength in ^{58}Ni

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This study aims to test and develop the (p,p' γ) detection capabilities of the K600 magnetic spectrometer when positioned at zero degrees and coupled to the Ball of Germanium and Lanthanum bromide detectors (BaGeL) at iThemba LABS. This is done through an investigation into the low-lying dipole strength of ^{58}Ni with a proton beam of $E_p = 80$ MeV. The use of proton inelastic scattering at forward angles favours the electric dipole excitation and thus gives access to the full strength of the E1 resonance. Detecting these protons in coincidence with the subsequent γ decay improves the selectivity to low spin transfer, allows for the separation of nearby excitations and the assignment of multiplicities. Moreover, the high energy-resolution γ detectors used in decay studies allow for an improvement of the standard energy resolutions obtainable with magnetic spectrometers. The results of this study will be compared to previous experiments to elucidate the advantages of coincidence measurements at iThemba LABS. Important decay paths as well as transition levels will be presented.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

PhD

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