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Study of dynamics of Rabi oscillation under a pulsed perturbation using hyperfine transition of trapped cesium atoms JAI MIN CHOI, GEE-NA KIM, D. CHO, Department of Physics, Korea University — We study dynamics of Rabi oscillation under a periodic pulsed perturbation. We study how the resonance frequency of a cesium ground hyperfine transition between sublevels with nonzero magnetic quantum number is affected by periodically applied magnetic pulses. When the pulse height and pulse duration are set such that a fictitious spin completes a 2π or its integer multiple precession around the principal quantization axis, there is no frequency shift [1]. We carry out the experiment using spin-polarized cesium atoms trapped in a magneto-optical trap. This has an important implication for metrological application of atoms trapped in an optical trap, where a systematic frequency shift and inhomogeneous broadening due to an ac Stark shift limits accuracy and precision. Our method is complimentary to the ones using a magic wavelength in a multi-level configuration [2-4] or a polarization dependence of the ac Stark shift to compensate for the differential ac Stark shift [5].
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