THE ISOSCALAR GIANT DIPOLE RESONANCE AND NUCLEAR INCOMPRESSIBILITY

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The current status of the experimental work on the ISOSCALAR giant dipole resonance (ISGDR) will be reviewed. ISGDR is an exotic mode of collective nuclear vibration and can be described as a hydrodynamical density oscillation in which the volume of the nucleus remains constant and the state can be visualized in the form of a compression wave—analogous to a sound wave—oscillating back and forth through the nucleus.[1]
Convincing evidence for the ISGDR has now been obtained in inelastic α-scattering measurements at 200 MeV (IUCF) [2], 240 MeV (Texas A& M) [3] and 400 MeV (RCNP, Osaka) [4]. In all nuclei studied so far, the ISGDR strength is observed to be spread over a rather wide excitation-energy range (up to $\sim$ 15 MeV).
The excitation energy of the ISGDR is related to the nuclear incompressibility, K_∞. The ISGDR results so far point to a value for K_∞ that is $\sim$ 30-40% lower than that obtained from the energies of the other compressional mode, the giant monopole resonance. Results from recent theoretical attempts to reconcile this difference will be presented.
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References:
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