On the shape coexistence and possible shape isomers in the Pt-Hg-Pb neutron deficient nuclei *

J. Bartel[1], X. Guan[2], J. Guo[2], H. Molique[1], B. Nerlo-Pomorska[3], K. Pomorski[4], Q.-W. Sun[2], and M. Warda[3]

[1] *CNRS-IN$_2$P$_3$, Université de Strasbourg, Strasbourg, France*
[2] *School of Physics and Electronic Technology, Liaoning Normal University, Dalian, China*
[3] *Department of Theoretical Physics, M.C.S. University, Lublin, Poland and*
[4] *National Centre for Nuclear Research, Warsaw, Poland*

Potential energy surfaces (PES) of even-even isotopes of Pt, Hg, and Pb around ^{172}Hg and ^{186}Hg are evaluated within a macroscopic-microscopic model based on the Lublin-Strasbourg-Drop macroscopic energy [1] and the microscopic one obtained using the Yukawa-folded mean-field potential [2] to establish the Strutinsky shell corrections and the pairing correlation energy through the BCS approach with a monopole pairing force [3]. The rapidly converging Fourier-over-Spheroid shape parametrization [4-5] describes nuclear deformations. The stability of the identified shape isomeric states with respect to the non-axial and higher-order deformations is investigated [6,7]. It is also found that in the description of the non-axial deformation, special attention needs to be devoted to the orientation of the triaxial shape. For example of the ^{186}Hg nucleus, where three prolate shape-isomeric states are found, it is shown that the potential energy surfaces obtained in our model are close to the one obtained in the Hartree-Fock-Bogoliubov theory with the Gogny energy-density functional. A comparison between the PES evaluated with the exact and the BCS solution of the pairing eigenproblem demonstrates that BCS pairing tends to smooth out shape coexistence and reduce the depth of the shape isomer, leading to less pronounced deformation features [7].

[1] K. Pomorski, J. Dudek, Phys.Rev. C **67**, 044316 (2003).
[2] A. Dobrowolski, J. Bartel, K. Pomorsk, Comp. Phys. Comm. **237**, 253 (2019).
[3] S. G. Nilsson et al., Nucl. Phys. A **131**, 1 (1969).
[4] K. Pomorski, B. Nerlo-Pomorska, Acta Phys. Polon. Conf. Suppl. **16**, 4-A21 (2023).
[5] K. Pomorski et al., Phys. Rev. C **107**, 054616 (2023).
[6] J. Bartel, H. Molique, B. Nerlo-Pomorska, M. Warda, K. Pomorski, sub. to Phys. ReV. C
[7] X. Guan, J. Guo, Q.-W. Sun, B. Nerlo-Pomorska, K. Pomorski, Nucl. Scien. Tech. in print.
[8] X. Guan, K.D. Launey, M.X. Xie et al., Comp. Phys. Com. **185**, 2714 (2014).

*Paper is partially supported by the Polish National Science Centre, grant No. 2023/49/B/ST2/01294.