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Attosecond studies of electronic concerted motion: an ab initio perspective

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Autoionizing states are a pervasive aspect of atomic and molecular ionization and a distinct signature of electronic correlation. Only with the advent of attosecond sources, however, did it become possible to resolve the evolution of autoionizing states in real time, and to study how they are affected, and can be controlled, by light. Ab initio studies are key to intepret many current attosecond pump-probe experiments. Time-dependent close coupling (TDCC) has affirmed itself as the leading tool to simulate the ionization of atoms under the influence of ultrashort pulses, beyond the single-active-electron approximation. In this talk I will illustrate through examples how TDCC can reproduce the decay dynamics of rare-gas atoms excited by sequences of sub-femtosecond light pulses in realistic experimental conditions. These studies shed light on the concerted motion of electrons in transiently bound states, as well as on the elusive delay with which photoelectrons eventually part from their confined dancing companions.

Reference: C. Ott et al., "Reconstruction and control of a time-dependent two-electron wave packet," *Nature* **516**, 374 (2014).

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