A STUDY OF THE $A^2\Pi/B^2\Sigma^+$ - $X^2\Sigma^+$ BAND SYSTEMS OF CALCIUM MONOHYDRIDE, CaH, USING A SUPERSONIC MOLECULAR BEAM SOURCE AND LASER INDUCED FLUORESCENCE DETECTION

JAMIE GENGLER, TIMOTHY STEIMLE, and JINHAI CHEN, *Department of Chemistry and Biochemistry, Arizona State University, Tempe, AZ 85287.*

The high-resolution laser induced fluorescence spectrum of a molecular beam sample of calcium monohydride, CaH, in the region of the strongly overlapped (1,0) $A^2\Pi$-$X^2\Sigma^+$ and (0,0) $B^2\Sigma^+$-$X^2\Sigma^+$ band systems near 630 nm and the (0,0) $A^2\Pi$-$X^2\Sigma^+$ band system near 690 nm have been recorded and analyzed. The spectral features exhibit a small splitting which is attributed to proton magnetic hyperfine interactions in the $X^2\Sigma^+$ (v=0) state[a,b].The energy levels of the $A^2\Pi$ (v=0) and $X^2\Sigma^+$ (v=0) vibronic states were modeled using a traditional effective Hamiltonian approach, where as those for the interacting $A^2\Pi$ (v=1)/$B^2\Sigma^+$ (v=0) vibronic levels were modeled by augmenting the traditional effective Hamiltonian with terms to account for local perturbations. A comparison to the analysis of the high temperature spectra performed by Martin[c], which did not include many of the spectral features of the present work, will be given.

[a]C.I. Frum, J.J. Oh, E.A. Cohen, and H.M. Pickett, Ap. J. **408** L61 (1993).
[b]W.L. Barclay, Jr., M.A. Anderson, and L.M. Zuirys, Ap. J. **408**, L65 (1993).
[c]H. Martin, J. Mol. Spec. **108**, 66 (1984).