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Multipole Response of Hypernuclei within Skyrme Energy Density Functional

We have extended the Hartree-Fock and Random Phase Approximation method to calculate the multipole giant resonances of hypernuclei within the Skyrme energy density functional self-consistently. This means that the same Skyrme interactions, including the nucleon-nucleon, nucleon-hyperon as well as hyperon-hyperon interaction, are adopted in the calculation of the properties of ground states and collective states in hypernuclei. In the calculations we use SKM* Skyrme interaction for the nucleon-nucleon interaction and Yamamoto nucleon-hyperon interaction as well as the Lanskoy SΛΛ1 parameter set for hyperon-hyperon interaction. We have systematically investigated the multipole response of double-Λ hypernuclei 18OΛΛ, 42CaΛΛ, 92ZrΛΛ, 122SnΛΛ and 210PbΛΛ. The effect of hyperon interaction on response function, the transition density, the low-lying states are analyzed in more details, the role of hyperon interaction depends on the type of the collective excitations, in some case it gives attractive effect, in another case, it is repulsive.

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