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Properties of Magnetic Sublevel Coherences for Precision Measurements[1] I. CHAN, York University, S. BEATTIE, Beattie, A. KUMARAKRISHNAN, York University — We have solved the density matrix rate equations for atoms interacting with laser fields that create coherences between adjacent magnetic sublevels of the F=3 ground state in ^{85}Rb. The rate equations are solved in an irreducible tensor basis and allow us to calculate the polarization of the atoms as a function of time after interaction with the laser fields. We include all the states in the excited hyperfine manifold, assume that the magnetic sublevels are degenerate and compare the results with experiments using laser cooled atoms. We also describe the effect of a magnetic field on this system as a time dependent rotation about the quantization axis. The rotation matrix is written in terms of the Euler angles and the results are useful in modeling the signals used to measure the atomic g factor ratio using ^{85}Rb and ^{87}Rb isotopes. We also compare the results obtained for the magnetic field dependence using Rb vapour at room temperature.

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