Role of shake-up channels in Neon photoionization time delay

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].


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