

Abstract Submitted
for the DAMOP07 Meeting of
The American Physical Society

Bright Source of Cold Ions for Surface-Electrode Traps¹ MARKO CETINA, ANDREW GRIER, Department of Physics, MIT Center for Ultracold Atoms, JONATHAN CAMPBELL, Department of Physics, United States Military Academy, ISAAC CHUANG, Department of Physics and Department of Electrical Engineering, MIT Research Laboratory of Electronics, VLADAN VULETIC, Department of Physics, MIT Center for Ultracold Atoms — We produce large numbers of low-energy ions by photoionization of laser-cooled atoms inside a surface-electrode-based Paul trap. The isotope-selective trap loading rate of 4×10^5 $^{174}\text{Yb}^+$ ions/s exceeds that attained by photoionization (electron impact ionization) of an atomic beam by four (six) orders of magnitude. Our high loading rate could enable rapid, isotope-selective loading of large ion trap arrays for use in quantum computing or atomic clocks. The ions are confined in the same spatial region as the laser-cooled atoms, which will also allow experimental investigation of the interactions between cold ions and cold atoms.

¹This work was supported in part by the NSF Center for Ultracold Atoms

Marko Cetina
Department of Physics, MIT Center for Ultracold Atoms

Date submitted: 01 Feb 2007

Electronic form version 1.4