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Fine structure of the Isoscalar Giant Quadrupole Resonance and 2⁺ level densities in spherical to deformed nuclei across the isotope chain ^{142,144,146,148,150}Nd using the (p,p') reaction

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<p>A systematic experimental investigation of the phenomenon of fine structure, with emphasis on the region of the Isoscalar Giant Quadrupole Resonance (ISGQR), in nuclei across stable even-even neodymium isotopes has been performed. Measurements were made using the K600 Magnetic Spectrometer of iThemba Laboratory for Accelerator Based Sciences, a facility which is situated at Faure near Cape Town, South Africa. Unique high energy-resolution inelastic proton scattering experiments were performed at an incident proton energy of E_p = 200 MeV on targets <sup>

142,144,146,148,150</sup>Nd. Nuclei with mass number A ≈ 150 and neutron number N ≈ 90 are of special interest since they occupy that region of the nuclide chart wherein the onset of permanent prolate deformation occurs. The stable neodymium (Z = 60) isotopes have been chosen in the present study, in order to investigate the effects accompanying the onset of deformation, on the excitation energy spectra in the ISGQR region (10 ≤ E_x ≤ 25 MeV), since they extend from the semi-magic N = 82 nucleus (¹⁴²Nd) to the permanently deformed N = 90 (¹⁵⁰Nd) nucleus. An important further step is to test the effect that the transition from spherical to deformed nuclei has on level densities. Experimental details, data extraction and analysis techniques, together with preliminary results 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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