Enhanced collectivity of neutron-rich ^{129}Sb beyond the particle-core coupling scheme

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The region around the double-magic ^{132}Sn has been of interest in recent years, with Radioactive Ion Beam accelerator facilities allowing experiments to be conducted in neutron-rich nuclei. Experimental evidence shows ^{132}Sn to be one of the best doubly magic nuclei, providing a testing ground for the shell model and investigations into the onset of collectivity.

Coulomb excitation data from the Holifield Radioactive Beam Facility (HRIBF) at Oak Ridge National Laboratory will be presented. 11 HPGe Clover detectors in the Clarion array and 54 CsI particle detectors in the BareBall array were used to study ^{129}Sb, a radioactive nucleus near ^{132}Sn. The measurements provide a test of particle-core coupling schemes.

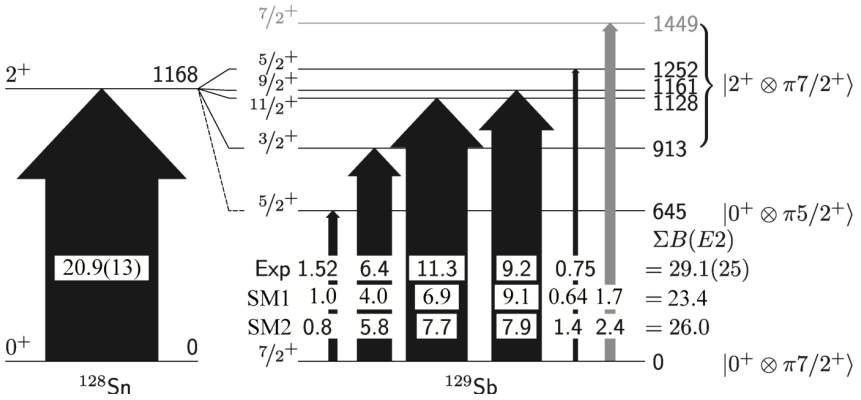

FIG. 1: Fragmentation of the $B(E2)$ strength in the ^{128}Sn core into the $d_{5/2}$ proton and $2^+ \otimes g_{7/2}$ multiplet members is shown.

The results indicate that the total electric quadruple strength exciting the $2^+ \otimes g_{7/2}$ multiplet of ^{129}Sb is a factor of 1.39(11) larger than that of the 2^+ excitation of the ^{128}Sn core. This is in stark contrast to the expectations of particle-core coupling schemes [1, 2]. The odd proton must polarize the core. Two state-of-the-art shell-model calculations were performed, which account for some but not all of the enhanced collectivity.

[1] A. de Shalit, *Phys. Rev.* **122**, 1530 (1961)

[2] A. Bohr and B. R. Mottleson, *Nuclear Structure, Vol II* (W. A. Benjamin, New York, 1975) p. 360