Abstract Submitted
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Raman transitions in ultracold 85Rb by chirped nanosecond-time-scale pulses[1] GENGYUAN LIU, SVETLANA MALINOVSKAYA, Stevens Institute of Technology — Ultracold alkali atoms have been conventionally used for quantum operations. Previously it has been shown theoretically that a single nanosecond, linearly chirped pulse may be implemented to perform population inversion in hyperfine levels of 5S shell in Rb [1]. Here, within a rigorous semiclassical model that involves all optically allowed transitions between hyperfine states of D1 and D2 lines in the ^{85}Rb atom, we demonstrate a possibility of controlled population transfer using pulses having the duration from one to a few nanoseconds and chirped to induce Raman transitions in the hyperfine state manifold. Experimentally the chirping of nanosecond pulses may be performed in the time domain using fiber-based electro-optical modulators [2]. We will discuss the role of the chirp rate, the pulse duration and the field intensity as control parameters.

[1] T. A. Collins, S. A. Malinovskaya, *Opt. Lett.* **37,** 2298-2300 (2012).
[2] Rogers III, C.E., Wright, M.J., Carini, J.L., Pechkis, J.A., Gould, P.L., *J. Opt. Soc. Am. B* **24,** 1249-1253 (2007).

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