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Nuclear-anapole-moment Effects in Diatomic Molecules

Tuesday 15 May 2018 18:00 (5 minutes)

In diatomic systems, the rich and varied spectra and nearly degenerate energy levels provide huge enhancements for tiny physical effects, making it possible to look for new physics beyond the Standard Model in a single experiment. Nuclear-spin dependent parity-violating interactions and nuclear-anapole-moment effects in diatomic molecules in particular provide precise test of the electroweak Theory of the Standard Model. For instance, the weak interaction coefficient WA can be used to extract helpful information, which determines nuclear-spin dependent parity-violating interactions, from experiments. It, specifically, depends on electronic structure and can be obtained from evaluating the matrix elements of the $\alpha\rho(r)$ operator in the molecular spinor basis. In this work, the WA coefficients for the selected alkaline earth metal fluorides are reported with relativistic Coupled Cluster methods and their properties are also discussed.

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Author: HAO, Y.

Co-authors: BORSCHEVSKY, A. (University of Groningen); ILIAS, M. (Matej Bel University)

Presenter: HAO, Y.

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