

Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Towards wire-mediated coupling of trapped ions SANKARANARAYANAN SELVARAJAN, UC Berkeley & University of Innsbruck, SOENKE MOELLER, UC Berkeley, NIKOS DANIILIDIS, UC Berkeley & University of Innsbruck, HARTMUT HAEFFNER, UC Berkeley — Our experiment aims at the transfer of quantum information between distant trapped ions using a macroscopic metal wire: an oscillating trapped ion induces oscillating image charges in the trap electrodes. If this current is sent to the electrodes of a second trap, it influences the motion of an ion in the second trap. With manageable trap geometries, a transfer rate of 1 ms between the motional states of the ions is possible. This “wire-mediated” coupling may be used not only for scaling up the quantum information processing devices, but also as a means to interconnect atomic systems to solid-state systems. Towards these goals, we are characterizing the behavior of our planar trap in terms of stray fields and electric field noise. In addition, we discuss experimental tools that we developed to characterize the trap operation in the presence of a floating wire which at a later stage will couple the two ions.

Sankaranarayanan Selvarajan
UC Berkeley & University of Innsbruck

Date submitted: 27 Jan 2010

Electronic form version 1.4