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Fine structure of the Isoscalar Giant Monopole Resonance in ²⁰⁸Pb, ⁹⁰Zr, ⁵⁸Ni and ⁴⁰Ca using medium energy Alpha-particle Scattering at Zero Degree

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Abstract content
   (Max 300 words)
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A systematic experimental investigation was performed of the phenomenon associated with the fine structure of giant resonances, with emphasis on the Isoscalar Giant Monopole Resonance (ISGMR), for ²⁰⁸Pb, ⁹⁰Zr, ⁵⁸Ni and ⁴⁰Ca using a 200 MeV alpha-particle beam delivered by the Separated Sector Cyclotron of iThemba LABS. These nuclei are of special interest since they are doubly-magic, ²⁰⁸Pb and ⁴⁰Ca, and proton-magic, ⁹⁰Zr and ⁵⁸Ni. Measurements were made using the state-of-the-art K = 600 magnetic spectrometer to obtain unique high energy-resolution alpha-particle inelastic scattering excitation-energy spectra in the region of ISGMR at θlab = 0deg; where the cross-section of the ISGMR is at a maximum. In addition, measurements were also made for all four target nuclei at θlab = 4deg;, where the cross-section of the Isoscalar Giant Quadrupole Resonance (ISGQR) is at a maximum. This was done in order to subtract the contribution of the ISGQR from the excitation energy spectra taken at zero degrees. Preliminary results are presented.

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