

Abstract Submitted
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An assessment of tunneling-multiphoton dichotomy in atomic photo-ionization: Keldysh parameter versus scaled frequency¹ TURKER TOPCU, FRANCIS ROBICHEAUX, Auburn University — It is common practice in strong-laser physics community that dynamical regime of atomic ionization is described by the Keldysh parameter, γ . Two distinct cases where $\gamma \ll 1$ and $\gamma \gg 1$ are associated with ionization mechanisms that are predominantly in tunneling and in multi-photon regimes, respectively. We report on our fully three-dimensional *ab initio* quantum simulations of ionization of hydrogen atoms in laser fields described in terms of the Keldysh parameter by solving the corresponding time-dependent Schrödinger equation. We find that the Keldysh parameter is useful in inferring the dynamical ionization regime only when coupled with the scaled laser frequency, Ω , when a large range of laser frequencies and peak intensities are considered. The additional parameter Ω relates the laser frequency ω to the classical Kepler frequency ω_K of the electron, and together with the Keldysh parameter, they can be used to refer to an ionization regime.

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