

Nuclear-anapole-moment Effects in Diatomic Molecules

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In diatomic molecules, 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 particular in diatomic molecules provide precise test of the electroweak theory of the Standard Model [1]. The nuclear anapole moment interaction coefficient W_A can be used to extract helpful information, which determines nuclear-spin dependent parity-violating interactions, from experiments [1]. 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 [1, 2, 3]. In this work, the W_A coefficients for the selected alkaline earth metal fluorides are reported with Relativistic Coupled Cluster theory combined with Finite Field approach and their properties are also discussed.

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