MOLECULAR ION SPECTROSCOPY OF BACL$^+$

STEVEN J. SCHOWALTER, KUANG CHEN, WADE G. RELLERGERT, SCOTT T. SULLIVAN, AND ERIC R. HUDSON, *Department of Physics and Astronomy, University of California, Los Angeles, California 90095, USA*.

We discuss our efforts to perform high-resolution spectroscopy of the BaCl$^+$ ion, an exciting candidate for ultracold molecular ion studies. This work details our search for a predicted predissociation channel between the first-excited $B^1\Sigma$ and $A^1\Pi$ states. It is expected that the rovibrational resolution afforded by predissociation spectroscopy will allow us to efficiently measure molecular-ion rovibrational temperatures. This is a crucial step in confirming our method to produce ultracold molecular ions via sympathetic collisions with a ^{40}Ca MOT. To observe the predissociation of trapped BaCl$^+$, we detect slight increases in fragment Ba$^+$ with a novel time-of-flight device using radial extraction from a linear quadrupole trap.