

Abstract Submitted
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Optical switching via recoil-induced resonances¹ JOEL GREENBERG, Duke University, MARCOS ORIA, CCEN Universidade Federal da Paraiba, DANIEL GAUTHIER, Duke University — Recoil-induced resonances (RIRs), which can be viewed as Raman transitions between momentum states, result in very narrow (100 kHz) Gaussian-derivative lineshapes. While the amplitude of these signals has traditionally been small, quasi-one dimensional samples of cold atoms obtained via an anisotropic magneto-optical trap (MOT) have been used to demonstrate large steady-state gains. Along with these large gains, the index of refraction changes rapidly over a narrow frequency range, allowing for sensitive control of the phase shift induced by the atoms. This, combined with the intensity-dependence of the observed gain, enables optical switching with low input powers. We report our progress on achieving an all-optical phase switch in a sub-Doppler collection of Rb atoms contained in an anisotropic MOT.

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