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Analytical model for atomic resonant attosecond transient absorption[1] C CARIKER, Univ. Central Florida, FL, USA, T KJELLSON, E LINDROTH, Univ. Stockholm, SE, EU, L ARGENTI, Univ. Central Florida, FL, USA — Recent advancements in ultrafast laser technology have made it possible to probe electron dynamics in highly excited atomic states that autoionize on a femtosecond timescale, thus giving insight into the dynamics of Auger decay and its interference with the continuum. These experiments provide a stringent test for time-resolved analytical models of autoionization. Here we present a finite-pulse, multi-photon perturbative model which is used in conjunction with ab-initio structure calculations to predict the attosecond transient absorption spectrum (ATAS) of an atom above the ionization threshold. We apply this model to compute the ATAS of argon in the vicinity of the $3s^{-1}4p$ resonance as a function of the time delay between an extreme ultraviolet (XUV) and an infrared (IR) pulse, as well as of the angle between their polarization. We show that by modulating the parameters of the IR pulse it is possible to control the dipolar coupling between neighboring states and hence the lineshape of the $3s^{-1}4p$ resonance.

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