Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Dynamics of ultracold molecules in confined geometry and electric field[1] GOULVEN QUÉMÉNER, JOHN BOHN, JILA, University of Colorado — We present a time-independent quantum formalism to describe the dynamics of molecules with permanent electric dipole moments in a two-dimensional confined geometry such as a one-dimensional optical lattice, in the presence of an electric field [1]. Bose/Fermi statistics and selection rules play a crucial role in the dynamics. As examples, we compare the dynamics of confined fermionic and bosonic polar KRb molecules under different confinements and electric fields. We show how chemical reactions can be suppressed, either by a "statistical suppression" which applies for fermions at small electric fields and confinements, or by a "potential energy suppression", which applies for both fermions and bosons at high electric fields and confinements. Good agreement is found between our theoretical predictions and recent experimental results [2] of KRb molecules.

[1] G. Quéméner and John L. Bohn, Phys. Rev. A 83, 012705 (2011).
[2] M. H. G. de Miranda, A. Chotia, B. Neyenhuis, D. Wang, G. Quéméner, S. Ospelkaus, J. L. Bohn, J. Ye, D. S. Jin, to appear in Nature Physics, arXiv:1010.3731.

[1]This work was sponsored by a MURI-AFOSR grant.

Goulven Quéméner
JILA, University of Colorado

Date submitted: 04 Feb 2011 Electronic form version 1.4