



Contribution ID: 91

Type: Oral

Microscopic aspects of γ -softness in atomic nuclei

Thursday, 20 July 2023 17:00 (15 minutes)

How the collective features emerge from the microscopic degrees of freedom is one of the main research themes in quantum many-body systems. Using the microscopic approach of the triaxial projected shell model (TPSM), the authors demonstrate that admixing few quasiparticle excitations into the vacuum configuration with a fixed triaxiality parameter γ provides a quantitative description of the shape fluctuations of the γ -soft nuclei.

This is demonstrated by a detailed study of ^{104}Ru , which reproduces a large set of experimental energies and $BE2$ matrix elements measured by COULEX [1].

The collective features are elucidated using the quadrupole shape invariant analysis, and also the staggering phase classification of the γ -band. A systematic study of twenty-two nuclei has been carried out by means of the TPSM. The experimental energies of the yrast bands and γ bands as well as the pertaining experimental $B(E2)$ values for intra and inter band transitions are very well reproduced. The signatures of triaxiality softness, as the position of the 2_2^+ state relative to the 4_1^+ state, the energy staggering of the γ band, the position of the 0_2^+ state and its $E2$ decay are discussed.

[1] N. Nazir et al. Phys. Rev. C 107, L021303 (2023)

Primary author: FRAUENDORF, Stefan (Department of Physics, University of Notre Dame, Notre Dame,)

Co-authors: SHEIKH, Javid (Department of Physics, University of Kashmir); BHAT, G. H. (Department of Physics, SP College); ROUOOF, S.P. (Department of Physics, Islamic University of Science and Technology); NAZIR, Nazira (Department of Physics, University of Kashmir); JEHANGIR, S. (Department of Physics, Islamic University of Science and Technology); RATHER, N. (Department of Physics, Islamic University of Science and Technology)

Presenter: FRAUENDORF, Stefan (Department of Physics, University of Notre Dame, Notre Dame,)

Session Classification: Session 13A

Track Classification: Theoretical Nuclear Structure