

Abstract Submitted  
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**Observation of Exchange Reactions in Ultracold Atom-Molecule Collisions**<sup>1</sup> J.P. D'INCAO, Dept. of Physics and JILA, University of Colorado, B.D. ESRY, Kansas State University, S. KNOOP, F. FERLAINO, M. BERNINGER, M. MARK, H.-C. NÄGERL, R. GRIMM, Universitat Innsbruck and Institut für Quantenoptik und Quanteninformation — We study exchange reactions in an ultracold gas mixture of Cs atoms and Cs<sub>2</sub> Feshbach molecules. Our theoretical and experimental studies were able to demonstrate the important role of the large scattering lengths in the collision dynamics. We have found large rates for the conversion between two different molecular states through the  $A_2+B \rightarrow AB+B$  reactive scattering process, where the final products can still remain trapped. Both theoretical and experimental results are in an excellent agreement, demonstrating that this reaction process is tunable — therefore providing a striking example of ultracold controlled chemistry.

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