Mixing effects on K-forbidden transition rates – Interaction with George in 2011-2013

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The anomalously fast decay of a $19/2^+$ three-quasiparticle isomer in ^{171}Tm [1] was interpreted as an example of *K* mixing induced by a very small mixing matrix element [2] but a (random) close proximity to a collective state. To understand the source of the residual interaction we have generalized the projected shell model [3] by introducing two-body octupole and hexadecupole forces into the Hamiltonian and expanding the model space with inclusion of specific three-quasiparticle configurations. It is found that the *K* mixing is built up from small interactions transferred through numerous highly excited configurations that contain high-*j* orbitals. While the chance near-degeneracy enhances the transition strength, the octupole correlation and Coriolis coupling produce the mixing matrix element [4].

The problem of the very different *E*2 decay rates [5] from the two-quasineutron $K^\pi = 6^+$ isomers in the $N = 104$ isotones ^{172}Er, ^{174}Yb, ^{176}Hf, and ^{178}W is investigated using the triaxial projected shell model with inclusion of multi-quasiparticle configurations [6]. It is demonstrated [7] that the highly *K*-forbidden transition from the 6^+ isomer to the ground-state band is sensitive to mixing with the 6^+ state of the γ-vibrational band. Thus the inter-band transitions, and lifetimes, depend on the relative position of the γ-band and the isomeric state in each isotone.

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