## **SAIP2016**



Contribution ID: 388 Type: Oral Presentation

## Observation of K-splitting in the Isoscalar Giant Quadrupole Resonance within the neodymium isotope chain using high energy-resolution inelastic proton scattering

Friday, 8 July 2016 10:20 (20 minutes)

Abstract content <br/> &nbsp; (Max 300 words)<br/> dry-<a href="http://events.saip.org.za/getFile.py/atarget="\_blank">Formatting &<br/> &classed chars</a>

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 LABS, Cape Town, South Africa. Unique high energy-resolution inelastic proton scattering data were obtained at an incident proton energy of Ep = 200 MeV on targets 142,144,146,148,150Nd. Nuclei with mass number A  $\approx$  150 and neutron number N  $\approx$  90 are of special interest since they occupy that region of the nuclide chart wherein the onset of permanent prolate deformation occurs. Background subtraction using the Discrete Wavelet Transform (DWT) technique greatly enhances the ISGQR. After extraction of resonance widths, results show a systematic broadening of the ISGQR from spherical to highly deformed nuclei which is attributed to K-splitting of the ISGQR following the comparison with Skyrme separable RPA strength functions for isoscalar B(E2) and the use of the Continuous Wavelet Transform (CWT) technique.

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

No

Level for award<br/>
-&nbsp;(Hons, MSc, <br>
-&nbsp; PhD, N/A)?

N/A

Main supervisor (name and email)<br/>
sand his / her institution

N/A

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

No

## Please indicate whether<br/> -br>this abstract may be<br/> -published online<br/> -(Yes / No)

Yes

**Primary authors:** Dr KUREBA, Chamunorwa Oscar (School of Physics, University of the Witwatersrand, Johannesburg 2050, South Africa); Prof. CARTER, John (University of the Witwatersrand)

**Co-authors:** Prof. SIDERAS-HADDAD, ELIAS (University of the Witwatersrand); Dr SMIT, Frederick David (iThemba LABS); Dr USMAN, Iyabo (University of the Witwatersrand, Johannesburg.); Mr JINGO, MAXWELL (UNIVERSITY OF THE WITWATERSRAND); Prof. VON NEUMANN-COSEL, Peter (IKP, TU Darmstadt); Dr NEVELING, Retief (iThemba LABS); Prof. FEARICK, Roger (University of Cape Town); Dr NESTERENKO, Valentin (JINR Dubna)

Presenter: Prof. CARTER, John (University of the Witwatersrand)

Session Classification: Nuclear, Particle and Radiation Physics (1)

Track Classification: Track B - Nuclear, Particle and Radiation Physics