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Investigation of the isoscalar giant monopole resonance as a function of neutron excess in the 42,44,48Ca isotope chain

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Study of the Isoscalar Giant Monopole Resonance (ISGMR) provides insight into the incompressibility of the nuclear matter since it has a direct connection with the excitation energy of ISGMR. Nuclear incompressibility is an important quantity in the study of neutron stars and related astrophysics applications. In recent years, isotope dependence of the nuclear incompressibility has been mostly concentrated in heavy nuclei, in particular Sn and Pb isotopes with a limited range of neutron excess, yielding varying results. Therefore, a study of ISGMR in 42,44,48Ca isotopes with a much larger range of neutron excess promises a more precise determination of the nuclear incompressibility. Experiments were performed using the Separated Sector Cyclotron of iThemba LABS, together with the K600 magnetic spectrometer using inelastic scattering of 200 MeV alpha particles at zero degrees from 42,44,48Ca for high energy-resolution measurements in the region of ISGMR. In addition, unique insight into the competition of various damping mechanisms contributing to the decay of the ISGMR can be gained from the extracted energy scales. Following an autocorrelation function analysis, $J\pi = 0^+$ level densities can also be extracted. Preliminary results will be presented.

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

Yes

Level for award (Hons, MSc, PhD, N/A)?

PhD

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

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

No

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