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The competition of particle-vibration coupling and tensor interaction in spherical nuclei[1] ANATOLI AFANASJEV, Mississippi State University, ELENA LITVINOVA, Western Michigan State University — The search for missing terms in the energy density functionals (EDF) is one of the leading directions in the development of nuclear density functional theory (DFT). Tensor force is one of possible candidates [1]. However, despite extensive studies [1] the questions about its effective strength and unambiguous signals still remain open. One of the main experimental benchmarks for the studies of tensor interaction is provided by the data on the single-particle states in the $N = 82$ and $Z = 50$ isotopes. The energy splittings of the proton $h_{11/2}$ and $g_{7/2}$ states in the $Z = 50$ isotopes and neutron $1i_{13/2}$ and $1h_{9/2}$ states in the $N = 82$ isotones are used in the definition of tensor force in the Skyrme DFT [1]. However, in experiment these states are not "mean-field" states because of coupling with vibrations. Employing relativistic particle-vibration coupling (PVC) model [2] we show that many features of these splittings can be reproduced when PVC is taken into account. This suggests the competition of PVC and tensor interaction and that tensor interaction should be weaker as compared with previous estimates.

[1] H. Sagawa and G. Colo, Prog. Part. Nucl. Phys. 76, 76 (2014).
[2] E. Litvinova, Phys. Rev. C 85, 021303(R) (2012).

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