

Abstract Submitted  
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**Technique for Elimination of Excited States from Atomic and Molecular Ion Beams** C.R. VANE, M.E. BANNISTER, C.C. HAVENER, YUAN LIU, Oak Ridge National Laboratory, Oak Ridge, TN 37831-6372 — Fundamental interactions of atomic and molecular ions with electrons, neutral atoms and molecules, surfaces, and photons play major roles in many important plasma and chemical environments. Achieving a detailed understanding of these interactions is often complicated by the presence of uncharacterized populations of electronic or vibrational excited states, especially in making direct comparisons with theoretical predictions problematic. We are developing experimental techniques for reducing or eliminating ion source-generated excited states in atomic and molecular ion beams using a gas-filled RF quadrupole (RFQ) ion cooler, through natural radiative cooling during ion transit, and by preferential quenching in charge transfer collisions with selected buffer gases. Technical details and progress toward these goals will be presented. Research sponsored by the Laboratory Directed Research and Development Program of Oak Ridge National Laboratory, managed by UT-Battelle, LLC, for the U. S. Department of Energy.

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