Abstract Submitted
for the DAMOP06 Meeting of
The American Physical Society

Negative molecular ion in a strong DC field[1] S. BORZUNOV, M.V. FROLOV, N.L. MANAKOV, Voronezh State University, Russia, ANTHONY F. STARACE, University of Nebraska-Lincoln — We study the simplest model of a negative molecular ion, i.e., two attractive 3D zero-range potentials (ZRP) separated by a distance R, in a static electric (DC) field $\mathbf{F}$. For this model, both the Green function and the equation for its poles (resonances) are expressed in terms of Airy functions. For a weak field F, we obtain simple analytical expressions for the decay rate and polarizability for an arbitrary orientation of $\mathbf{F}$ with respect to the molecular axis. We also present large scale calculations of the Stark-shift and decay rate as functions of R and F. Our analyses show that decay rates are largest if the molecular axis is orthogonal to $\mathbf{F}$. The poles of the Green function as functions of F are found numerically to include not only those for the quasistationary states but also an infinite number of broad resonances which merge to a continuum when F tends to zero (as found previously for 1D [1] and 2D [2] two ZRP models). We also analyze the complex quasienergies of molecular ions in a low-frequency AC field using an adiabatic approximation [3]. [1] H.J. Korsch and S. Mossmann, J. Phys. A **36**, 2139 (2003); [2] G. Alvarez and B. Sundaram, Phys. Rev A 68, 013407 (2003); [3] B.Borca et al., J. Phys. B **34**, L579 (2001).

[1]Supported in part by NSF Grant PHY-0300665, RFBR Grant 04-02-16350, and the Dynasty Foundation (MVF).

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Date submitted: 03 Feb 2006 Electronic form version 1.4