ATTOSECOND PULSES FOR STUDYING ULTRAFAST ELECTRON DYNAMICS

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Extreme Ultraviolet light sources based on high-order harmonic generation in gases are now used in many areas of science. The radiation consists of a train of extremely short light bursts, in the 100-attosecond range, allowing for outstanding temporal resolution.

Attosecond pulses have enabled the study of photoionization of atoms and molecules in a completely new way. Through the availability of a synchronized probe field and interferometric measurements, it has become possible to measure the incredibly small-time delay in photoionization, a concept introduced by E. Wigner in 1955, and the phase change of an electron wavepacket across a Fano resonance. Recently, the use of a bicolor probe field has allowed us to perform the quantum state tomography of a photoelectron.