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

This study aims to explore the (p,p'γ) detection capabilities of the K600 magnetic spectrometer coupled to the Ball of Germanium and Lanthanum bromide detectors (BaGeL) at zero degrees at iThemba LABS. This is being done through an investigation into the low-lying dipole strength of ^{58}Ni using the (p,p'γ) reaction at 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 pygmy dipole resonance. These probes are, however, less selective with respect to the spin of the excitation, and the energy resolution obtainable with particle spectrometers is far poorer than that of the high-purity germanium detectors used in decay studies following electromagnetic excitation. Performing coincident measurements allows for the separation of nearby excitation, the assignment of multipolarities, the determination of branching ratios and the study of the isospin character of bound states. Results from both (p,p') and (p,p'γ) for the low-lying states of ^{58}Ni will be compared 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)?

MSc

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