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Decay of an autoionizing Intruder State resolved in time[1]
JEREMY PONSOT, NICOLAS DOUGUET, BEJAN GHOMASHI, LUCA ARGENTI, Univ of Central Florida — Polyelectronic atoms can exhibit autoionizing Rydberg series whose quantum defects and reduced widths change sharply with energy, due to the interaction between the main configurations of the series and a different configuration, energetically close to the series limit, known as intruder states. Modern time-resolved photoelectron spectroscopies offer the chance to resolve the decay of such intruder states in time. Here, the evolution of an intruder state is studied by solving the time-dependent Schroedinger equation on a grid for a 1D model with zero-range potentials. The intruder state, excited from the ground state by a short light pulse, decays first to a transiently-bound wavepacket, formed by several terms of the autoionizing series, and subsequently to the continuum. The characteristic times of these two stages of the decay are recognized in the dipole-transition amplitude from the ground state, which is analytically known. Preliminary results for the decay of intruder states in realistic atomic targets [1,2] will also be presented. [1] L. Argenti et al., J. Phys. B 39, 2773 (2006). [2] K. Schulz et al., Phys. Rev. A 54, 3095 (1996).

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