

Abstract Submitted
for the DAMOP08 Meeting of
The American Physical Society

Quantum dynamics of ultracold atom-molecule and molecule-molecule systems¹ GOULVEN QUÉMÉNER, BALAKRISHNAN NADUVALATH, University of Nevada Las Vegas, ROMAN KREMS, University of British Columbia — We report here on our recent progress on reactive atom-molecule and inelastic molecule-molecule collisions in the ultracold regime. The F + HCl/DCI systems are investigated to study the effect of long-range interaction, tunneling, and rotational and vibrational excitation of the molecule on the reactivity. Taking the F+HCl reaction as an illustrative example we also explore the validity of the coupled-states approximation for chemical reactions at cold and ultracold temperatures. The H₂-H₂ system is used as a prototype for the study of rotational and vibrational transitions in molecule-molecule collisions at ultracold temperatures [1]. We show that energy transfer in molecule-molecule collisions can be highly efficient and selective when the internal energy and total rotational angular momentum of the colliding molecules are simultaneously conserved. [1] G. Quéméner, N. Balakrishnan, and R. V. Krems, arXiv:0709.3081v2 [quant-ph] (2007).

¹This work is supported by NSF grant No. PHY-0555565.

Balakrishnan Naduvalath
University of Nevada Las Vegas

Date submitted: 31 Jan 2008

Electronic form version 1.4