

ULTRACOLD CHEMICAL REACTIONS OF KRb MOLECULES

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Our goal is to understand the details of the quantum dynamics of chemical reactions that take place at ultracold ($< 1 \mu\text{K}$) temperatures. These dynamics fundamentally determine both the products of the chemical reaction and their quantum states. We have constructed an apparatus that combines techniques from atomic physics and physical chemistry in order to prepare reactant KRb molecules in a single quantum state and detect product molecule quantum state distributions with a highly sensitive ionization detection method. We apply this approach to the chemical reaction $\text{KRb} + \text{KRb} \rightarrow \text{K}_2 + \text{Rb}_2$ in the ultracold regime.