Abstract Submitted
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Two-photon double-ionization of the H_2 molecule in light perpindicular to the internuclear axis: effects of pulse duration XIAOXU GUAN, KLAUS BARTSCHAT, Drake University, BARRY SCHNEIDER, NIST, LARS KOESTERKE, TACC — Earlier [1–3], we solved the time-dependent Schrödinger equation to calculate the two-photon double ionization of the hydrogen molecule induced by non-sequential absorption of photons with a central energy of 30 eV in a short laser pulse lasting for about 1.6 femtoseconds. The linear polarization of the radiation was aligned with the internuclear axis. At the equilibrium distance R_{eq}, several doubly excited $^1\Sigma_{g,u}$ states, accessible through photon absorption,lie about 30 eV above the $X\,^1\Sigma_g$ ground state. These states are likely responsible for the significant disagreement seen in the literature for previous results on both angle-integrated and angle-differential cross sections. Here we continue to explore the fundamental role of doubly excited states on the two-photon break-up process,now for the even more difficult problem of laser polarization perpendicular to the internuclear axis. Such studies require relatively long laser pulses, thus making the calculations computationally very challenging.

[1] X. Guan, K. Bartschat, and B. Schneider, Phys. Rev. A **82**, 041404 (2010).
[2] X. Guan, K. Bartschat, and B. Schneider, Phys. Rev. A **84**, 033403 (2011).
[3] X. Guan, K. Bartschat, B. Schneider and L. Koesterke, Phys. Rev. A **88**, 043402(2013)

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