Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Nonlinear waveguide arrays and disorder AMIT RAI, DIMITRIS ANGELAKIS, Centre for Quantum Technologies, National University of Singapore — Waveguide arrays with quadratic nonlinearity has been studied recently. We investigated the waveguide arrays with quadratic nonlinearity and explored the possibility of generating broadband continuous-variable entanglement in such structures. We propose an integrated approach toward continuous-variable entanglement based on integrated waveguide quantum circuits, which are compact and relatively more stable. We further continued our work on waveguide arrays by studying a hybrid system which contains a combination of linear and nonlinear waveguides. We assume that all the waveguides except the central one are assumed to be linear. The central waveguide is assumed to have $\chi^{(2)}$ nonlinearity. We assume that the central waveguide is pumped through a coherent light. The coupling between the waveguide is achieved by the evanescent overlap of the guided modes. For all the other waveguides in the array the light propagates in the linear regime. We also study the effect of disorder which can be introduced by varying the distance between the waveguides. We are particularly interested in investigating the effect of disorder and quadratic non-linearity in the waveguide array system.

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Date submitted: 09 Nov 2012 Electronic form version 1.4