Abstract

In this thesis the properties of low dimensional electron systems are studied by means of magnetocapacitance and magnetotransport measurements.
The samples are prepared on special GaAs/AlGaAs **EpiMIS**-heterostructures (**m**etal-**i**nsulator-**s**emiconductor) with **epi**taxial crystalline gate electrodes.

By lateral structuring the epitaxial electrode the extension of the electron system which is induced at the AlGaas/GaAs interface can be manipulated.
Different gate structures, as extended gates, arrays of wires and dots, are prepared in order to create two-, one- and zero-dimensional electron systems. The structuring of the epitaxial electrodes results from electron beam lithography and different etching techniques. The size of the smallest structures amounts to 150 nm.

The capacitance spectra are used to gain information about the thermodynamical density of states of the electron systems, about the one-dimensional subband spacing and about the effektive Landé factor of spin splitting.
Additionally conclusions are drawn from the spectra about the single particle density of states of the electron systems and about the tunneling process between the electron system and the reservoir.

Magnetotransport measurements are implemented on EpiMIS-structures. The parallel transport in the structures is modeled and results for the mobility and density of the 2DEGs are received.