

Abstract Submitted
for the SES06 Meeting of
The American Physical Society

Using Time of Flight Mass Spectrometry to Determine Temperature¹ JAMES GLEESON, JAMES COWART, ANTHONY CALAMAI, ADRIAN DAW, Appalachian State University — In support of measurements of rate coefficients and other atomic and molecular parameters for astronomy and astrophysics, we are developing a method of obtaining and analyzing time of flight spectra (TOFS). This is analogous to obtaining temperatures from profiles of optical emission lines. Using a cylindrical RF ion trap, ion clouds were generated by bombarding H₂ and N₂ gas at nano-torr pressures with electrons having roughly 100 eV of kinetic energy. The ion clouds were ejected from the trap by applying voltage pulses to the trap end caps, and detected using an electron multiplier. The voltage, rise time, and RF phase of the ejection pulse were varied to obtain either the best charge-to-mass resolution or to obtain the best information on the energy distribution of stored ions. The TOFS produced under these conditions were modeled and simulated using Sim-Ion 7.0 ion optics software. The experiment and simulation data are compared and information pertaining to the kinetic energies of the ions in the generated ion cloud is presented.

¹This work is supported in part by NSF grant AST-04-06706 and Research Corporation grant CC6409 to ASU.

James Gleeson
Appalachian State University

Date submitted: 21 Aug 2006

Electronic form version 1.4