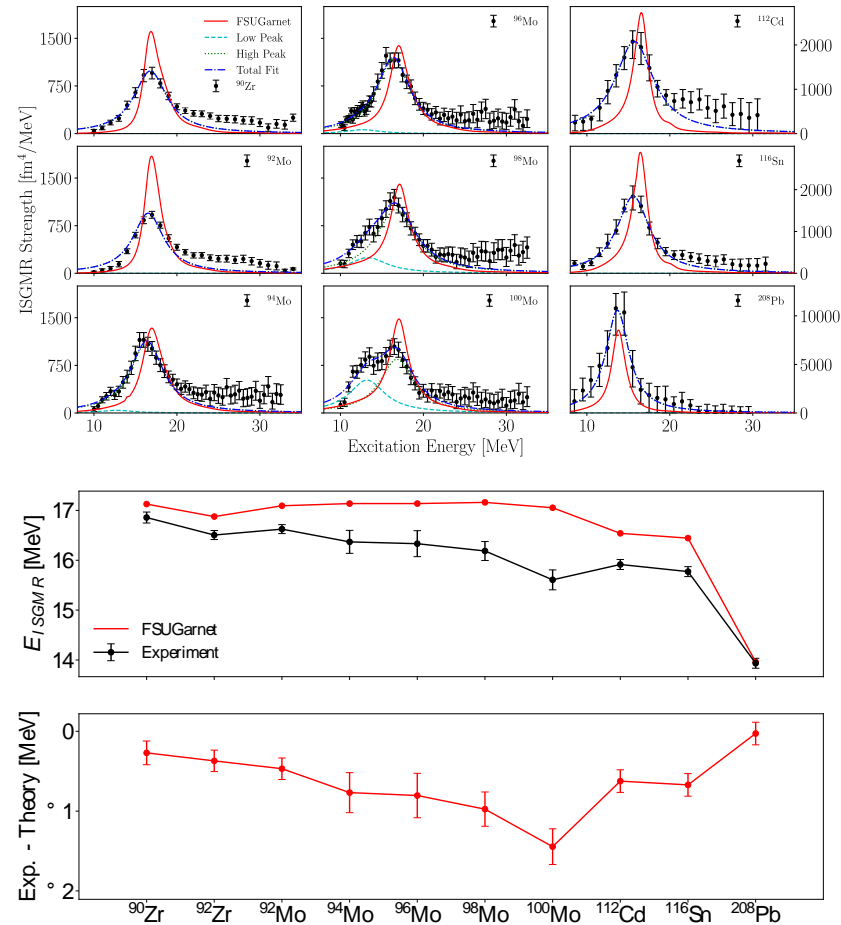


Compressional-mode resonances in the molybdenum isotopes: Emergence of softness in open-shell nuclei near A=90



"Why are the tin isotopes soft?" has remained, for the past decade, an open problem in nuclear structure. Models that reproduce the isoscalar giant monopole resonance (ISGMR) in the doubly-closed shell nuclei ^{90}Zr and ^{208}Pb also overestimate the ISGMR energies of the open-shell tin and cadmium nuclei, by as much as 1 MeV. The implications on the nuclear Equation of State are significant: even small changes in the nuclear incompressibility, which is constrained primarily by the ISGMR in such nuclei, can result in significant discrepancies in predicted stellar phenomena such as neutron star radii.

To shed some light onto the possible presence of softness, we performed detailed studies of ISGMR using the $^{94,96,98,100}\text{Mo}(\alpha, \alpha')$ reaction at $E_\alpha = 386$ MeV. A comparison of the results with relativistic, self-consistent Random-Phase Approximation calculations indicates that the ISGMR response begins to show softness in the molybdenum isotopes beginning with A=92.



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