



QUANTUM OPTICS SEMINAR

Title: From an ox cart to a covered wagon: efforts toward controlling more trapped-ion quantum bits

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Time: Monday, July 31, 2006 at 11:15

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Abstract:

Trapped ions have proven to be a nice candidate for quantum bits due to relatively easy control and long coherence times. I will briefly outline how we control individual ions and interaction between ions in order to use them for quantum computing (QC). I will then address efforts towards scaling up the system. Among many challenges, new trap designs are required to increase the number of ions to a level useful for QC. In particular, I will present recent results on ion-trapping in a micro-fabricated trap with a new and improved geometry. The novelty consists in that all the electrodes reside in one single plane, and the ions are trapped above this plane [1, 2]. Against Murphy's Law, the heating rate of one ion in the trap seems to be slightly lower than expected (confirmation of this statement is underway), which would allow this trap design to be useful for QC.

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[1] J. Chiaverini *et al.*, *Quant. Inform. Comp.* 5, 419 (2005)

[2] S. Seidelin *et al.*, *Physical Review Letters*, 96, 253003 .

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