Abstract Submitted for the DAMOP13 Meeting of The American Physical Society

Sympathetic cooling and reactions in an ion-neutral hybrid trap.¹ WINTHROP SMITH, University of Connecticut, Storrs, CT 06269-3046, JAMES WELLS, DOUGLAS GOODMAN, ILAMARAN SIVARAJAH, University of Connecticut, FRANK NARDUCCI, Naval Air Systems Command, Patuxent River, MD 20670 — We investigated the sympathetic cooling of Na^+ ions by collisions with cold Na atoms in a hybrid trap consisting of a MOT and a linear Paul trap. Since Na^+ is a closed shell ion and lacks optically accessible transitions from the ground state, we applied four general non-optical techniques for thermometry in a hybrid trap. Simulations using SIMION 7.0 and also our experimental results suggest that there is a cooling effect, but this effect is modest for large numbers of ions (~ 10⁴). When we attempted to use the Na MOT to cool Ca^+ ions, there was evidence of a surprisingly large charge exchange rate, to be discussed.

¹Supported in part by NSF Grant PHY0855570 and by the University of Connecticut.

Winthrop Smith University of Connecticut

Date submitted: 25 Jan 2013

Electronic form version 1.4