SUB-MILLIMETER/TERAHERTZ SPECTROSCOPY OF FeH AND FeD ($X^4\Delta_i$)

M. P. BUCCHINO and L. M. ZIURYS, *Department of Chemistry and Biochemistry, Department of Astronomy, and Steward Observatory, University of Arizona, Tucson, Arizona 85721.*

Direct measurements of the lowest pure rotational transitions of the Ω = 7/2, 5/2, and 3/2 ladders of FeD and of the Ω = 1/2 ladder of FeH in the $^4\Delta_i$ ground electronic states have been conducted using millimeter/sub-millimeter direct absorption techniques in the frequency range 530-810 GHz. Both species were created in an AC discharge from the reaction of $Fe(CO)_5$ with H_2 or D_2. In several of these transitions lambda-doubling and proton/deuterium hyperfine structure have been resolved. These data improve on the zero field frequencies predicted from previous LMR data by several MHz.[a] Accurate frequencies are crucial for sub-millimeter searches for FeH toward the interstellar medium. Searches for additional transitions are in progress.

[a] J.M. Brown, H. Korsgen, S.P. Beaton, & K.M. Evenson, J. Chem. Phys. 124, 234309 (2006)