Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Cooling and Trapping of NH radicals L. PAUL PARAZZOLI, CARLOS ROMERO, DANIEL LOBSER, HEATHER LEWANDOWSKI, University of Colorado — In the past decade, cooling and trapping of atoms has allowed physicists to probe the nature of quantum mechanics on a macroscopic scale. Molecules, having a more complex structure, are considerably more difficult to cool. However, it is their complex structure, including rovibrational states and permanent dipole moments, which make them so interesting. We cool metastable NH ($^1\Delta$) radicals using supersonic expansion coupled with Stark deceleration. The NH radicals are created by photolysis of HN_3 during supersonic expansion. The supersonic expansion produces a cold beam of radicals, which is loaded into a Stark decelerator. The Stark decelerator uses time varying inhomogeneous electric fields to decelerate the NH molecules. The resulting molecular sample has a temperature of 10 -100 mK. Further cooling will be explored using interactions with ultracold Rubidium atoms.

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Date submitted: 20 Nov 2006 Electronic form version 1.4