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Attosecond Control of Molecular Photoionization FREEK KELKENSBERG, WING KIU SIU, GEORG GADEMANN, ARNAUD ROUZEE, FOM Institute AMOLF, PER JONSSON, Lund University, MARC VRAKKING, FOM Institute AMOLF — We will report on experiments on molecular photoionization by a train of attosecond pulses synchronized to an infrared (IR) laser field. It is shown that photoionization of a molecule by an attosecond pulse is sensitive to the instantaneous electric field at the moment of ionization. In the simplest case this can be understood by considering the coupling of two ionic states by the laser field, which effectively polarizes the molecule. Ionization takes place into these coupled states rather than the field free states. We demonstrate this in a prototype experiment by monitoring the yield and angular distributions of fragments produced upon dissociative ionization of hydrogen molecules as a function of delay between the attosecond pulses and the infrared field. Both the yield and the angular distributions, resulting from specific dissociation channels, oscillate as a function of the delay with twice the laser period. Furthermore we show that this effect can be generalized to other more complex molecules.

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