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Two-color few-photon ionization of helium: comparison of theory and experiment.[1] AARON BONDY, KLAUS BARTSCHAT, Drake University, SEVERIN MEISTER, ROBERT MOSHAMMER, Max-Planck Institute for Nuclear Physics — In this joint theoretical and experimental project, we investigate the response of the He atom subjected to a combination of two short and intense laser pulses, namely 1) an eXtreme Ultraviolet (XUV) pulse from a free-electron laser (FEL) and 2) an infrared (IR) pulse. The XUV frequency can be varied between the excitation energy of the $(1s2p)^1P$ state ($\approx 21.8\,\mathrm{eV}$) and the ionization threshold ($\approx 24.6\,\mathrm{eV}$), thereby making it possible to hit or miss resonant $(1snp)^1P$ Rydberg states and also to investigate light-induced states [1,2] that are generated through the combined interaction of the two pulses. The appearance and disappearance of various pronounced features can further be observed by varying the delay between the pulses. Our calculations are based on the single-active electron (SAE) approximation, in which one electron is kept frozen in the 1s orbital while the other one is moving in the partially screened Coulomb potential of the nucleus and subjected to the laser pulses. Overall, very satisfactory agreement between theory and experiment is obtained. [1] M. Reduzzi *et al.*, Phys. Rev. A **92** (2015) 033408. [2] S. Chen *et al.*, Phys. Rev. A **86** (2012) 063408.

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