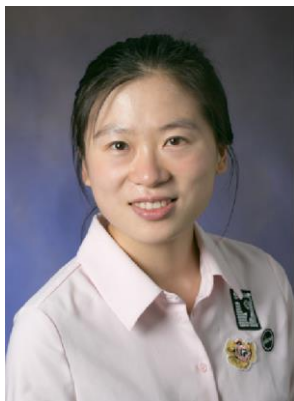


Invitation to IQST Seminar

on **Tuesday, July 25**, 2017, 10am
University of Stuttgart
Seminar room 3.123, Pfaffenwaldring 57



Wenchao Xu

Graduate Student at the University of Illinois at Urbana-Champaign

Dynamics in a Fermi lattice gas

Ultracold fermionic atoms trapped in optical lattices provide a platform to study phenomena in strongly correlated systems that are otherwise challenging to probe in condensed matter. In this talk, I will discuss our discovery of "bad metal" behavior for the first time in quantum gases. Bad metals, such as the normal state of some high-temperature superconductors, present anomalous scaling of resistivity with temperature, lack of resistivity saturation and the absence of well-defined quasiparticles. A complete understanding of bad metal behavior remains debated. In our group, we directly measure the transport lifetime induced by inter-particle scattering for a mass current of atoms excited by stimulated Raman transitions and infer the analog of resistivity. By exploring a range of interaction strengths and a regime of temperature inaccessible to solids, we identify three characteristics of bad metals: incoherent transport, resistivity that does not saturate as Mott-Ioffe-Regel limit is approached, and anomalous resistivity scaling consistent with T-linear behavior. The relationship between anomalous resistivity scaling, a reduction of quasiparticle weight from strong interactions, and bad-metal behavior is validated through comparison to dynamical mean-field theory (DMFT) simulations.

Host: Prof. Dr. Tilman Pfau, 5. Physikalisches Institut, Universität Stuttgart