On properties of isoscalar giant multipole resonances in medium-heavy spherical nuclei

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In recent years, a large volume of theoretical studies of properties of Isoscalar (T = 0) Giant Multipole (L = 0 - 3) Resonances (ISGMPRs) in medium-heavy spherical nuclei has been performed [1, 2]. Within the Particle-Hole Dispersive Optical Model (PHDOM), main relaxation modes of high-energy particle-hole-type nuclear excitations associated with Giant Resonances (GRs) in medium-heavy closed-shell nuclei are together taken into account. For this reason, PHDOM has unique abilities in describing such characteristics of various GRs in nuclei, as the strength function, transition densities, and probabilities of direct one-nucleon decay (Ref. [2] and references therein). In the present work, studies of Ref. [2] related to ISGMPRs in ^{48}Ca, ^{90}Zr, ^{132}Sn, and ^{208}Pb are supplemented by the following points. (i) The strength distributions deduced from an analysis of (α, α')-reaction of ISGMPR excitation [3,4] are compared with the respective strength functions calculated within PHDOM. (ii) The method of evaluating, within PHDOM, partial branching ratios of GR direct one-nucleon decay is specified to make more adequate the comparison with experimental data of Ref. [5]. (iii) The extended PHDOM version, in which nucleon pairing in open-shell spherical nuclei is approximately taken into account, is implemented to evaluate the strength function of Isoscalar Monopole GR in the chain of even $^{114\text{-}124}$Sn isotopes. The results are compared with the experimental data of Ref. [6]. In a whole, the obtained results in PP. (i)-(iii) calculation are in a reasonable agreement with the respective experimental data.

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