

Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Universal ultracold collision rates for polar molecules of two alkali-metal atoms¹ PAUL JULIENNE, THOMAS HANNA, Joint Quantum Institute, NIST and the University of Maryland, ZBIGNIEW IDZIASZEK, Institute of Theoretical Physics, University of Warsaw — Highly reactive ultracold polar molecules have universal near-threshold reaction rate constants that depend only on the long-range interaction potential, as shown for the KRb molecule [1-3]. We extend these calculations to estimate universal reaction rate constants for the bosonic and fermionic isotopes of the reactive species LiNa, LiK, LiRb, LiCs, and also the universal vibrational quenching rate constants for vibrationally excited states of the non-reactive species NaK, NaRb, NaCs, KCs, and RbCs. We also examine the variation with electric field of the universal collision rates for these species in quasi-2D geometry in a one-dimensional optical lattice. For many of these species an electric field of a few kV/cm perpendicular to the lattice plane should be effective in shielding the molecules from destructive collisions even at relatively modest lattice confinement strength.

[1] Z. Idziaszek and P. S. Julienne, Phys. Rev. Lett. 104, 113202 (2010).

[2] A. Micheli, *et al.*, Phys. Rev. Lett. 105, 073202 (2010).

[3] S. Ospelkaus, *et al.*, Science 327, 853 (2010).

¹Supported by an AFOSR MURI and a Polish government grant.

Paul Julienne
Joint Quantum Institute, NIST and the University of Maryland

Date submitted: 04 Feb 2011

Electronic form version 1.4