Polarization dependence of lineshapes in modulation transfer spectroscopy for 87Rb Atoms

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We present the polarization dependence of the lineshapes in modulation transfer spectroscopy for the transitions from the lower ground state (Fg = 1) of 87Rb atoms. We measured the spectra for the two polarization configurations: The carrier and probe beams were linearly polarized in parallel or perpendicular directions. The measured spectra were compared with the calculated results obtained by solving the density-matrix equation. We found that the spectra were strongly dependent on the polarization configurations. In particular, the signal for parallel polarization configuration was generated via an incoherent process mediated by spontaneous emission.