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Self-consistent microscopic description of nobelium isotopes

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Nobelium isotopes serve as a test gateway for theoretical models pretending to description of superheavy elements [1]. We give a general review of the present status of spectroscopy of nobelium isotopes and present a systematic investigation of their ground-state properties and low-energy spectra of $^{250-262}$No [2] in the framework of self-consistent Quasiparticle Random-Phase-Approximation (QRPA) with Skyrme forces [3]. The model was previously widely applied to exploration of low-energy spectra and fine structure of giant resonances in light, medium and heavy nuclei, see e.g. [4-6]. The monopole, quadrupole, octupole and hexadecapole excitations as well as some K-isomers of a high multipolarity in No isotopes are considered. The main attention is paid to nuclei ^{252}No and ^{254}No, for which the most extensive experimental spectroscopic information is available. In particular, we analyze a possible shell gap in neutron single-particle spectrum and corresponding drop of the neutron pairing in these isotopes. The features and assignment of K-isomers are discussed in detail, taking into account the latest experimental data [7-9]. The disputed 8^- isomer in ^{252}No is firmly assigned. Low-energy pairing-vibrational $K^\pi = 0^+$ states in ^{252,254}No are predicted.

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