复旦大学物理系 Colloquium

Time: 14:00, Tuesday, 2024.10.15

Location: C108, Jiangwan Physics Building

Probing ultrafast Spin and Electron Dynamics in Momentum, Space, and Time

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Abstract: Competing interactions of spin with charge and lattice, determined by the spin-orbit interaction, yield rich phase diagrams of states in novel correlated electron materials. Unfortunately, the dominant interaction responsible for the formation of a particular phase is often difficult to determine in thermal equilibrium, so that a fundamental understanding of the underlying competing interactions is out of reach using static measurements. Time-resolved spectroscopy techniques have the potential to overcome these limitations by temporally driving the material system out of equilibrium. The subsequent relaxation pathways are then determined by the spin-charge-lattice interactions, which can be studied using various photoemission techniques. In this presentation I will show how recent developments in ultrafast light sources and photoemission detector technology have paved the way for a completely new generation of time- and spin-resolved photoemission experiments. With this tool at hand, we can directly observe the temporal evolution of excited carriers and spins in energy, momentum space and time, providing an unprecedented insight into the fundamental energy and (angular) momentum dissipation mechanisms even in complex condensed matter.

Biography: Prof. Martin Aeschlimann is currently working in the Physics Department at the University of Kaiserslautern. He earned his Ph.D. from ETH Z ü rich in 1989. Following this, he worked as a research associate at ETH Z ü rich, a postdoctoral researcher at NIST and the University of Rochester, and a Senior Research Associate at ETH Z ü rich. He became a professor at the University of Duisburg-Essen in 1998 before moving to the University of Kaiserslautern in 2000. His research focuses on investigating ultrafast phenomena in solids, thin films, and nanoparticles. This includes combining short-pulsed laser systems with surface science technology to develop novel methods for measuring ultrafast relaxation processes in real time with high temporal and spatial resolution.