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Fingerprints of chiral bands associated with multi-quasiparticle configuration

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Abstract content
   (Max 300 words)

Nuclear chiral systems are formed when the total angular momentum of the nucleus is aplanar, i.e. when it has significant projections along the three nuclear axes [1]. Chiral symmetry is associated with the observation of degenerate ΔI = 1 partner bands [1] (this is the most revealing feature of strongly broken chiral system). In this work the reliability of the chiral fingerprints, such as degeneracy in the properties of the chiral partner bands [1], staggering in the B(M1) transition probabilities [2] and a lack of energy staggering [3, 4] associated with multi-quasiparticle configurations in the mass regions of 100, 130 and 190 was investigated using the multi-particle-plus-rotor (MPR) model calculations [5]. A strongly broken chirality for nuclei with large and stable triaxiality and with a suitable chiral configuration was not found for any restricted (a configuration space containing only one orbital for each of the odd valence nucleons) or non-restricted (a configuration space containing realistically large number of orbitals close to the corresponding Fermi level) configurations. In fact the multi-quasiparticle partner bands with suitable chiral configurations exhibit much worse near-degeneracy than the two-quasiparticle bands investigated in reference [6]. These results, as well as the reliability of the other chiral fingerprints such as B(M1) and energy staggering, will be discussed.

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