

Abstract Submitted
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Nuclear Spin-Dependent Parity Nonconservation in Diatomic Molecules DAVID RAHMLow, DENNIS MURPHREE, SIDNEY CAHN, DAVID DEMILLE, Yale University, EDWARD DEVENY, Bridgewater State University, RICHARD PAOLINO, United States Coast Guard Academy, MISHA KOZLOV, Petersburg Nuclear Physics Institute — Nuclear spin-dependent parity nonconservation (NSD-PNC) effects arise from couplings of the Z_0 boson (parameterized by the electroweak coupling constants $C_{2P,N}$) and from the interaction of electrons with the nuclear anapole moment, a parity-odd magnetic moment. The effects of the anapole moment scale with the nucleon number A of the nucleus as $A^{2/3}$, while the Z_0 coupling is independent of A ; the former will be the dominant source of NSD-PNC in nuclei with $A > 20$. To date, the most precise result on NSD-PNC comes from a measurement of the hyperfine dependence of atomic PNC in ^{133}Cs . However, the effects of NSD-PNC can be dramatically enhanced in diatomic molecules. We outline an experimental program to take advantage of this enhancement. We have identified over ten suitable molecules; from measurements on the nuclei in these molecules we can extract the relative contributions of the anapole moment and the electroweak Z_0 couplings. This will increase the available data on nuclear anapole moments, as well as reduce the uncertainties in current measurements of C_{2N} and C_{2P} . We report on the design of our pulsed molecular beam experiment and the current status of our efforts.

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