BRANCHING RATIOS, RADIATIVE LIFETIMES, AND TRANSITION DIPOLE MOMENTS FOR YbOH

BENJAMIN AUGENBRAUN, *Department of Physics, Harvard University, Cambridge, MA, USA*; EPHRIEM TADESSE MENGESHA, ANH T. LE, TIMOTHY STEIMLE, *School of Molecular Sciences, Arizona State University, Tempe, AZ, USA*; LAN CHENG, CHAOQUN ZHANG, *Department of Chemistry, Johns Hopkins University, Baltimore, MD, USA*; ZACK LASNER, JOHN M. DOYLE, *Department of Physics, Harvard University, Cambridge, MA, USA*.

Yb-containing molecules exhibit strongly enhanced sensitivity to physics beyond the Standard Model, including the symmetry-violating electron electric dipole moment (eEDM). Laser cooling and trapping are necessary in order to fully leverage this intrinsic sensitivity. To this end, we present medium resolution laser-induced fluorescence (LIF) excitation spectra of a rotationally cold sample of YbOH in the 17300-17950 cm^{-1} range recorded using two-dimensional (excitation and dispersed fluorescence) spectroscopy. High resolution dispersed LIF (DLIF) spectra and radiative lifetimes of numerous bands detected in the medium resolution spectra are described. The vibronic energy levels of the $\tilde{X}\,^2\Sigma^+$ state are predicted using a discrete variable representation approach and compared with observations. The DLIF spectra are analyzed to determine vibrational branching ratios and transition dipole moments, important determinants in the efficacy of laser cooling. Implications for laser cooling and trapping of YbOH are discussed.