Abstract Submitted
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Recoil-induced Resonances as All-optical Switches[1] F.A. NARDUCCI, Naval Air Systems Command, S.A. DESAVAGE, K.H. GORDON, St. Mary's College of Southern Maryland, D.L. DUNCAN, AMPAC, G.R. WELCH, Texas A&M, J.P. DAVIS, Naval Air Systems Command — We have measured recoil-induced resonances (RIR) [1,2] in our system of laser-cooled 85Rb atoms. Although this technique has been demonstrated to be useful for the purpose of extracting the cloud temperature [3], our aim was to demonstrate an all optical switch based on recoil-induced resonances. In addition to a very narrow "free-space" recoil-induced resonance of approximately 15 kHz, we also discovered a much broader resonance ($\sim$ 30 MHz), caused by standing waves established by our trapping fields. We compare and contrast the switching dynamics of these two resonances and demonstrate optical switching using both resonances. Finally, we consider the applicability of the narrow, free-space resonance to the slowing of a weak probe field. [1] J. Guo, P.R. Berman, B. Dubetsky and G. Grynberg *PRA*, **46**, 1426 (1992). [2] (a) P. Verkerk, B. Loumis, C. Salomon, C. Cohen-Tannoudji, J. Courtois *PRL*, **68**, 3861 (1992). (b) G. Grynberg, J-Y Courtois, B. Lounis, P. Verkerk *PRL*, **72**, 3017 (1994). [3] (a) T. Brzozowski, M. Brzozowska, J. Zachorowski, M. Zawada, W. Gawlik *PRA*, **71**, 013401 (2005). (b) M. Brzozowska, T. Brzozowski J. Zachorowski, W. Gawlik *PRA*, **72**, 061401(R), (2005).

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