Abstract Submitted
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Simple treatment of ultracold polar molecule collisions[1] JOHN BOHN, GOULVEN QUÉMÉNER, JILA, University of Colorado, ZBIGNIEW IDZIASZEK, Institute of Theoretical Physics, University of Warsaw, PAUL JULIENNE, Joint Quantum Institute, NIST and the University of Maryland — Collisions of polar molecules at ultracold ($< \mu K$) temperatures open the way for prospects of manipulating collision dynamics, including chemical reactions, by by varying an electric field. To understand such processes, one needs a scattering theory that accounts sufficiently accurately for the long-range van der Waals and dipolar forces acting between the molecules, but that also has a reasonable parametrization of the short-range physics when the molecules actually encounter one another. In this presentation we discuss a theory that marries a quantum-defect-theory parametrization of short-range physics [2], to a modified Langevin-like model that has successfully estimated the effect of electric fields [3]. We discuss the character of the resulting scattering, including field-dependent chemical reaction rates and resonances.

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[2]Z. Idziaszek and P. S. Julienne, e-print arXiv:0912.0370 (2009).
[3]G. Quéméner and J. L. Bohn, Phys. Rev. A, to appear (2009).

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