

Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

Long Distance Quantum Communication Using Cascade Emission in Atomic Ensembles¹ HSIANG-HUA JEN, National Tsing Hua University

— The ladder configuration of atomic levels provides a source for telecom photons (signal) from the upper atomic transition. For rubidium and cesium atoms, the signal field has the range around 1.3-1.5 μm that can be coupled to an optical fiber and transmitted to a remote location. Cascade emission may result in pairs of photons, the signal entangled with the subsequently emitted infrared photon (idler) from the lower atomic transition. This correlated two-photon source is potentially useful in the DLCZ protocol for the quantum repeater. We investigate the role of time-frequency entanglement in the protocol, and find that it deteriorates the performance but the harmful effect can be diminished by using shorter pump pulses to generate the cascade emission.

¹NSF, USA and NSC, Taiwan, ROC.

Hsiang-Hua Jen
National Tsing Hua University

Date submitted: 21 Dec 2011

Electronic form version 1.4