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Title: **Evidence for the wobbling mode in ^{163}Lu**

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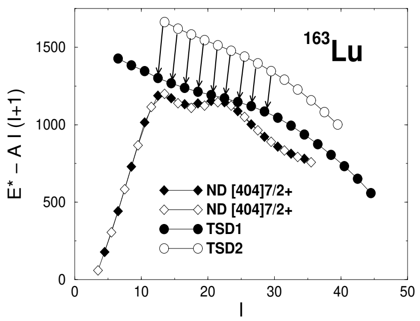
The wobbling mode is a direct consequence of rotational motion of a triaxial body. The wobbling degree of freedom introduces sequences of bands with increasing number of wobbling quanta [1], and a characteristic $\Delta I = 1$ decay pattern between the bands in competition with the in-band decay.

Favourable candidates for establishing for the first time this exotic excitation mode may be found in Lu-isotopes for which stable triaxial superdeformed shapes are expected. Several, presumably triaxial, superdeformed bands (TSD's) involving an aligned $i_{13/2}$ proton, which would strongly influence the decays from a wobbling excitation [2], are reported in recent years [3].

In a search for the wobbling mode built on TSD1 in ^{163}Lu an experiment using the fusion evaporation reaction ^{139}La(^{29}Si,5n) with a beam energy of 152 MeV was performed at the Euroball IV setup in Strasbourg. Several crossband transitions between a new band, TSD2, and TSD1 have been established, see the figure. From angular distribution, DCO ratio, and linear polarization measurements the mixed E2/M1 multipolarity could be deduced. Thereby firm spin and parity are assigned to TSD2. The relative excitation energy (200-300 keV) of TSD2 compared to TSD1 and in particular the EM properties with $B(E2)_{out}/B(E2)_{in} \sim 0.2$ and $B(M1)/B(E2)_{in} \sim 0.006\mu_N^2/e^2b^2$, are in severe disagreement with expectations for the signature partner. Furthermore, no three-quasiparticle excitations of the correct spin and parity is expected this low in excitation energy from cranking calculations. In contrast, a comparison to calculations [2] for the wobbling excitation shows reasonable agreement, thereby giving experimental evidence for observation of the long sought wobbling mode for the first time.



References

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Preferred presentation of the contribution: in the oral session.