Abstract Submitted
for the DAMOP07 Meeting of
The American Physical Society

Towards storage of squeezed light by electromagnetically induced transparency JÜRGEN APPEL, University of Calgary, EDEN FIGUEROA, University of Calgary, FRANK VEWINGER, University of Bonn, DMITRY KORYSTOV, University of Calgary, GEORG GÜNTER, University of Konstanz, ALEXANDER LVOVSKY, University of Calgary — Electromagnetically induced transparency (EIT) is a quantum interference effect, in which a strong control laser beam changes a medium's linear dispersion and absorption in such a way that a weak signal beam travels without absorption and its group velocity is greatly reduced. Theoretical models and recent experiments predict that adiabatic switching of the control field while the signal is inside the medium reversibly maps the signal quantum state to the states of the irradiated atoms. We report on our recent progress in storing and retrieving a squeezed optical state by adiabatic conversion to a collective coherent superposition of the hyperfine ground levels of the D1 transition in rubidium-87. A bright narrowband source of nonclassical light for interaction with atoms has been constructed based on an optical parametric amplifier featuring a periodically poled KTP crystal. Ultrafast lossless switching allows us to generate 1 μs pulses of up to 3 dB squeezed vacuum resonant to the EIT transparency window. We investigate the transmission and storage of these states under EIT conditions by homodyne tomography.

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Date submitted: 06 Feb 2007 Electronic form version 1.4