

Abstract Submitted  
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**Multiphoton ionization and high-order harmonic generation of  $\text{H}_2^+$  in intense ultrashort elliptically polarized laser fields**<sup>1</sup> KOBRA NASIRI AVANAKI, SHIH-I CHU, University of Kansas, DMITRY A. TELNOV, St. Petersburg State University, Russia — We present an *ab initio* 3D calculation of multiphoton ionization (MPI) and high-order harmonic generation (HHG) of the hydrogen molecular ion subject to intense elliptically polarized laser pulses. The numerical procedure involves the extension of the generalized pseudospectral (GPS) method for non-uniform spatial discretization of the Hamiltonian and wave functions in prolate spheroidal coordinates; the time propagation scheme is based on the split-operator technique in the energy representation. The calculations are performed for the ground and first excited electronic states of  $\text{H}_2^+$  at the equilibrium internuclear separation  $R = 2$  a.u. as well as for the stretched molecule at  $R = 7$  a.u. The dependence of the HHG spectra on the ellipticity parameter is analyzed. The spectral and temporal structures of the HHG signal are studied by means of the wavelet time-frequency analysis. The results provide new insights regarding the detailed HHG mechanisms in elliptically polarized laser fields.

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