Abstract Submitted
for the DAMOP08 Meeting of
The American Physical Society

Photoassociation of a spin-1 BEC to molecular states with hyperfine structure EVA BOOKJANS, CHRISTOPHER D. HAMLEY, GHAZAL BEHINAEIN, PEYMAN AHMADI, MICHAEL S. CHAPMAN, Georgia Institute of Technology — We report on the high resolution (5 MHz) photoassociation spectroscopy of ^{87}Rb spin-1 BEC to the 1g ($P_{3/2}$) v=152 excited molecular state manifold. Using a combination of dipole selection rules, collision channel analysis and rotational progression of the spectrum we identify total molecular angular momentum, F, and total molecular nuclear spin, I, for the observed states. These identifications are compared to a hyperfine-rotational Hamiltonian [1] for Hund's case (c). We find a good agreement to the predicted lines. The eigenvalues of this Hamiltonian was used to predict further weak lines which their existence are confirmed experimentally. In conclusion, we demonstrate the use of spin dependent photoassociation to experimentally identify hyperfine-rotational structure of the molecular states with sufficiently high resolution. These studies will improve current understanding of the hyperfine-rotation molecular potentials in Hund's case (c). [1] X.T. Wang, et al., Phys. Rev. A. 57, 4600 (1998).

Eva Bookjans
Georgia Tech

Date submitted: 01 Feb 2008 Electronic form version 1.4