Abstract Submitted
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Prevalence of different double ionization pathways in driven atomic and molecular systems[1] AGAPI EMMANOUILIDOU, University College London and University of Massachusetts at Amherst — We present in a three-dimensional quasiclassical framework a unified way of exloring double ionization in strongly driven atomic and molecular systems as a function of total electron escape energy and as a function of intensity [1]. Exploring the double ionization pathways the electrons follow to escape we identify the regimes of total electron energy for which the Direct pathway (simultaneous ejection of both electrons after recollision) prevails over the Delayed one (one electron ionizes with a delay with respect to the recollision time) and vise versa [2]. We also identify new double ionization pathways and explore the differences between double ionization in atoms and molecules. We also show that in the case of N_2 for intensities in the over the barrier regime that are still in the non-sequential ionization regime the correlated momenta with a characteristic square structure and the probability distribution as a function of total energy with a two peak structure probe the tunneling phase of the re-colliding electron [3]. Finally, we present in a consistent way the double ionization pathways (enhanced ionization and re-scattered double ionization) as well as single ionization pathways in the full fragmentation of the H_2 molecule in very good agreement with experimental results. [1] A. Emmanouilidou et al. arXiv:1005.3126 submitted 2010. [2] A. Emmanouilidou, Phys. Rev. A 83, 023403 (2011). [3] A. Emmanouilidou et al. arXiv:1101.4960 submitted 2011.

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