Abstract Submitted
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Band Termination in Heavy-Nuclei[1] MARK RILEY, Florida State University — The generation of angular momentum (spin) is perhaps one of the most beautiful illustrations of finite particle number effects in nuclei. A deformed prolate nucleus can increase its spin by collective rotation about an axis perpendicular to its symmetry axis leading to I(I+1) quantum-rotor behavior and the observation of regular rotational bands. However, since the nucleus is a finite mesoscopic quantal system, such collective behavior must have an underlying microscopic basis which limits the spin that a particular nuclear configuration, or band, can generate. A combination of Coriolis and centrifugal forces, induced by rapid rotation, can break the valence pairs and align the individual nucleonic angular momentum along the collective rotation axis. These aligned nucleons move in equatorial orbits polarizing the nucleus, from its original prolate shape, towards an oblate one. Eventually the available spin is exhausted when all the valence nucleons outside a spherical, doubly magic core are aligned. This is known as valence-space "band termination" and is observed in gamma-ray emission spectra by the abrupt and characteristic end to a rotational band. High-spin terminating bands in heavy nuclei were first identified around Er-158, see Ref. [1] and references therein. Recent experimental data on this classic nucleus and its neighbors have greatly enhanced the band termination story and will be presented. [1] A.V. Afanasjev, D.B. Fossan, G.J. Lane, and I. Ragnarsson, Phys. Rep. 322, 1 (1999).

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