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Mechanism of Anomalous Ellipticity Dependence of Near-threshold Harmonics in H_2^+[1] KOBRA NASIRI AVANAKI, University of Kansas, USA, DMITRY A. TELNOV, St. Petersburg State University, Russia, SHIH-I CHU, University of Kansas, USA — We have studied the mechanism of anomalous dependence of near-threshold harmonics in H_2^+ on ellipticity of driving field with the carrier wavelength 780 nm. The numerical procedure is based on accurate solution of the time-dependent Schrödinger equation in prolate spheroidal coordinates with the help of generalized pseudospectral method. Our analysis reveals that the origin of this phenomenon is mainly in the near-resonant excitation of π_u molecular orbitals in H_2^+. For the lowest affected harmonic, the maximum in the ellipticity dependence of the radiation energy is exclusively due to excitation of the $1\pi_u$ state; however, for higher near-threshold harmonics, higher-lying excited π_u states are playing significant role as well. The closer the harmonic to the threshold, the larger number of excited states make considerable contributions. All these contributions interfere, resulting in the anomalous ellipticity dependence with a maximum at some non-zero value of the ellipticity parameter. In the vicinity of this value, the harmonics with the anomalous dependence are linearly polarized along the minor axis of the polarization ellipse of the driving field and may show strong elliptical polarization as well.

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