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Molecular ion spectroscopy of $BaCl^{+}$[1] STEVEN SCHOWALTER, KUANG CHEN, University of California, Los Angeles, SVETLANA KOTOCHIGOVA, ALEXANDER PETROV, Temple University, WADE RELLERGERT, SCOTT SULLIVAN, ERIC HUDSON, University of California, Los Angeles
— We demonstrate a simple technique for molecular ion spectroscopy. $BaCl^{+}$ molecular ions are trapped in a linear Paul trap in the presence of a room-temperature He buffer gas and photodissociated by driving an electronic transition from the ground $X^1\Sigma^+$ state to the repulsive wall of the $A^1\Pi$ state. The photodissociation spectrum is recorded by monitoring the induced trap loss of $BaCl^{+}$ ions as a function of excitation wavelength. Accurate molecular potentials and spectroscopic constants are determined. Comparison of the theoretical photodissociation cross-sections with the measurement shows excellent agreement. This study represents the first spectroscopic data for $BaCl^{+}$ and an important step towards the production of ultracold ground-state molecular ions. Future steps include investigating a strong predissociation channel between the first excited $^1\Sigma$ and $A^1\Pi$ states where it is expected that the rovibrational resolution afforded by predissociation spectroscopy will allow us to efficiently measure molecular ion rovibrational temperatures.

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