Elefterios Goulielmakis:

Elements of Attosecond control of Electrons

I will discuss about recent progress in lightwave technologies [1-4] with the focus on the synthesis of ultrafast light transients [5] and their applications in attosecond spectroscopy and control. With novel types of light-field synthesizers, operating over a spectral bandwidth of more than 2 octaves spanning the near IR the visible and the ultraviolet part of the electromagnetic spectrum, we are able to tailor the field of light waveforms with attosecond precision and to craft their field shapes on demand [1]. I will try to explain why this degree of control over light waves opens up new vistas for manipulating electrons in atoms, molecules and the condensed matter [6] [7].

[1] E. Goulielmakis et al., Science 320, 1614 (2008).
[2] R. Kienberger et al., Nature 427, 817 (2004).
[3] E. Goulielmakis et al., Science 305, 1267 (2004).
[4] E. Goulielmakis et al., Science 317, 769 (2007).
[5] A. Wirth et al., Science 334, 195 (2011)
[6] E. Goulielmakis et al., Nature 466, 739 (2010).
[7] M. Th. Hassan et al., In preparation (2012)