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Ultracold atom-molecule and molecule-molecule collisions¹ GOULVEN QUÉMÉNER, T.J. DHILIP KUMAR, BALAKRISHNAN NADU-VALATH, Department of Chemistry, University of Nevada Las Vegas, Las Vegas, NV 89154, TECK-GHEE LEE, Physics Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, ROMAN KREMS, Department of Chemistry, University of British Columbia, Vancouver, Canada — Recent success in cooling and trapping of molecules has attracted much attention on cold and ultracold molecular collisions as well as controlled chemistry. Here we report on our progress on atom-molecule and molecule-molecule collisions in the ultracold regime. The F+HCl/DCl systems are investigated to study the effect of long-range interaction, tunneling, and rotational excitation of the molecule on chemical reactivity. The H₂-H₂ system is used as a prototype for the study of rotational and vibrational transitions in molecule-molecule collisions at ultracold temperatures. We will present results of reactive and nonreactive scattering on these systems including the relaxation of vibrationally excited H₂ molecules.

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