Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Spectroscopy of YbOH Isotopologues for New Physics Searches.[1] NICKOLAS PILGRAM, ARIAN JADBABAIE, YI ZENG, Caltech, TIMOTHY STEIMLE, Arizona State University, NICHOLAS HUTZLER, Caltech — Heavy polar molecules act as a powerful probe of physics beyond the standard model due to their high sensitivity to charge parity violating electromagnetic moments. The polyatomic molecule YbOH is a promising candidate for new physics searches in both the leptonic sector, via a search for the electron electric dipole moment (eEDM) in the ^{174}YbOH isotopologue, and the hadronic sector, via a search for the nuclear magnetic quadrupole moment (nMQM) of the Yb nucleus in the ^{173}YbOH isotopologue. In preparation for measurements of the eEDM and nMQM, we have measured the $\tilde{A}^2\Pi_{1/2}(0,0,0) - \tilde{X}^2\Sigma^+(0,0,0)$ transition of a molecular beam sample of YbOH at near-linewidth resolution and modeled the corresponding fine and hyperfine splittings for all isotopologues. This builds on the previous optical study of the ^{174}YbOH and ^{172}YbOH and microwave study of ^{174}YbOH. An optimized set of fine and hyperfine parameters of the $\tilde{X}^2\Sigma^+(0,0,0)$ and $\tilde{A}^2\Pi_{1/2}(0,0,0)$ states, were obtained via a nonlinear least squares fit to the observed transition wavenumbers. The estimated hyperfine parameters of the odd isotopes of YbOH are compared to the corresponding parameters of isoelectronic YbF, as well as to ab initio calculations.

[1]Work at Caltech supported by the Heising-Simons Foundation, NSF CAREER Award, NIST Precision Measurement Grant. Work at ASU supported by the Heising-Simons Foundation

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Date submitted: 31 Jan 2020 Electronic form version 1.4