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Search for the candidate chiral nuclei in the A˜80 mass region

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Spontaneous symmetry breaking is a fundamental concept in nature. As a many-body quantum system, the atomic nucleus carries a wealth of information on fundamental symmetries and symmetry breaking. As one example, chiral symmetry breaking in atomic nuclei has attracted considerable attention and intensive discussion since it was first predicted by Frauendorf and Meng [1]. They pointed out that, in the intrinsic frame of the rotating triaxial nucleus, the total angular momentum vector may lie outside the three principal planes, referred to as chiral geometry. The spontaneous chiral symmetry breaking in the laboratory framemay give rise to pairs of nearly degenerate ΔI = 1 bands with the same parity, i.e., chiral doublet bands.

The present work performed a series of theoretical studies on nuclear chiral symmetry breaking in the A˜80 mass region. Following the reports of candidate chiral doublet bands observed in 78,80,82Br[2-4], chirality in the Rb, Kr, Br, and As isotopes is investigated for the first time by using adiabatic and configuration-fixed constrained triaxial relativistic mean field (RMF) theory[5-7]. The existence of the chiral doublet bands, as well as multiple chiral doublet bands in the A˜80 mass region is demonstrated.

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Abstract Type

Poster

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