

SFA – TDSE COMPARISONS

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Photoelectron spectra in strong-field ionization by a high-frequency field

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We analyze atomic photoelectron momentum distributions induced by bichromatic and monochromatic laser fields within the strong-field approximation (SFA), separable Coulomb-Volkov approximation (SCVA), and *ab initio* treatment. We focus on the high frequency regime—the smallest frequency used is larger than the ionization potential of the atom. We observe a remarkable agreement between the *ab initio* and velocity gauge SFA results while the velocity gauge SCVA fails to agree. Reasons of such a failure are discussed.

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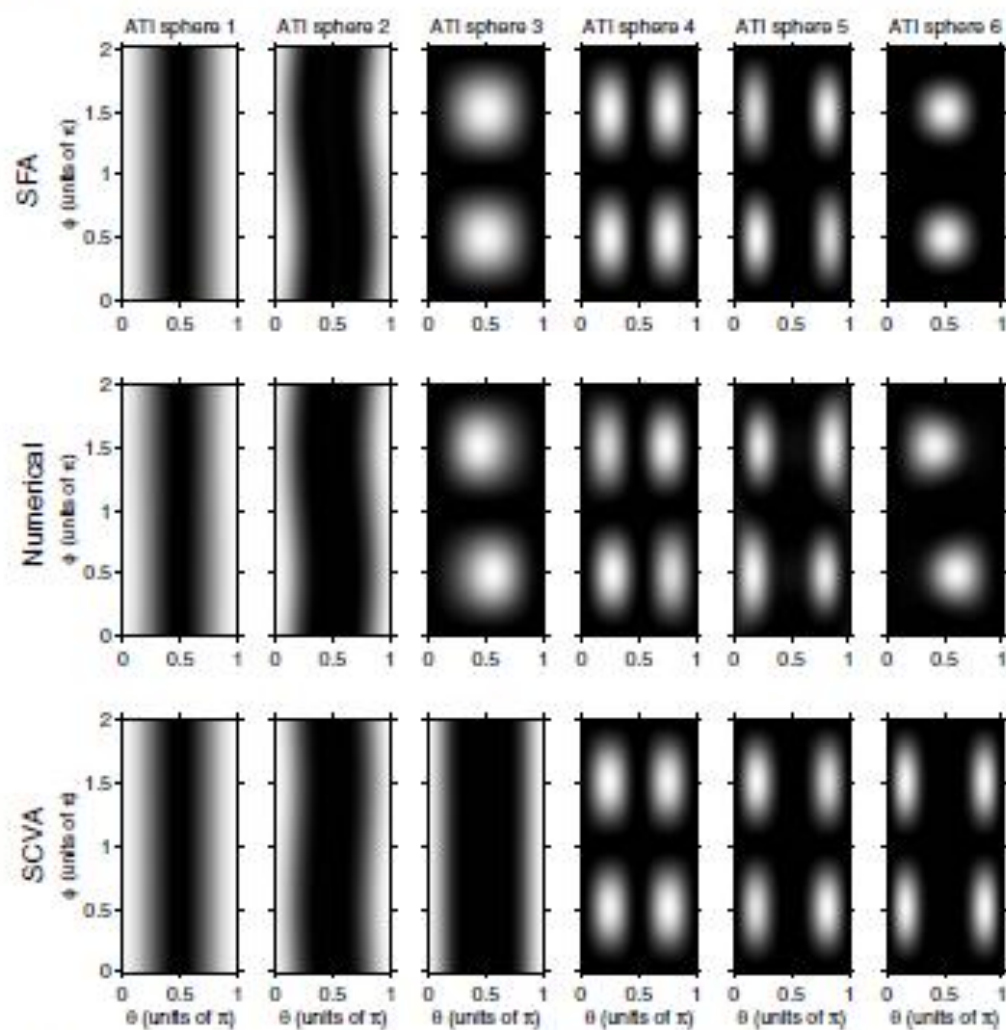


FIG. 1. Normalized ATI spheres (within the SFA, *ab initio*, and SCVA results) for the ground state of a hydrogen atom with field parameters given by $E_1^{(1)} = (0, 0, 0.1)$ (a.u.), $E_2^{(1)} = 0$, $\Omega_1 = 1$ (a.u.), $\varphi_1 = 0$ and $E_1^{(2)} = (0, 0.1, 0)$ (a.u.), $E_2^{(2)} = 0$, $\Omega_2 = 3$ (a.u.), $\varphi_2 = 0$; θ and ϕ are spherical angles (zenith and azimuth). Linear color scale goes from zero (black) to maximum (white).

