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Forward light scattering from a dense and cold microscopic 87Rb sample[1] KASIE KEMP, S.J. ROOF, M.D. HAVEY, Old Dominion University, I.M. SOKOLOV, D.V. KUPRIYANOV, State Polytechnic University, DEPARTMENT OF PHYSICS, OLD DOMINION UNIVERSITY COLLABORATION, DEPARTMENT OF THEORETICAL PHYSICS, STATE POLYTECHNIC UNIVERSITY COLLABORATION — In this paper we report on the near-resonance forward scattering of light in a cold atomic sample of ^{87}Rb ranging in density from 10^{11} to 10^{14} atoms/cm^3. The sample, initially prepared in a magneto-optical trap, is loaded into a far-off-resonance trap (FORT) with a temperature of $\sim$100 μK and Gaussian radii of $\sim$3 μm and $\sim$280 μm in the transverse and longitudinal directions, respectively. Here the $F = 2 \rightarrow F' = 3$ nearly closed hyperfine transition is studied; in this case, far-off-resonance inelastic Raman transitions are weak. The experimental geometry consists of tightly focusing the near-resonance beam through the optically deep region of the FORT and collecting the transmitted light as a function of detuning from resonance. A shift in the spectral distribution of transmitted light is observed as a function of sample density.

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