



IR-ON Seminar

Numerical and model studies of perturbed Landau states in a quantum well

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Seminarraum des Instituts für Photonik

Gußhausstrasse 27, 1040 Wien, Raum CBEG02

The motion of electrons in a quantum well under a strong vertical magnetic field is characterized by the existence of Landau orbits disposed in discrete energy levels. We shall discuss two couplings affecting the motion of one electron in actual samples: electron-phonon and alloy disorder. Because of the singular Landau spectrum, these two effects should be treated non-perturbatively. Coupling to optical phonons partly lifts the macroscopic degeneracy and generates mixed electron-phonon states (quantum well magneto-polarons). Alloy disorder in ternary-based wells strongly affects the states by introducing localization and broadening effects. We will present numerical studies of the energy spectrum and of the time evolution within the perturbed states of the full system. We will show that even if at first glance the dynamics is rather intricate, its prominent features are nevertheless understandable in the framework of a simple model of a discrete state coupled to a finite-width continuum of states, opening up a new route for understanding and modelling dynamical processes for electrons in actual QCL structures.

Host: K. Unterrainer

