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Photoelectric effect in the time domain.[1] RUIHUA XU, XU WANG, Graduate School of China Academy of Engineering Physics, Beijing 100193, China — Photoelectric effect had almost exclusively been studied in the energy or momentum domain, which was of course adequate restricted to long laser pulse durations available then. With rapid advancements of ultrafast laser technologies, which enable the generation of laser pulses as short as a few tens of attoseconds, a time-domain (re-)study of photoelectric effect is of interest and highly desired. We present such a combined theoretical and numerical study in this presentation, and show how a photoelectron wave packet rapidly changes its shape in the real time space after being emitted, from a largely messy and irregular shape to a regular single-peak shape, within a sizeable time period depending on the length of the laser pulse. With a short few-cycle pulse, the photoelectric effect can be strikingly different from usual understandings obtained with long laser pulses.

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