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High-K state and rotational band in light superheavy nuclei by PNC-CSM method

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Inspired by the newly discovered experimental data, the nuclear structure of the light superheavy nuclei are studied. The single-particle structure, high-K isomers, rotational properties and α-decay energies of the light superheavy nuclei are investigated within the framework of the cranked shell model (CSM) with pairing correlation treated by a particle-number-conserving (PNC) method. High-order deformation ε_6 plays an important role both in the single-particle orbitals and in the multi-particle states of the light superheavy mass region. A reverse of the single-particle energy levels is resulted by including ε_6 deformation, based on which the microscopic mechanism of the identical bands between Lr isotopes is explained. The reflection asymmetric octupole deformation is used to explain the variation of the rotational bands versus the rotational frequency in U and Pu isotopes. Pairing reduction of the multi-particle bands in the light superheavynuclei is discussed in details.

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