

Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Large Effects of Electric Fields on Atom-Molecule Collisions at Millikelvin Temperatures HEATHER LEWANDOWSKI, L. PAUL PARAZOLI, NOAH FITCH, JILA / University of Colorado, PIOTR ZUCHOWSKI, JEREMY HUTSON, University of Durham — Controlling interactions between cold molecules using external fields can elucidate the role of quantum mechanics in molecular collisions. In the millikelvin temperature regime, only a few partial waves contribute to the scattering, which allows us to understand in detail the role of quantum mechanics. We create a new experimental platform in which ultracold atoms and cold molecules are separately cooled and trapped by magnetic and electric fields and then brought together to study collisions. Using this new playground, we explore elastic and inelastic collisions between rubidium atoms and ammonia molecules in the ground ro-vibrational state. We use quantum-mechanical scattering calculations and experimental measurements to show that electric fields can have a major effect on the molecular collisions, even in the absence of dipole-dipole interactions.

Heather Lewandowski
JILA / University of Colorado

Date submitted: 26 Jan 2011

Electronic form version 1.4