

## Spin scissors mode in Actinides

Wednesday 3 July 2024 15:00 (20 minutes)

The scissors mode is investigated in the actinide region, including even-even superheavy nuclei up to  $^{256}\text{No}$ , within the Time Dependent Hartree-Fock-Bogoliubov (TDHFB) approach. The solution of TDHFB equations by the Wigner Function Moments (WFM) method predicts a splitting of the scissors mode into three intermingled branches due to spin degrees of freedom [1]. Both the calculated energy centroid and integrated  $M1$  strength in  $^{254}\text{No}$  are in good agreement with the results of recent measurements performed by the Oslo method [2]. The energy centroids and summed  $B(M1)$  values for other transuranium nuclides are predicted.

The calculations are performed also for  $^{232}\text{Th}$  and  $^{236,238}\text{U}$  isotopes. The scissors resonance in many actinide region nuclei exhibits a prominent double-hump structure [3,4]. The WFM analysis allows to assume that the observed splitting of scissors resonance can occur due to the separation of conventional scissors and spin-scissors excitations.

[1] E. B. Balbutsev, I.V. Molodtsova, A. V. Sushkov, N. Yu. Shirikova, P. Schuck, Phys. Rev. C **105**, 044323 (2022)

[2] F. L. Bello Garrote, A. Lopez-Martens, A.C. Larsen, I. Deloncle, S. Peru *et al.*, Phys. Lett. B **834**, 137479 (2022)

[3] A. S. Adekola, C. T. Angell, S. L. Hammond, A. Hill, C. R. Howell, H. J. Karwowski, J. H. Kelley, E. Kwan, Phys. Rev. C **83**, 034615 (2011)

[4] M. Guttormsen, L. A. Bernstein, A. Gorgen, B. Jurado, S. Siem *et al.*, Phys. Rev. C **89**, 014302 (2014)

### Section

Nuclear structure: theory and experiment

**Primary author:** MOLODTSOVA, Irina (Bogoliubov Laboratory of Theoretical Physics, Joint Institute for Nuclear Research, Dubna)

**Co-author:** Dr BALBUTSEV, Evgeny (Bogoliubov Laboratory of Theoretical Physics, Joint Institute for Nuclear Research, Dubna)

**Presenter:** MOLODTSOVA, Irina (Bogoliubov Laboratory of Theoretical Physics, Joint Institute for Nuclear Research, Dubna)

**Session Classification:** Nuclear structure: theory and experiment