June 20th, 2013 - 11:00

Seminar Room IV, CFEL (Bldg. 99, 01.111)

CFEL SCIENCE

Max Planck Research Department for **Structural Dynamics**

SEMINAR

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Ultrafast charge recombination in photoexcited Mott-Hubbard insulator

Recent femtosecond pump-probe experiments on Mott-Hubbard insulators reveal charge recombination, which is in picosecond range, much faster than in clean band-gap semiconductors although the excitation gaps in Mott-Hubbard insulators are larger.

I will present a calculation of the recombination rate of the excited holon-doublon pairs, based on two-dimensional model relevant for undoped cuprates, which shows that such fast processes can be explained even quantitatively with the multi-magnon emission.

We find that the recombination rate is exponentially dependent on the Mott-Hubbard gap and on the magnon energy, with a small prefactor which can be traced back to strong correlations and consequently large charge-spin coupling. Moreover, in the frame of spin degrees of freedom different stages and timescales of thermalization will be identified and interpreted.

Z. Lenarčič and P. Prelovšek, arXiv:1211.3236 (2012)

Host: Martin Eckstein, MPSD-CFEL