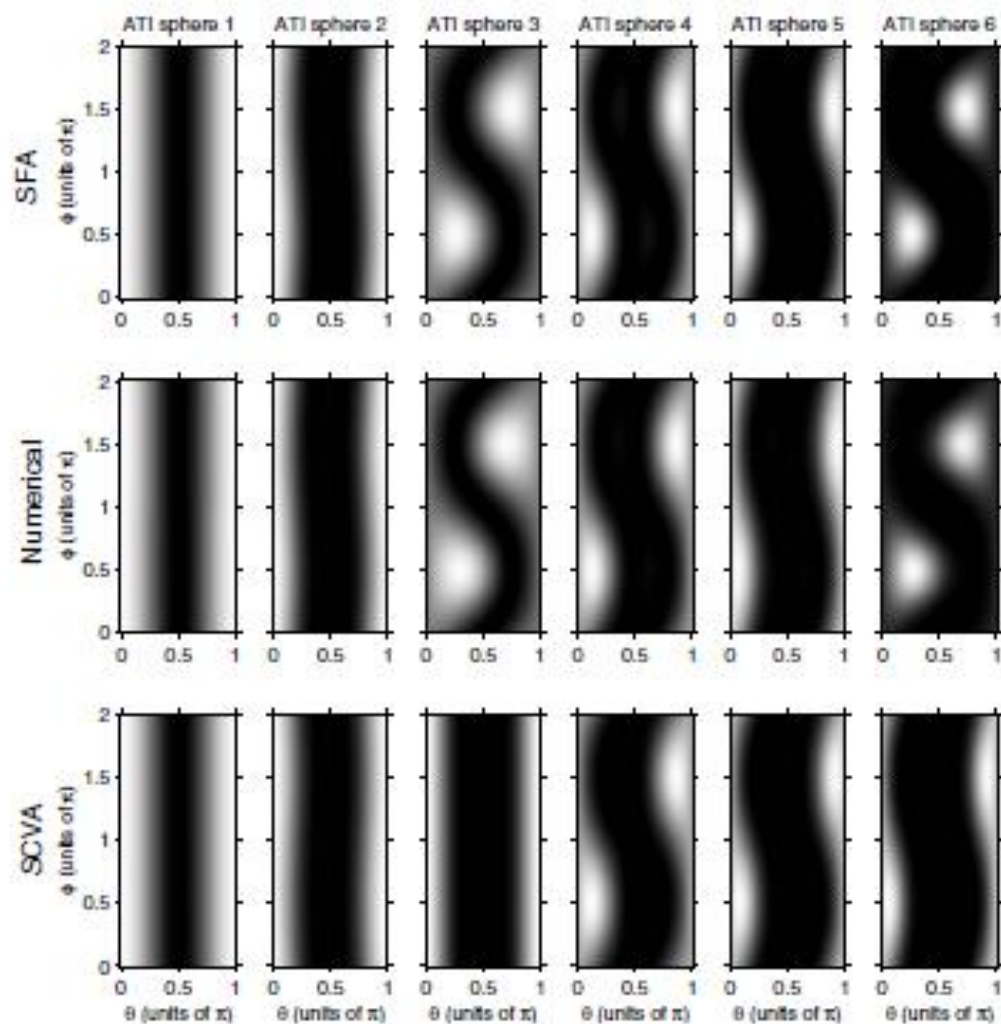


FIG. 2. Normalized ATI spheres (within the SFA, *ab initio*, and SCVA results) for the ground state of a hydrogen atom with field parameters given by $\mathbf{E}_1^{(1)} = (0, 0, 0.1)$ (a.u.), $\mathbf{E}_2^{(1)} = 0$, $\Omega_1 = 1$ (a.u.), $\varphi_1 = 0$ and $\mathbf{E}_1^{(2)} = 0.1(0, \sin[\pi/4], \cos[\pi/4])$ (a.u.), $\mathbf{E}_2^{(2)} = 0$, $\Omega_2 = 3$ (a.u.), $\varphi_2 = 0$. Linear color scale goes from zero (black) to maximum (white).