Abstract

This work presents the development and optical investigations of semiconductor microcavities based on II-VI compounds. The most relevant results of this thesis concern the magneto-optical properties of semimagnetic cavity polaritons resulting from the strong coupling of excitons in a semimagnetic quantum well and cavity photons. Depending on the excitation power, we observe a linear or nonlinear dependence of the photoluminescence intensity as a function of this excitation power. In the linear regime, the giant Zeeman splitting of semimagnetic polaritons is studied and a model fitting the experimental results is proposed. In the nonlinear regime, semimagnetic polaritons Bose-Einstein condensates are studied in magnetic field. The condensation of semimagnetic polaritons triggered by magnetic field is evidenced and an interpretation of the magnetic field dependence of the threshold power is elaborated. The polarization properties of semimagnetic polaritons condensates emission are investigated and we find indices for a quenching of the Zeeman effect.

A part of this thesis is devoted to technological aspects related to the design, MBE growth and optimization of microcavity structures in three material systems. We particularly focus on structures with non magnetic Bragg reflectors embedding semimagnetic quantum wells specially designed to enhance the magneto-optical properties of cavity polaritons. Important milestones results to achieve this goal are the characterization of the strong coupling regime and the lasing action without losing the strong coupling regime *i.e.* the Bose-Einstein condensation of cavity polaritons.

The results on the magneto-optical properties of semimagnetic cavity polaritons presented in this work pave the way for further investigations on spin polarized Bose-Einstein condensates.