Chirality and its correlations with single-particle states

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Only triaxial nuclei can exhibit chirality; hence, it is direct evidence of the breaking of axial symmetry in atomic nuclei [1]. This phenomenon is manifested through the degeneracy of energy levels which allows us to understand the correlations with singl-particle configurations. Electromagnetic (EM) decay properties are also crucial signatures of chirality. These measurements of such transition probabilities have been beneficial in identifying chiral doublet bands [2]. We will discuss the application of the nonadiabatic quasiparticle approach [3,4] to study chiral doublet bands in ^{128}Cs, ^{130}Cs, ^{130}La, ^{136}Pm and ^{138}Pm. In this approach, the rotation-particle coupling is carried out so that the matrix elements of the even-even core appear explicitly. This treatment provides the opportunity to utilize the experimental energies of the core, which in turn reduces the dependence on the moment of inertia. We identify the correlations leading to vibrational or static nature of chirality. The application of our approach in ascertaining the spin and parity of the states involved also will be presented.

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