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Odd-even splitting in scissors bands

The rotational band based on the scissors mode is investigated by an angular-momentum-projected method, which introduces the scissors degree of freedom by projecting protons and neutrons independently. An odd-even splitting of the rotational energy is found as a characteristic feature of these bands, which can be amplified by mixing with K=1 two-quasiparticle excitations. The odd-even splitting found here provides a quantitative explanation for the observed 2+ member of the scissors band in 156Gd, which stays unexpectedly close to the 1+ band head. The splitting in the scissors band can be attributed to the flipping of the rotational axis between odd and even spins, as well as the signature splitting of the two-quasiparticle band mixed with it.

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