

DECAY OF SUPERDEFORMED EXCITATIONS IN $A \sim 190$ NUCLEI

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Since the discovery of superdeformation (SD) a plethora of information has been extracted from the study of the decay of these highly elongated structures. Studies of the decay of SD excitations in ^{192}Hg and ^{194}Hg [1,2] have been used to extract excitation energies of SD states. Single-step transitions which connect normal deformed (ND) states to SD states have been used to determine the spin and parity of SD excitations in ^{194}Hg [2]. Similar studies for ^{192}Pb and ^{194}Pb [3,4,5,6,7], have yielded excitation energies, spins and parities of SD states. Measurements of the quasicontinuous decay of Hg and Pb [1,7] SD excitations have also provided information on the hot ND states through which the levels of the SD band decay.

Current understanding of the decay out from the SD well is that at low spin the barrier separating the two wells is sufficiently reduced by its spin dependence, so that the SD wave function penetrates the barrier and mixes with nearby ND levels. To understand the decay of SD bands to ND levels it is important to extract the spreading width through the barrier, which can be used to deduce the height of the barrier between the SD and ND wells and the magnitude of the ND component in the wavefunction of the SD state, assuming a model for the ND decay widths. It has recently been observed that Stafford and Barrett's two-level model allows extraction of the spreading width from experimental results [8].

In the present talk we will present new measurements of the decay of the SD bands in ^{195}Pb and ^{198}Po . The tunneling widths, extracted from expressions given in [9], based on the Stafford-Barrett model, will be compared to those in other $A \sim 190$ SD nuclei, and used to deduce the SD well depth and ND components in the wavefunctions of the SD excitations as functions of spin.

- [1] T. Lauritsen, *et al.*, Phys. Rev. C **62**, 044316 (2000).
- [2] T. L. Khoo *et al.*, Phys. Rev. Lett. **76**, 1583 (1996).
- [3] D. P. McNabb, *et al.*, Phys. Rev. C **61**, 2474 (1997).
- [4] A.N. Wilson, *et al.*, Phys. Rev. Lett. **90**, 142501 (2003).
- [5] M. J. Brinkman, *et al.*, Phys. Rev. **C53**, R1461 (1996).
- [6] K. Hauschild *et al.*, Phys. Rev. **C55**, 2819 (1997).
- [7] D. P. McNabb, *et al.*, Phys. Rev. C **61**, 031304 (2000).
- [8] C. A. Stafford, B. R. Barrett, Phys. Rev. C **60**, 051305 (1999)
- [9] D.M. Cardamone, *et al.*, Phys. Rev. Lett. **91**, 102502-1 (2003).

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