

Ultrafast Studies of Laser Induced Dynamics in Charge and Orbital Ordered Manganites

Thursday, 19 September 2013 16:50 (15 minutes)

Disentangling the coupled processes in the material class of strongly correlated electron materials offers great challenges due to their intricate balance of competing structural, magnetic and charge interactions. In order to advance the understanding of the underlying correlations in these materials our current efforts focus on the interaction of the atomic, electronic, and magnetic subsystems on their relevant time scales. In the atomic and molecular regime masses are so light and distances so short such that these time scales shift to the subpicosecond range.

Here, we present our study of specific lattice modulations coupled to the melting of charge and orbital order in a manganite by means of femtosecond x-ray diffraction. More recently, by recording Bragg reflections sensitive to the charge, orbital and structural order on and off resonance at a free electron laser further progress is made to disentangle the interactions of the different ordering mechanisms.

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Session Classification: Strongly Correlated Electron Systems: Novel Interaction Phenomena