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Fine Structure of the Isovector Giant Dipole Resonance: a survey with (p,p') scattering at zero degrees

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A survey of the fine structure phenomenon of the Isovector Giant Dipole Resonance (IVGDR) was investigated, using the newly commissioned Zero-degree Facility of the K = 600 magnetic spectrometer of iThemba LABS. Measurements were performed for inelastic proton scattering at an incident energy of 200 MeV for targets ranging from ^{27}Al to ^{208}Pb . Targets of areal density of $1 - 2 \text{ mg/cm}^2$ gave an energy resolution of 45 keV Full Width at Half Maximum (FWHM) after utilising the faint-beam dispersion-matching technique. A reasonable background subtraction procedure allowed for the extraction of excitation energy spectra with low background. The data from the survey promise to give a unique insight into the competition of the various damping mechanisms contributing to the decay of the IVGDR. Furthermore, level densities of $J^\pi = 1^-$ states can be extracted in a model-independent way, which serves as an important input to models applied in astrophysics. Finally, this survey will simultaneously provide bench-marks on the capabilities and limitations of the new Zero-degree Facility important for planning of the future experimental work. The experimental techniques, experimental results and preliminary theoretical calculations for the measurement of 0^+ proton scattering will be presented.

Level (Hons, MSc, PhD, other)?

PhD

Consider for a student award (Yes / No)?

Yes

**Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?**

Yes

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