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Extraction of Giant Monopole Resonance strength with Mulitipole Decomposition Analysis

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Inelastic scattering of alpha particles at ≥ 200 MeV, especially at very forward angles including 0°, stands out as a robust technique for probing the strength distribution of the isoscalar giant monopole resonance (ISGMR) in atomic nuclei. Due to contradicting results concerning the isotopic trend of the nuclear incompressibility within the calcium isotopic chain, a dedicated study of the ISGMR in 40,42,44,48Ca was undertaken at iThemba LABS. From measurements at 0° and 4°, an energy-dependent version of the difference-of-spectra (DoS) method was initially utilized. Although this method offers high energy resolution, it is dependent on the strength contributions of all L \geq 0 multipolarity components published in literature, and this negatively impacts the independence of our results. To address this concern, we will employ a method called Multipole Decomposition Analysis (MDA) to extract E 0 strength distributions. While the limited angular range means that the MDA procedure may not yield precise strengths for higher multipolarities, it does enable the accurate extraction of the E0 component independently of other studies. Preliminary results of 40,42,44,48Ca will be presented.

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Primary authors: JAFTA, Lesedi (University of the Western Cape); NEVELING, Retief (iThemba LABS); DON-ALDSON, Lindsay (iThemba Laboratory for Accelerator Based Sciences); TRIAMBAK, Smarajit (University of Western Cape); BAHINI, Armand (University of the Witwatersrand, Johannesburg); BRUMMER, Johann Wiggert (iThemba LABS); JIVAN, Harshna (University of the Witwatersrand); JONES, Pete (iThemba LABS); JONGILE, Sandile (iThemba LABS); LI, Kevin (Stellenbosch Postgraduate Student); PELLEGRI, Luna (University of the Witwatersrand and iThemba LABS); SMIT, Ricky (iThemba LABS); STEYN, Deon (iThemba LABS); USMAN, Iyabo (University of the Witwatersrand)

Presenter: JAFTA, Lesedi (University of the Western Cape)

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