Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Mean-Field Study of Magnetic Resonance for Spin-1 Condensates ANDREW ROBERTSON, HONG LING, DAVID GROCHOWSKI, Rowan University, Glassboro NJ — A spin-1 alkali atom has three hyperfine spin levels |f=1,m=-1,0,+1>. An optical dipole trap is capable of simultaneously trapping and condensing all the hyperfine states, forming the so-called spinor Bose-Einstein condensate (BEC), where the spin degrees of freedom are virtually free. The spin-1 BEC is amenable to manipulation by magnetic field. Magnetic resonance theory is developed for a spin-1 BEC subject to both a rotating transverse magnetic field and a longitudinal magnetic field. The focus of the theory is the magnetization, which will be analyzed both analytically and numerically. Magnetization is used to probe the nonlinear two-body collisions, which strongly affect the properties of the spin-1 BEC. It is shown that while collisions modulate the population dynamics, it is the quadratic Zeeman interaction that couples the population dynamics due to collisions to the magnetization.

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Date submitted: 28 Nov 2005 Electronic form version 1.4