Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Coherent Light Fields for Entanglement based Quantum Communication KIM FOOK LEE, Department of Physics, Michigan Technological University, Houghton, MI 49931 — Nonlocal polarization correlations of two distant observers based on Stapp's formulation are observed by using coherent light fields. Using a 50/50 beam splitter transformation, a vertically polarized coherent light field is entangled with a horizontally polarized coherent noise field. The superposed light fields at each output port of the beam splitter are sent to two distant observers, where the fields are interfered and manipulated at each observer by using a quarter wave plate and an analyzer. The interference signal contains information of the projection angle of the analyzer, which is hidden by the phase noises. The nonlocal correlations between the projection angles of two distant observers are established by analyzing their data through analog signal multiplication without any post-selection technique. This scheme can be used to implement Ekert's protocol for quantum key distribution. The implementation of two independent coherent states in this scheme is also discussed.

Kim Fook Lee
Dept of Physics, Michigan Technological University, Houghton, MI 49931

Date submitted: 01 Dec 2008 Electronic form version 1.4