

Abstract Submitted  
for the DAMOP12 Meeting of  
The American Physical Society

**Integrated Cavity QED in a linear Ion Trap Chip for Enhanced Light Collection** FRANCISCO BENITO, Sandia National Laboratories - University of New Mexico, STERK JONATHAN, Sandia National Laboratories, TABAKOV BOYAN, Sandia National Laboratories - University of New Mexico, RAYMOND HALTLI, CHRIS TIGGES, DANIEL STICK, MATTHEW BALIN, DAVID MOEHRING, Sandia National Laboratories — Realizing a scalable trapped-ion quantum information processor may require integration of tools to manipulate qubits into trapping devices. We present efforts towards integrating a 1 mm optical cavity into a microfabricated surface ion trap to efficiently connect nodes in a quantum network. The cavity is formed by a concave mirror and a flat coated silicon mirror around a linear trap where ytterbium ions can be shuttled in and out of the cavity mode. By utilizing the Purcell effect to increase the rate of spontaneous emission into the cavity mode, we expect to collect up to 13% of the emitted photons. This work was supported by Sandia's Laboratory Directed Research and Development (LDRD) and the Intelligence Advanced Research Projects Activity (IARPA). Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the US Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Francisco Benito  
Sandia National Laboratories - University of New Mexico

Date submitted: 30 Jan 2012

Electronic form version 1.4