Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

Recombination of a Strongly Magnetized Two-Component Plasma in a Nested Penning-Ioffe Trap A.P. POVILUS, J.H. CHOI, J.R. GUEST, G. RAITHEL, Physics Department, University of Michigan — Evidence of three-body recombination of cold ^{85}Rb ions and electrons is reported in the environment of a nested Penning- Ioffe Trap. Laser-cooled and magnetically trapped ^{85}Rb atoms are ionized by a pulsed laser, leading to a strongly magnetized cold plasma consisting of slowly moving Rb ions and an electron gas contained in the Penning-Ioffe trap. Recombination leads to the formation of long-lived high-m drift Rydberg states, analagous to those recently observed in cold $\bar{\mathrm{H}}$. Electric-field ionization techniques are then used to analyze the distribution and evolution of these Rydberg states. Of particular interest are the density and temperature dependence of the recombination rates. We have also studied the stability of simultaneous ion- and neutral-atom trapping in relation to asymmetries inherent in the Penning-Ioffe trapping scheme.

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Date submitted: 28 Jan 2005 Electronic form version 1.4