

Abstract Submitted
for the GEC09 Meeting of
The American Physical Society

Testing theoretical ion-atom interaction potentials by precise measurements of gas-phase ionic mobilities RAINER JOHNSEN, University of Pittsburgh, LARRY VIEHLAND, Chatham University, TIMOTHY WRIGHT, University of Nottingham — In a collaborative effort, we have recently tested *ab-initio* interaction potentials for the ion-atom pairs O^+ -He, O^+ -Ne, O^+ -Ar, He^+ -Ne, and Ne^+ -He by comparing experimental ionic mobilities to those derived from the computed potentials (T. Wright and co-workers) in conjunction with ion transport theory (L. A. Viehland and co-workers). The computed mobilities were then compared to selected-ion drift-tube measurements carried out in the lab of R. Johnsen. Generally, the magnitude and E/n dependences of the calculated mobilities agree with their measured values sufficiently well (within a few percent) to be used with confidence in applications such as discharge modeling, but more accurate mobility measurements (at the 1% or better level) are needed to test for finer details of the interaction, e.g. effects arising from spin-orbit coupling, curve crossings, and the spin state of the ion. Improvements in the experimental apparatus are in progress. We will also present preliminary results on the He^+ -Ar ion-atom pair, for which no previous mobility measurements are available.

Rainer Johnsen
University of Pittsburgh

Date submitted: 10 Jun 2009

Electronic form version 1.4