

## Ultra-fast laser spectroscopy: probing matter dynamics on ultra-short time scales

Ultrafast lasers produce light pulses as short as a few femtoseconds. These durations are of the order or smaller than electron and vibration relaxation times: experiments using a sequence of pulses can thus give valuable information about the dynamics of excited states in a large panel of materials, from atomic to solid-state physics and chemistry. Electrons in semiconductor nanostructures, vibrational states in biomolecules, spins in magnets can be thus tracked over their lifetime. Moreover, the coherence of laser pulses can be exploited: quantum superposition of states can optically be addressed and determined. That gives rise to the possibility of developing new procedures for the optical control and measurement of atoms, molecules, nano-objects...

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**Classification de thématique:** Manipulating light