SFB1242

SFB 1242 Nichtgleichgewichtsdynamik kondensierter Materie in der Zeitdomäne

UNIVERSITÄT DUISBURG ESSEN

Open-Minded

19.05.2026 / 10 Uhr c.t., Raum MG 272
Campus Duisburg

Ultrafast Transmission Electron Microscopy and Electron Spectroscopy

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Most material processes occur far from equilibrium on ultrafast timescales. Ultrafast Transmission Electron Microscopy (UTEM) has emerged as a powerful technique to probe such rapid transient dynamics by combining the nanoscale spatial resolution of conventional TEM with the temporal resolution of pulsed electron sources synchronized to sample excitation. However, space charge effects in short electron pulses impose fundamental trade-offs between spatial, temporal, and energy resolution.

In this lecture, I will discuss optimization strategies for balancing signal quality, time resolution, and energy resolution in UTEM experiments. I will then present experimental examples demonstrating how UTEM characterizes ultrafast spin, charge, and atomic structural dynamics in materials. Particular emphasis will be placed on recent picosecond Lorentz TEM studies of laser-driven ferromagnetic phase transitions in FeRh, as well as novel approaches for characterizing ultrafast dynamics in quantum functional materials.

Für diese Zeit steht eine Kinderbetreuung nach vorheriger Anmeldung zur Verfügung.

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