


Travail pratique de diplôme de physique
Session de octobre 03 – février 03
Candidat : Schifferle Lucas

Role of free electrons on the nonlinear dynamics of excitons and negatively charged excitons in quantum wells.

In semiconductors, Coulomb interactions between holes and electrons can lead to the formation of bound electron-hole pairs (excitons) or more complex quasi-particles like charged excitons (an electron or a hole bound to an exciton, also called a trion). The nonlinear behaviour of excitons in undoped semiconductor is well understood, while a careful study of excitons and charged excitons nonlinearities in the presence of an electron gas is still missing. This diploma work aims on studying the exciton gas induced nonlinearities in modulation-doped CdMnTe quantum wells.

This study will be carried out through linear absorption and time resolved pump and probe spectroscopy.

The absorption experiment, in the presence of an additional light source will allow us to change the electron concentration in the well, and to measure directly this concentration. We will then get insight into the nonlinear effects linked with the presence of excitons, trions and electrons through a time resolved pump and probe experiment with femtosecond resolution.



Professor: Benoît Deveaud-Plédran

Lausanne, Wednesday 22 October 2003