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Giant Optical Nonlinearities Between Two Matched Pulses[1] ANDREW MACRAE, GEOFF CAMPBELL, ZENG-BIN WANG, KARL-PETER MARZLIN, ALEXANDER LVOVSKY, Institute for Quantum Information Science, University of Calgary — One of the primary limitations of nonlinear optics is that relatively high intensities are needed to produce a noticeable effect. However, in an atomic system with electromagnetically induced transparency (EIT) it is possible to observe nonlinearities at light levels as low as a few photons per atomic cross section [1]. Implementation of the EIT-based nonlinearity with pulsed light may however be challenging as it requires the interacting pulses to propagate at equal group velocities. Recently, a scheme satisfying this requirement was proposed which employs double EIT in atomic Rubidium-87 [2]. We report on our recent progress towards experimentally realizing this scheme. We have successfully demonstrated a double EIT system in which two separate pulses may be simultaneously slowed or stored. By applying a large, homogenous magnetic field across the atomic vapor, thus splitting the atomic levels, we create a large nonlinear interaction in the form of XPM. *References: [1]: H. Schmidt, and V. Imamoğlu, Optics Letters 21 23 1996 [2]: Z.B. Wang, K.P. Marzlin, B.C. Sanders, Phys. Rev. Lett. 97 06, 2006

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