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**Electroweak Physics in Molecules** E. DEVENEY, Bridgewater St. C., R. PAOLINO, U.S. Coast Guard Acad., M.G. KOZLOV, Petersburg Nuc. Phys. Inst., J. BARRY, S.B. CAHN, D. MURPHREE, D. RAHMLOW, M. STEINECKER, C.G. YALE, D. DEMILLE, Yale U. — We report on recent progress of our program to measure nuclear spin-dependent parity nonconservation (NSD-PNC) in electron-nucleon interactions. We probe enhanced NSD-PNC signals from the mixing of rotational/hyperfine states in diatomic molecules that are Zeeman shifted to near degeneracy. The NSD-PNC effect arises from two main sources: the electron-vector/nucleon-axial ($V_e A_n$) tree-level neutral current (a $Z^0$-mediated coupling parameterized by electroweak constants $C_{\{2P,N\}}$), and a hyperfine term resulting from coupling of the nuclear anapole moment (a magnetic moment induced by intra-nuclear electoweak interactions) to the electron's magnetic dipole moment. The $V_e A_n$ term is independ. of the nucleon number $A$ of a given nucleus and is suppressed in the Standard Model, while the anapole term scales as $A^{2/3}$making it the dominant source of NSD-PNC in nuclei with$A > 20$. Measurements in molecules containing nuclei over a large range of $A$ should allow us to disentangle the two NSD-PNC contributions, increasing available data on nuclear anapole moments and reducing uncertainties in current measurements of $C_{2P}$ and $C_{2N}$. Progress includes demonstration of an increased-flux molecular beam source, and a substantial improvement of molecular detection efficiency using a new scheme.

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