Max-Planck-Institut für Struktur und Dynamik der Materie

Max Planck Institute for the Structure and Dynamics of Matter

Monday, December 4th, 2017 – 03:00 p.m.
CFEL Seminar room IV (Bldg. 99)

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Optical control and quasiparticle witnessing in strongly correlated electron systems

The prospect of “forcing” the formation of quantum coherent states in matter, by means of pulsed electromagnetic fields, discloses a new regime of physics where thermodynamic limits can be bridged and quantum effects can, in principle, appear at ambient temperatures. In this presentation I will introduce the field of optical control of correlated electron systems. I will focus on the possibility of coherently driving low-lying excitations of quantum many body systems making light-based control of quantum phases in real materials feasible. I will review the recent results in archetypal strongly correlated cuprate superconductors and introduce our new approach to go beyond mean photon number observables. I will show that quantum features of light can provide a richer statistical information than standard linear and non-linear optical spectroscopies. This will potentially uncover with unprecedented detail the evolution and properties of light-induced transient states of matter.

References

Science 331 (6014), 189 (2011)
Nature Comm. 6, 10249 (2015)
Nature Comm. 5, 5112 (2014)
New J. Phys. 16 043004 (2014)
Nature materials 12 (10), 882-886(2013)

Host: Angel Rubio

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