

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Resolved sideband spectra of calcium ions in a Penning trap JOE GOODWIN, GRAHAM STUTTER, DANIEL SEGAL, RICHARD THOMPSON, Imperial College London — I report on recent work at Imperial College London, with laser cooled calcium-40 ion Coulomb crystals in Penning traps. Penning traps provide a number of advantages over the more common radiofrequency (RF) trap; namely the ability to trap 3-dimensional, micromotion-free ion Coulomb crystals, and the ability to produce deep traps while maintaining a large ion-electrode surface distance. While these factors should permit lower heating rates than in typical RF traps, very little research has been conducted into the behavior and control of small Coulomb crystals in Penning traps due to the experimental challenges involved. We have spent several years developing techniques to overcome these obstacles, and are now making rapid progress towards the sub-Doppler cooling and coherent control of small ion crystals. We have already observed high resolution optical spectra showing sidebands due to radial and axial motions, giving estimated temperatures close to the Doppler limit.

Joe Goodwin
Imperial College London

Date submitted: 28 Nov 2012

Electronic form version 1.4