The Beauty of Good Data: Unveiling the Traces of Mixed Symmetry

N. Pietralla

Institut für Kernphysik, Technische Universität Darmstadt, 64289 Darmstadt, Germany

A consequence of the formulation of the proton-neutron version of the Interacting Boson Model [1] is the occurrence of low-energy mixed-symmetry states with boson couplings that were partially non-symmetric with respect to proton and neutron boson labels. This results in enhanced M1 gamma-ray transitions to lower-lying fully symmetric states.

The technique of projectile-Coulomb excitation on light targets has proven itself as a powerful method for the identification and quantitative investigation of one-phonon mixed-symmetry $2^+_{1,ms}$ states of vibrational nuclei. A complete set of data on the $2^+_{1,ms}$ state has been obtained [2,3] on the stable even-even isotopes of the A=130 mass region on the basis of absolute M1 transition rates. For the case of ^{132}Te the method has recently produced first solid evidence for a mixed-symmetry state of a radioactive nuclide [4].

Further information on the dominant single-particle components involved in the formation of quadrupole-collective one-phonon states of vibrational nuclei has very recently been obtained from a comparison of inelastic electron-scattering and proton-scattering cross sections. Quantum interferences in charge- or matter-transition densities enable one to determine whether a proton boson or a neutron boson couples antisymmetrically [5]. New data [6] on that phenomenon will be presented and discussed.

[1] F. Iachello and A. Arima, *The interacting boson model* (Cambridge Univ. Press, 1987).
[2] L. Coquard *et al*., Phys. Rev. C **82**, 024317 (2010).
[3] Th. Möller *et al*., TU Darmstadt, in preparation.
[4] M. Danchev *et al*., Phys. Rev. C **84**, 061306(R) (2011).
[5] Ch. Walz *et al*., Phys. Rev. Lett. **106**, 062501 (2011).
[6] A. Scheikh-Obeid *et al*., TU Darmstadt, in preparation.