Max-Planck-Institut für Struktur und Dynamik der Materie

Max Planck Institute for the Structure and Dynamics of Matter

Monday, October 19th 2015 - 14:30
Seminar Room IV, 01.111, CFEL (Bldg. 99)

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Revealing hidden symmetry breaking in strongly correlated matter

Essential to a microscopic understanding of strongly correlated materials is a clear picture of the relationship between their myriad quantum ground states. However, in phenomena ranging from unconventional magnetism to high temperature superconductivity, this picture is often obscured by the presence of broken symmetries hidden from view of existing experimental techniques. This may include hidden structural symmetries or tensor order parameters representing complex spatial arrangements of multipolar electric and magnetic moments. It may even include electronic forms of order which come in and out of existence on ultrashort timescales, invisible to static probes. I will demonstrate how ultrafast time resolved and nonlinear optical methods can reveal hidden symmetry breaking in some of the most intensely researched strongly correlated materials of the past decade, including high-temperature superconductors, spin-orbit coupled transition metal oxides and heavy fermion materials, and I will discuss how the newly uncovered symmetries play a fundamental role in their physics.

Host: Andrea Cavalleri

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