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Power dependence of multi-photon processes in the $5S_{1/2} - 5P_{3/2} - 5D_{5/2}$ transition of ^{87}Rb atoms HAN SEB MOON, Department of Physics, Pusan National University, HEUNG-RYOUL NOH, Department of Physics, Chonnam National University — We have experimentally demonstrated the multi-photon effects of the ladder-type electromagnetically-induced transparency (EIT) according to the intensities of the probe and coupling lasers in the $5S_{1/2} - 5P_{3/2} - 5D_{5/2}$ transition of ^{87}Rb atoms. When the intensity of the probe laser was comparable to one of the coupling laser, the transmittance spectra of the $5S_{1/2}(F = 2) - 5P_{3/2}(F' = 3) - 5D_{5/2}(F'' = 4)$ cycling transition were observed a variety of variation due to EIT and double-resonance optical pumping (DROP) according to the intensities of the probe and coupling lasers. The spectral features of the transmittance spectra were interpreted as the multi-photon processes composed of the one-photon resonance, the two-photon resonance, and the mixed term using the diagrammatic analysis of multi-photon processes. The observed transmittance spectra were a good agreement with the numerically calculated results by the full density matrix equations.

Han Seb Moon
Department of Physics, Pusan National University

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