



Seminarankündigung

Dienstag, 16. Dezember 2014

15:00 Uhr

WSI, Seminarraum S 101

“Momentum resolved optical pump-probe spectroscopy in monolayer graphene: An analytical model and measurements”

Further development in graphene based photonics and optoelectronics requires fundamental information on the evolution of the strongly out-of-equilibrium charge carrier distribution created by the light-carrier interaction. Here, we report polarization and fluence dependent ultrafast optical pump-probe spectroscopy of high quality CVD-grown monolayer graphene. An analytical model has been developed and employed to describe the experiments. Graphene offers a unique opportunity to probe the photocarrier occupation, not only at different energies using a two-color setup, but also in different directions in momentum space applying linearly polarized beams. The latter approach is possible due to the pseudospin-momentum coupling which results in an optical pseudospin-selection rule. Our method allows us to quantify and control the relative contributions of both the strongly non-equilibrium anisotropic occupation and the hot Fermi-Dirac photocarrier distribution to the total differential transmission measured. We provide a conclusive and quantitative evidence for an anisotropic photocarrier occupation with a life-time of about 100fs and claim that its relaxation towards the isotropic distribution occurs mostly due to optical phonon emission. The photocarrier occupation anisotropy makes it possible to separate the photoelectric and photo-thermoelectric contributions in the total photoresponse of metal-graphene-metal photodetectors.

Dr. Maxim Trushin
University of Konstanz
Germany