Contribution ID: **14** Type: **not specified**

Investigation of fine structure of the Isovector Giant Dipole in nuclei across the periodic table using proton inelastic scattering at zero degrees.

A survey of the fine structure phenomenon of the Isovector Giant Dipole Resonance (IVGDR) was carried out, using proton inelastic scattering at an incident energy of 200 MeV for a wide target-mass range of closed and near-closed shell nuclei: ²⁷Al, ⁴⁰Ca, ⁵⁶Fe, ⁵⁸Ni and ²⁰⁸Pb. The data obtained will provide an unique insight into the role of different damping mechanisms contributing to the decay of the IVGDR. A comparison between the present data and photo-absorption cross-sections will be done in order to check for consistency. Absolute cross-sections together with systematic predictions on the position and width (Γ) of the IVGDR in a given nuclei will be presented. The presence of other multipole admixtures, such the Isoscalar Giant Quadrupole Resonance (ISGQR) and Isovector Giant Quadrupole Resonance (IVGQR), were found in the obtained spectra in some of the target nucleus investigated. Such information led to the confirmation of their respective resonance widths, centroids and strengths for each identified giant resonance. Experimental results from other probes exciting the IVGDR will also be compared to this present work and the corresponding correlations extracted. Characteristic energy scales from the experimental data will be extracted using the wavelet analysis technique, an unique technique that has been able to provide a solution to the long-standing search for experimental signatures of scales associated with the coupling between collective states and internal degrees of freedom.

Primary author: Mr JINGO, Maxwell (University of Witwatersrand, Johannesburg, South Africa)

Co-authors: Prof. RICHTER, Achim (Institut für Kernphysik, Technische Universität Darmstadt, Germany); Ms HEILMANN, Anna-Maria (Institut für Kernphysik, Technische Universität Darmstadt, Germany); Prof. TAMII, Atsushi (Research Center for Nuclear Physics, Osaka University, Japan); Mr KUREBA, Chamunorwa Oscar (University of the Witwatersrand, Johannesburg, South Africa); Dr FOURIE, Dirk (iThemba LABS, Cape Town, South Africa); Prof. SIDERAS-HADDAD, Elias (University of the Witwatersrand, Johannesburg, South Africa); Prof. COOPER, Gordon R.J (School of Geosciences, Johannesburg, South Africa); Dr POLTORATSKA, Iryna (Institut für Kernphysik, Technische Universität Darmstadt, Germany); Dr USMAN, Iyabo (University of the Witwatersrand, Johannesburg, South Africa); Mr SWARTZ, Jacobus (iThemba LABS, Cape Town, University of Stellenbosch, South Africa); Mr MIRA, Joel (iThemba LABS, Cape Town, University of Stellenbosch, South Africa); Prof. CARTER, John (University of the Witwatersrand, Johannesburg, South Africa); Dr CONRADIE, Lowry (iThemba LABS, Cape Town, South Africa); Dr PAPKA, Paul (iThemba LABS, Cape Town, University of Stellenbosch, South Africa); Prof. VON NEUMANN-COSEL, Peter (Institut für Kernphysik, Technische Universität Darmstadt, Germany); Dr NEVELING, Retief (iThemba LABS, Cape Town, South Africa); Dr NEWMAN, Richard (University of Stellenbosch, Cape Town, South Africa); Dr SMIT, Ricky (iThemba LABS, Cape Town, South Africa); Prof. FEARICK, Roger (University of Cape Town, Cape Town, South Africa); Mr MURRAY, Sean (iThemba LABS, Cape Town, South Africa); Dr FORTSCH, Siegfried (iThemba LABS, Cape Town, South Africa); Dr BUTHELEZI, Zinhle (iThemba LABS, Cape Town, South Africa)

Presenter: Mr JINGO, Maxwell (University of Witwatersrand, Johannesburg, South Africa)