2015 European Nuclear Physics Conference
European Physical Society | university of groningen | kvi - center for advanced radiation technology
Groningen | 31 August - 4 September 2015 | www.EuNCP2015.org

Contribution ID: **134** Type: **Oral**

Interplay of γ-rigid and γ-stable collective motion in the phase transition from spherical to deformed nuclear shapes

Tuesday, 1 September 2015 14:15 (15 minutes)

A simple exactly separable model for the competition between the γ-rigid and γ-stable collective motion in the phase transition between spherical and deformed shapes is proposed. The coupling of the two types of β vibration is achieved by introducing a control parameter measuring the degree of the system's γ-rigidity in an Ising type Hamiltonian. The separation of variables is achieved by considering a potential of the form u(β)+u(γ)/β^2 adapted to the current problem. Matching the two competing excitations, the γ potential is chosen to be a harmonic oscillator centered in γ=0, which is consistent with the prolate γ-rigid part of the problem. While for the β potential an infinite square well is considered. The resulting energy spectrum and E2 transition probabilities depend on two parameters excepting the scale, namely the rigidity and the stiffness of the γ vibrations. Their separate influence on the model's characteristics is investigated through numerical applications. The experimental realization of the model is found in few transitional rare earth nuclei around N=96.

Primary author: BUDACA, Radu (Horia Hulubei National Institute of Physics and Nuclear Engineering)

Co-author: Dr BUDACA, Andreea Ioana (Horia Hulubei National Institute of Physics and Nuclear Engineering)

Presenter: BUDACA, Radu (Horia Hulubei National Institute of Physics and Nuclear Engineering)

Session Classification: Nuclear Structure, Spectroscopy, and Dynamics III