

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**Supersonic Molecular Beam Optical Stark Spectroscopy of MnH.**<sup>1</sup> JAMIE GENGLER, TONGMEI MA, JEREMY HARRISON, TIMOTHY STEIMLE, Arizona State University — The large moment of inertia, large magnetic moment, and possible large permanent electric dipole moment of manganese monohydride, MnH, makes it a prime candidate for ultra-cold molecule production via Stark deceleration and magnetic trapping<sup>2,3</sup>. Here we report the first molecular beam production of MnH and the analysis of the Stark effect in the (0,0)  $A^7\Pi - X^7\Sigma^+$  band. The sample was prepared by laser ablation of solid Mn in an  $H_2$  supersonic expansion. The low rotational temperature (<50 K) and near natural linewidth resolution ( $\sim 50$  MHz) facilitated analysis of the  $^{55}\text{Mn}$  ( $I=5/2$ ) and  $^1\text{H}$  ( $I=1/2$ ) hyperfine structure. A comparison of the derived field-free parameters with those obtained from sub-Doppler optical<sup>4</sup> and Doppler limited infrared<sup>5</sup> measurements will be made. Progress on the analysis of the Stark effect will be given.

<sup>1</sup>Funding: NSF-Experimental Physical Chemistry (CHE-0317130)

<sup>2</sup>J.R. Bochinski, E.R. Hudson, H.J. Lewandowski, and J. Ye, *Phys. Rev. A* **70**, 043410 (2004).

<sup>3</sup>S.Y.T. van de Meerakker, R.T. Jongma, H.L. Bethlem, and G. Meijer, *Phys. Rev. A* **64**, 041401(R) (2001).

<sup>4</sup>T.D. Varberg, J.A. Gray, R.W. Field, and A.J. Merer, *J. Mol. Spec.* **156**, 296-318 (1992).

<sup>5</sup>I.E. Gordon, D.R.T. Appadoo, A. Shayesteh, K.A. Walker, and P.F. Bernath, *J. Mol. Spec.*, **229**, 145-149 (2005).

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Date submitted: 28 Nov 2005

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