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COLLECTIVE STATES AND BANDCROSSING IN EVEN CERIUM ISOTOPES

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On the base of microscopic version of the IBM1 plus other bosons of positive parity with spins from 0^+ to 10^+ properties of yrast-band states in even Ce isotopes are studied. Parameters of the boson Hamiltonian and interactions of the collective quadrupole bosons with other bosons are calculated microscopically. This study is a continuation of similar works on the isotopes Xe and Ba [1], in which the possibilities of the microscopic theory have been investigated in the description of increasingly deformed nuclei.

In all considered even Ce isotopes in which there are developed yrast-bands theoretical calculations show that at spin $I\mathrm{cr} = 12^+$ in $^{122-128}$Ce and at $I\mathrm{cr} = 10^+$ in ^{130,132}Ce the band-crossing takes place just as in even Ba isotopes [1]. The back-bending in moment of inertia (expect ^{122}Ce) at corresponding rotational frequency and minima in $B(E2;\ I \to I-2)$ values at $I = I\mathrm{cr}$ serve experimental confirmation of such calculations. In ^{122}Ce because of a strong interaction between two bands the moment of inertia up to $I = 14^+$ retains the square dependence on frequency. The suggested theory satisfactory describes these experimental facts: fig.1 present yrast-band energies (theoretical quantities distinguish from experimental ones not more then by 60 keV), fig.2 $B(E2)$'s for ^{128}Ce.

1. A.D.Efimov,V.M.Mikhajlov//Bull.RAS.Ac.Sci.Phys.2018.V.82.P.1266; ibid.2019.V.83.P.113.

Primary author: Dr EFIMOV, Alexander (Admiral Makarov State University of Maritime and Inland Shipping)

Presenter: Dr EFIMOV, Alexander (Admiral Makarov State University of Maritime and Inland Shipping)

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