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Photoionization of H_2^+ in intense elliptically polarized radiation[1]

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We investigate the photoionization of the H_2^+ ion irradiated by intense elliptically polarized laser pulses with central photon energies between 40 and 300 eV. We solve the time-dependent Schrödinger equation in prolate spheroidal coordinates [1,2] to extract the angle-integrated cross section as well as the angular distribution of the photoelectron. The polarization plane contains the molecular axis. The spatial coordinates are discretized by a finite-element discrete-variable representation. We discuss the electronic response to both short and long laser pulses. As a particular case, we analyze the "rotational" effect in circularly polarized laser light, which shows asymmetric angular distributions with respect to the molecular axis. The rotational effect depends on the photon energy and the internuclear separation. We also observe that the confinement effect persists in elliptically polarized radiation. Entangled confinement and rotational effects make the angular distributions more complicated than for linearly polarized light. The mechanisms behind these phenomena are discussed.

[1] X. Guan, E. Secor, R. DuToit, and K. Bartschat, Phys. Rev. A **86**, 053425 (2012).
[2] X. Guan, E. Secor, K. Bartschat, and B. Schneider, Phys. Rev. A **85** 043419 (2012).

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