Abstract Submitted for the DAMOP13 Meeting of The American Physical Society

Final results from the PbO electron electric dipole moment search STEPHEN ECKEL, PAUL HAMILTON, EMIL KIRILOV, HUNTER SMITH, DAVID DEMILLE, Yale University — We present the final results of an experiment to search for the electron EDM, using the polar molecule PbO. PbO offers several advantages compared to atoms, including a much larger effective internal electric field (> 10 GV/cm) and parity doubling. The latter can be used to reverse the effective internal electric field without reversing the laboratory electric field, which allows for significant rejection of systematic errors. Our experiment uses a high-temperature vapor cell to obtain significant density of PbO. The problems inherent to working in this environment-such as large leakage currents and electric field imperfections due to uncontrolled electron emission-provide one of the most rigorous tests of the power of this systematic error rejection method. Despite these problems, we obtain a limit on the EDM of  $d_e < 2 \times 10^{-26} e \cdot cm$ , only a factor of 20 from the current experimental limit. The use of parity-doublet states for systematic rejection is a common feature of molecules with similar energy structure, and our methods should be applicable to other experiments that use species such as ThO, WC, and  $HfF^+$ .

> Stephen Eckel NIST

Date submitted: 25 Jan 2013

Electronic form version 1.4