CEA - Saclay 91191 Gif-sur-yvette Cedex

Service de Physique de l'Etat Condensé

SÉMINAIRE

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Orme des Merisiers SPEC Salle Itzykson, Bât.774

Picosecond time-resolved experiments in a two-dimensional electron gas

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Time-dependent transport measurement in a two-dimensional electron gas (2DEG) system facilitates the investigation of the charge distribution and its collective dynamics. In our experiment, a 2DEG based on an AlGaAs/GaAs heterostructure is excited with optically generated electrical pulses. The response of the 2DEG is recorded as a function of magnetic field and time with resolution of 2 ps. A Fourier transform of the time domain data does not only provide the spectral amplitude of the excitation components across the full experimental bandwidth (up to a THz), but also their relative phase. The spectrum is composed of excitation modes, whose frequency either drops (edge magnetoplasmons) or increases with magnetic field (bulk magnetoplasmons). The phase information contained in the Fourier transform enables the identification and the assignment of the wavevector of each mode. In the second part of the talk, we present an electrical pulse correlation experiment on a 2DEG. The experimental results demonstrate non-linear processes in a 2DEG.

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