

Abstract Submitted
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Search for collective enhancement of the nuclear Schiff moment¹

ALEXANDER VOLYA, Florida State University, NAFTALI AUERBACH, Tel Aviv University, VLADIMIR ZELEVINSKY, Michigan State University — The non-zero expectation value of the nuclear Schiff moment violates invariance under spatial inversion and time reversal and produces the electrostatic potential that induces the electric dipole moment (EDM) of the atom. The experimental discovery of the atomic EDM pursued by several experimental groups would mark a significant progress in understanding fundamental symmetries of nature; the best limits on P,T-violating forces come from the EDM measurements in Hg and Xe nuclei. Strong interactions in the nucleus influence the value of the Schiff moment. The static octupole deformation was shown [1] to produce large enhancement of the Schiff moment in deformed nuclei through the mixing of parity doublets. We study the idea [2] of the possible enhancement in spherical nuclei with soft quadrupole and octupole collective modes. The existence of the effect was confirmed [3] in the limit of very small collective frequencies in the framework of the RPA. We show the results of the exact diagonalization in the model with pairing and multipole-multipole forces that demonstrate the presence of the enhancement as a result of the mixing in the odd nucleus of states with the same angular momentum and opposite parity having large phonon components.

[1] V. Spevak, N. Auerbach and V.V. Flambaum, Phys. Rev. C 56 (1997) 1357.

[2] V.V. Flambaum and V.G. Zelevinsky, Phys. Rev. C 68 (2003) 035502. [3] N. Auerbach, et.al., Phys. Rev. C 74 (2006) 025502.

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