Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

Loading of NH molecules into a magnetic trap LAURENS VAN BUUREN, WESLEY CAMPBELL, KATSUNARI ENOMOTO, MICHAEL GOTTSELIG, EDEM TSIKATA, JOHN DOYLE, Harvard University — Trapped polar molecules are predicted to be valuable for the study of new collective quantum effects, collisional processes, searches for T-violation, and as candidates for quantum bits in a robust quantum computer. We are working toward magnetic trapping of large numbers of NH radicals and evaporatively cooling them into the ultracold regime. Previously, we demonstrated that up to 10^{12} NH molecules in their ro-vibrational and electronic ground-state can be produced in cryogenic buffer gas, using a beam loading technique [1]. Recently, this technique has been employed to load NH molecules into the bore of a superconducting magnet that runs entirely in vacuum. Free-flight molecular beam spectra show resolvable hyperfine splittings, and thermalization with cryogenic ^{4}He buffer gas has been observed. The Zeeman splitting of the ground state, obtained in uniform field, agrees with the calculated spectra. Enhanced diffusion lifetimes for molecules in low field seeking states are observed at ~ 2.5 K in the trapping field of the magnet operated in anti-Helmholtz configuration. The apparatus is currently being upgraded to operate below 500 mK in preparation for trapping and evaporative cooling. [1] D. Egorov *et al.*, Eur. Phys. J. D 31 (2004) 307.

Laurens van Buuren
Harvard University

Date submitted: 28 Jan 2005 Electronic form version 1.4