

Transmission electron microscopy with engineered electrons

Fabrizio CARBONE, *EPFL, Losanna, Switzerland*

In this seminar, I will discuss the possibilities opened by combining femtosecond laser pulses with ultrashort electron bunches. Nano-confined light electrons interactions allow the reshaping of the electrons wavefunction, both in its transverse and longitudinal component. Thanks to this, ultrashort pulses of electrons can be generated, all the way down to attosecond; special beams carrying orbital angular momentum, so called vortex electron beams, can also be obtained.

These exotic beams find numerous applications ranging from magnetic sensing, quantum electron spectroscopy and even nuclear spectroscopy.

I will present few examples of current results obtained in these domains.