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**Control of Ultracold Chemical Reactions Through Conical Intersections**[1] CONSTANTINOS MAKRIDES, ALEXANDER PETROV, SVETLANA KOTOCHIGOVA, Temple University — The pioneering work on obtaining a quantum degenerate sample of ground state KRb molecules is one of the great successes in ultracold physics. The early experimental and theoretical investigations to describe quantum chemical reactions of ultracold KRb molecules with residual ultracold K atoms have been based on probing their inelastic collision loss rates. A natural progression towards control of molecular reactivity would be to study the potential landscape of the collisional complex with the inherited degeneracies and intersections between two lowest electronic states. The topology of these surfaces provide us with a qualitative understanding of the reaction mechanism. Here we study how the ability to prepare unique initial states combined with the presence of conical intersections can be used to control the outcome of ultracold chemical reactions of alkali-metal atoms and molecules. We locate and determine properties of conical intersections for the KRbK molecular system and determine signatures of non-adiabatic passage through the conical intersection to distinguish between relaxation and reaction pathways.

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