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Power and polarization dependences of ultra-narrow electromagnetically induced absorption (EIA) spectra of ^{85}Rb atoms in degenerate two-level system MUHAMMAD MOHSIN QURESHI, HAFEEZ UR REHMAN, Chosun University, Korea, HEUNG-RYOUL NOH, Chonnam University, Korea, JIN-TAE KIM, Chosun University, Korea — We have investigated ultra-narrow EIA spectral features with respect to variations of polarizations and powers of pump laser beam in a degenerate two-level system of the transition of ^{85}Rb D_2 transition line. Polarizations of the probe laser beam in two separate experiments were fixed at right circular and horizontal linear polarizations, respectively while the polarizations of the pump lasers were varied from initial polarizations same as the probe laser beams to orthogonal to probe polarizations. One homemade laser combined with AOMs was used to the pump and probe laser beams instead of two different lasers to overcome broad linewidths of the homemade lasers. Theoretically, probe absorption coefficients have been calculated from optical Bloch equations of the degenerate two level system prepared by a pump laser beam. In the case of the circular polarization, EIA signal was obtained as expected theoretically although both pump and probe beams have same polarization. The EIA signal become smaller as power increases and polarizations of the pump and probe beams were same. When the polarization of the pump beam was linear polarization, maximum EIA signal was obtained theoretically and experimentally. Experimental EIA spectral shapes with respect to variations of the pump beam polarization shows similar trends as the theoretical results.

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