

Abstract Submitted  
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**Role of shake-up channels in Neon photoionization time delay<sup>1</sup>**

DIDARUL ALAM, NICOLAS DOUGUET, Department of Physics, University of Central Florida, STEFAN DONSA, Vienna University of Technology, LUCA ARGENTI, Department of Physics and CREOL, University of Central Florida — The longstanding controversy surrounding the time delay difference ( $21 \pm 5$  as at 105 eV) measured in the photoionization of neon from the  $2s$  and  $2p$  shells [1] has been explained in a recent experimental work [2]. As predicted by a past *ab initio* study [3], it was shown in [2] that shake-up channels, which were not resolved in [1], were responsible for the discrepancy between theoretical calculations and the experimental data. This new finding, however, rises the question whether the shake-up channel indicated as being responsible for the measurement bias is the dominant one or if other channels might contribute significantly. In this work, we employ the NEWSTOCK *ab initio* method to analyze and quantify the effect of shake-up channels above 80 eV photon energy in neon. We also perform realistic XUV-pump-IR-probe time-dependent calculations and compare our results with the experimental data [2]. [1] M. Schültze *et al.* Science **328** 1658 (2010), [2] M. Isinger *et al.* Science **358** 893 (2017), [3] Feist *et al.* PRA **89** 033417 (2014).

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