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Charge Transfer in Ultracold Rydberg-Ground State Atomic Collisions SAMUEL MARKSON, Harvard-Smithsonian CFA, UConn, HOSSEIN SADEGHPOUR, Harvard-Smithsonian CFA — In excited molecules, the interaction between the covalent Rydberg and ion-pair channels forms a unique class of excited Rydberg states, in which the infinite manifold of vibrational levels are the equivalent of atomic Rydberg states with a heavy electron mass. Here, we develop an analytical, asymptotic charge transfer model for the interaction between ultracold Rydberg molecular states, and employ this method to demonstrate the utility of off-resonant field control over the ultracold ion-pair formation, with near unity efficiency.

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