

Extraction of Giant Monopole Resonance strength with Multipole 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 $40,42,44,48\text{Ca}$ 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 multiplicities, it does enable the accurate extraction of the $E0$ component independently of other studies. Preliminary results of $40,42,44,48\text{Ca}$ will be presented.

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