

PHYSIKALISCHES KOLLOQUIUM

Mittwoch, 23.05.2012, um 17:15 Uhr

Ort: Reichenhainer Str. 90; Neues Hörsaalgebäude, Raum: 2/N013



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Terahertz-Spektroskopie von Halbleiter-Nanostrukturen mit dem Freie-Elektronen-Laser

Free electron lasers (FEL) can deliver high-intensity narrow-band radiation in otherwise not easily accessible spectral ranges, such as the THz range. After briefly introducing the FEL at HZDR, I will discuss a quantum optical experiment, where we use the FEL to drive the 1s-2p intra-excitonic transition in semiconductor quantum wells and observe the so-called Autler-Townes splitting, a manifestation of electronic states dressed by the radiation field [1]. Our results indicate that we enter a regime well beyond the rotating-wave and two-level approximations. As a second example I will discuss pump-probe experiments on multilayer graphene over a wide range of photon energies (10-250 meV), hereby unveiling the relevant electronic relaxation mechanisms [2]. Remarkably we observe a sign change of the probe signal, i.e. a crossover from induced bleaching to induced absorption, which is related to the interplay between inter- and intraband absorption.

[1] M. Wagner, H. Schneider, D. Stehr, S. Winnerl, A. M. Andrews, S. Schartner, G. Strasser, M. Helm: „Observation of the intra-exciton Autler-Townes effect in GaAs/AlGaAs semiconductor quantum wells”, Phys. Rev. Lett. 105, 167401 (2010)

[2] S. Winnerl, M. Orlita, P. Plochocka, P. Kossacki, M. Potemski, T. Winzer, E. Malic, A. Knorr, M. Sprinkle, C. Berger, W. A. de Heer, H. Schneider, M. Helm: "Carrier relaxation in epitaxial graphene photoexcited near the Dirac point", Phys. Rev. Lett. 107, 237401 (2011)

Alle Zuhörer sind ab 17.00 zum Kaffee vor dem Hörsaal eingeladen.