ELECTRIC, MAGNETIC AND VORTICITY STRENGTHS IN HEAVIER NUCLEI

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The separable RPA method [1,2] starting from the Skyrme functional is applied for the analyses of E1 and M1 giant resonances in rare-earth and actinide spherical and deformed isotopes. A special attention is paid to the role of the time-odd currents in the Skyrme functional and to their influence on the GR properties [1,2]. We discuss the influence of Skyrme parameterizations with different effective masses on the description of the photoabsorption cross section, E1 sum rule, and M1 resonance [3,4]. The main contributions to the resonance width (deformation splitting, Landau fragmentation, etc) are analysed.

The low-energy E1 strength near the particle emission thresholds is known to be important for astrophysical problems. We inspect influence of the deformation on this strength for particular isotopic chains [3]. The impact is shown negligible near and below the thresholds. At the same time, it increases the E1 strength near the E1 GR.

The irrotationality of the nuclear matter is analysed using the strength function of the dipole vorticity operator derived from the long wave expansion of the electric E1 transition operator [5]. Vorticity strength is compared with the E1 and dipole toroidal strength especially in the excitation energy interval characteristic for the Pigmy mode.

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