Abstract Submitted for the DAMOP20 Meeting of The American Physical Society

Inelastic Raman Scattering and Optical Pumping in Cold <sup>87</sup>Rb<sup>1</sup> BRENT JONES, JOSHUA CARTER, STETSON J. ROOF, KASIE J. KEMP, M. D. HAVEY, Old Dominion University, Norfolk, VA, I. M. SOKOLOV, D. V. KUPRIYANOV, State Polytechnic University, St.-Petersburg, Russia — We report investigation of near-resonance light scattering on a three level system of cold <sup>87</sup>Rb atoms. A weak probe laser is tuned near the  $F = 2 \rightarrow F' = 2$  hyperfine transition to study optical pumping processes resulting in cold atomic ensembles in the F = 1hyperfine ground state. This process can be used to count the number of atoms in a sample for low optical depths, independent of detuning from resonance, by measuring the total absorbed light from the probe beam. For greater optical depths, the results depend on optical depth and probe detuning from resonance. This is a consequence of multiple scattering within the sample. We present experimental results for various optical depths, in comparison with simulation data, to study the dependencies of multiple scattering on optical depth.

<sup>1</sup>Supported by the National Science Foundation.

Joshua Carter Old Dominion University, Norfolk, VA

Date submitted: 01 Feb 2020

Electronic form version 1.4