

Atomic Electric Dipole Moments and Time-Reversal Symmetry Violation: Role of Octupole Collectivity *

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Time-reversal symmetry violation has so far been observed only in kaons [1], and its origin is still unclear. The search for electric dipole moments (EDMs) of neutral atoms provides a complementary window onto the same phenomenon. Experiments that search for EDMs can benefit by using atoms in which the moments can be enhanced by structural effects in either the atom or the nucleus.

Here we discuss an enhancement of the EDM in atoms whose nuclei have strong octupole correlations in the ground state [2,3]. After giving a rough estimate of the size of the enhancement, which depends sensitively on the matrix element of the time-reversal-violating nucleon-nucleon interaction, we discuss self-consistent mean-field calculations designed to capture the enhancement more precisely. We conclude that a source of radioactive octupole-deformed nuclei such as ^{225}Ra and ^{223}Rn would be worthwhile.

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[3] J. Engel, J.L. Friar, and A.C. Hayes, Phys. Rev. **C61**, 35502 (2000).

*This work was supported by the U. S. Department of Energy under contract DE-FG02-97ER41019.