Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Novel Ion Trap for Efficient Fluorescence Collection from Ion Qubits GANG SHU, NATHAN KURZ, MATTHEW DIETRICH, SHAW-PIN CHEN, BORIS BLINOV — Critical aspects of Trapped Ion Quantum Computation and Information such as qubit state readout and entanglement generation can directly benefit from improving the collection efficiency of ion fluorescence. By integrating a simple reflective optics to a linear Paul trap, we achieved a 10% photon collection efficiency. To eliminate photon blocking due to the trap structure and to further increase the collection efficiency, we built a novel trap combining the reflective optical surface and RF electrode. While at least doubling the collection efficiency, the new trap enjoys the nice future of self-aligning with full electric/optical controlling. We expect to be able to efficiently couple the ion fluorescence photons into a single mode optical fiber for remote manipulation and entanglement of ions.

Gang Shu

Date submitted: 22 Jan 2010 Electronic form version 1.4