Abstract Submitted
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Fast ion shuttling methods for segmented ion traps[1] LUDWIG DE CLERCQ, JOSEBA ALONSO, MATTEO FADEL, KARIN FISHER, BEN KEITCH, DANIEL KIENZLER, FLORIAN LEUPOLD, FRIEDER LINDENFELSER, HSIANG-YU LO, VLAD NEGNEVITSKY, JONATHAN HOME, ETH-Zurich, TIQI TEAM — I will present a new scheme for fast diabatic control of ion trap potentials, based on the use of in-vacuum high-speed switched electronics [1]. We have investigated theoretically the use of this method for transport within a single oscillation cycle of the ion in the trap, and for producing squeezed vacuum states. I will describe the cryogenic apparatus we are developing for investigating these possibilities using a micro-fabricated surface-electrode trap. In a second approach to ion transport using analog waveforms, I will describe the use of Tikhonov regularization to calculate voltage sequences required for shuttling chains containing Ca^+ and Be^+ ions in a segmented linear Paul trap.

[1] Alonso et al. arxiv:quant-ph/1208.3986, to be published in New Journal of Physics (2013)

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