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Observation of recoil-induced resonances and electromagnetically induced absorption of cold atoms in diffuse light LIANG LIU, Shanghai Institute of Optics and Fine Mechanics — In this paper we report an experiment on the observation of the recoil-induced resonances (RIR) and electromagnetically induced absorption (EIA) of cold ^{87}Rb atoms in diffuse light in an integrating sphere. The atoms are first cooled in diffuse light and a probe beam is inserted to observe nonlinear spectra of cold atoms. The pump light of RIR and EIA comes from the diffuse light, which also serves the cooling light. The probe light beam is a weak laser split from the cooling laser in order to keep the cooling and probe lasers coherent. We measured the nonlinear spectra varying with detuning of the diffuse laser light, and studied the mechanism of RIR and EIA in the configuration with diffuse-light pumping and laser probing. The differences of nonlinear spectra of cold atoms between diffuse-light cooling and a magneto-optical trap (MOT) are also discussed. We present the theoretical models of the RIR and EIA of cold atoms in diffuse laser light. The theoretical results are in good agreement with the experimental ones when the light intensity distribution in the integrating sphere is considered.

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