

Abstract Submitted
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Semiclassical propagation method for tunneling ionization¹ ILYA FABRIKANT, GORDON GALLUP, University of Nebraska-Lincoln — We apply the semiclassical propagation technique to tunneling ionization in atomic and molecular systems. Semiclassical wave functions and the tunneling flux are calculated from the solution of the classical equations of motion in the complex time plane. We illustrate this method by rederiving the known result for the decay rate of a negative ion in a weak electric field. We then obtain numerical results for atomic hydrogen, H_2^+ , H_2 and Ar, and compare them with the results of the asymptotic (ADK) theory. The asymptotic theory gives surprisingly good results for the atomic and molecular ionization rates. In particular, our calculations for the simplest case of molecular suppression, ionization of H_2 versus Ar, confirms the ADK analysis of Tong *et al*, Phys. Rev. A **66**, 013409 (2002) explaining that the suppression is mainly due to the different symmetries of the ionized orbitals, s in H_2 and $3p_z$ in Ar.

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