Attosecond dynamics of electronic wavepackets in atoms and molecules

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The generation of attosecond pulses represents one of the frontier in the Ultrafast Optics for the possibility to influence, control and monitor the motion of electronic wave packet inside molecules and atoms.

In this work we report on the generation, and temporal characterization of isolated attosecond pulses down to the single cycle regime. These pulses have been applied to excite a coherent superposition of electronic states in atoms (Helium) and molecules (Hydrogen and Deuterium). The subsequent evolution of the superposition is on the attosecond time scale and has been probed exploiting the electric field oscillation of a synchronized IR pulses. The experimental results evidence the possibility to create complex electronic wavepacket in atoms and to control molecular reaction steering on the attosecond time scale the electronic density distribution.