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Multichannel Quantum Defect Theory for State-Resolved Molecular Collisions MICHAEL MAYLE, BRANDON P. RUZIC, JOHN L. BOHN, JILA, University of Colorado and National Institute of Standards and Technology — With the advent of state-resolved, ultracold samples of ground state molecules, novel opportunities arise to explore the physics of cold and ultracold molecular collisions. We revisit state- resolved molecular scattering by employing a Multichannel Quantum Defect Theory treatment that allows us to describe long-range interactions by means of a few quantum defect parameters while the short-range physics can be modeled energy-independently. Being valid over a wide range of collision energies, the theory enables us to assess the effect of magnetic and electric fields on scattering resonances without the necessity of large-scale computations. Furthermore, a careful mapping of the resonances in cold collision experiments has the potential to provide insights on the physics of the short-range collision complex and its influence on the threshold scattering behavior.

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