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Fine Structure of the Isovector Giant Dipole Resonance using the (p,p') reaction at zero degrees: Effects of strong nuclear deformation

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Abstract content
   (Max 300 words)

The decay of giant resonances in nuclei is a prime example of how a well-ordered collective excitation dissolves into a disordered motion of internal degrees of freedom in fermionic quantum many-body systems. Fine structure of the Isovector Giant Dipole Resonance (IVGDR) for the neodymium isotope chain, ^{142,144,146,148,150}Nd, has been observed in high energy-resolution inelastic proton scattering experiments. The state-of-the-art K600 magnetic spectrometer of iThemba LABS was used to perform these experiments at zero-degrees scattering angle with an incident proton energy of 200 MeV. The analysis of the measured (p,p') energy spectra will yield insight into the transition from spherical (¹⁴²Nd) to highly deformed (¹⁵⁰Nd) nuclei and provide information about the dominant damping mechanisms. A comparison can be made to (&gamma,xn) data which clearly show a broadening and splitting of the IVGDR as deformation increases. It should be noted that other resonances are also observed at zero degrees. In particular, the Isoscalar Giant Quadrupole Resonance (ISGQR) for which comparisons can be made to data taken in a complimentary experiment at finite scattering angles. Preliminary results will be presented.

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

Yes

Level for award
 (Hons, MSc,
   PhD)?

MSc

Main supervisor (name and email)
and his / her institution

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Would you like to
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 Proceedings (Yes / No)?

No

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