
HL 37: Invited Talk Chatterjee

Time: Thursday 9:30–10:15

Location: ER 270

Invited Talk

HL 37.1 Thu 9:30 ER 270

Terahertz detection of many-body signatures in semiconductor heterostructures — •SANGAM CHATTERJEE, TORBEN GRUNWALD, DAVID KÖHLER, TILMANN G. JUNG, DANIEL GOLDE, MACKILLO KIRA, and STEPHAN W. KOCH — Faculty of Physics and Material Sciences Center, Philipps-Universität Marburg, Renthof 5, 35032 Marburg, Germany

The collective response of many-body systems in semiconductor heterostructures is studied by means of THz time-domain spectroscopy. This makes it possible to unambiguously identify correlated states in semiconductors such as plasmons or excitons.

As examples of our results we present investigations of a two-dimensional electron gas in a high electron-mobility transistor-like structure. While it is commonly accepted that the plasma frequency in two dimensions vanishes with vanishing momentum, we measure a plasmon pole in the transmission spectra of our system. Furthermore, the observed density dependence is similar to the 3D system (Nature 414, 286 (2001)).

As another example, experimental evidence of different excitonic behavior in GaAs/AlGaAs and (GaIn)As/GaAs quantum wells is presented. The dynamics of the induced absorption of the 1s-2p transition is monitored after optical excitation at the 1s resonance. A microscopic many-body analysis is used to explain the measured results.