Abstract Submitted
for the DAMOP09 Meeting of
The American Physical Society

Inelastic collisions in cold dipolar gases CATHERINE NEWELL, MICHAEL CAVAGNERO, University of Kentucky — Two elementary models of molecular structure are used to investigate inelastic collisions in cold trapped dipolar gases–first a two-state model of a polar molecule and then a three-state model consisting of a rotor molecule in an electric field. Cross sections and rate constants, calculated semiclassically, yield dramatically different results for the two types of dipoles. In particular, the two state model predicts collision rates proportional to d^2 where d is the intrinsic dipole moment, while the rotor model gives collision rates proportional to μ^2 where μ is the field-dependent induced dipole moment. Both elastic and inelastic scattering of the two-state dipoles peaks for low-values of the applied field, while the cross sections vanish at low fields for rotor dipoles.

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Date submitted: 24 Jan 2009 Electronic form version 1.4