Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

Quantum State Transfer Between Matter and Light DZMITRY MATSUKEVICH, THIERRY CHANELIERE, MISHKAT BHATTACHARYA, ALEX KUZMICH, Georgia Institute of Technology — We report on the coherent quantum state transfer from a two-level atomic system to a single photon. Entanglement between a single photon (signal) and a two-component ensemble of cold rubidium atoms is used to project the atomic ensemble onto any desired state by measuring the signal photon in a suitable basis. The atomic qubit is read out by stimulating directional emission of a single photon (idler) from the collective state of the ensemble. Faithful preparation and readout of atomic state are verified by the observed correlations between the signal and the idler photons. These results enable implementation of distributed quantum networking.

Dzmitry Matsukevich
Georgia Institute of Technology

Date submitted: 28 Jan 2005 Electronic form version 1.4