

Abstract Submitted
for the DAMOP08 Meeting of
The American Physical Society

Single photon nonlinearities using arrays of cold polar molecules

RENUKA RAJAPAKSE, TIMOTHY BRAGDON, University of Connecticut, ANA MARIA REY, ITAMP, SUSANNE YELIN, University of Connecticut, ITAMP — We model single photon nonlinearities via the dipole-dipole interaction of cold polar molecules. A manifold of protected symmetric eigenstates is used as basis for optical quantum computation. Decoherence occurs in this system because of non-symmetric interaction and phonon dispersion. We discuss the feasibility of this system in optical quantum computation processing as an element of a controlled phase gate.

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Date submitted: 31 Jan 2008

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