Moments of Inertia of Nuclei in the Rare Earth Region: A Relativistic versus a Non-relativistic Investigation

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A parameter free investigation of the moments of inertia of ground state rotational bands in well deformed rare-earth nuclei is carried out using Cranked Relativistic Hartree-Bogoliubov (CRHB) and non-relativistic Cranked Hartree-Fock-Bogoliubov (CHFB) theories. In CRHB theory, the relativistic fields are determined by the non-linear Lagrangian with the NL1 force and the pairing interaction by the central part of finite range Gogny D1S force. In CHFB theory, the properties in particle-hole and particle-particle channels are defined solely by Gogny D1S forces. Using an approximate particle number projection before variation by means of the Lipkin Nogami method improves the agreement with the experimental data, especially in CRHB theory. The effect of the particle number projection on the moments of inertia and pairing energies is larger in relativistic than in non-relativistic theory. published in Phys. Rev. **C62** (2000) 054306 (1-7)

Isoscalar Dipole Mode in Relativistic Random Phase Approximation

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The isoscalar giant dipole resonance structure in ^{208}Pb is calculated in the framework of a fully self-consistent relativistic random phase approximation (RRPA), based on an effective mean field Lagrangian with non-linear meson self-interactions. The results are compared with recent experimental data and with calculations performed in the HF plus RPA framework. Two basic isoscalar dipole modes are identified from the analysis of the velocity distributions. The discrepancy between the calculated strength distribution and current experimental data are discussed, as well as the implications for the determination of the nuclear matter incompressibility. published in Phys. Lett. **B487** (2000) 334