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Attosecond Transient Absorption Spectrum of Argon at the $L_{2,3}$-edge[1] ANDREW CHEW, NICOLAS DOUGUET, COLEMAN CARIKER, JIE LI, Univ of Central Florida, EVA LINDROTH, Stockholm University, XIAOMING REN, YANCHUN YIN, LUCA ARGENTI, Univ of Central Florida, WENDELL HILL, University of Maryland, ZENGHU CHANG, Univ of Central Florida — Attosecond transient absorption, or time-resolved pump-probe spectroscopy, has made it possible to study fast electron dynamics in atomic and molecular systems within subfemtosecond timescales. With the emergence of table-top attosecond sources with spectra that extend into the water window, it is now possible to study atoms and molecules with absorption edges at higher energies than before. One such atom is the Argon $L_{2,3}$ edge, that lies near 250 eV, where the autoionization states approaching the $2p^{-1}$ $2P^o_{3/2}$ decay most notably through Auger processes. We present here the first Attosecond Transient Absorption Spectrum of the Argon atom in the vicinity of the $2p^{-1}$ $2P^o_{3/2}$ threshold, dressed by a strong shortwave infra-red pulse, with sub-cycle time resolution and high energy resolution. Our spectra resolve the dynamics of autoionizing states converging to the $2p^{-1}$ $2P^o_{3/2}$ threshold. Comparison with theoretical simulations indicates that the measured resonant profiles display ac-Stark shift and bear the signature of simultaneous Auger decay and tunneling ionization.

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