Citation:
Hui Zhao, B. Dal Don, S. Moehl, H. Kalt, K. Ohkawa and D. Hommel, *Spatio-temporal dynamics of quantum-well excitons*, Physical Review B, 67 035306 (2003).

Published version:
Published version: http://link.aps.org/doi/10.1103/PhysRevB.67.035306

Other sources:
ArXiv: http://arxiv.org/abs/cond-mat/0207326v2

Key words:
Strongly Correlated Electrons
Mesoscale and Nanoscale Physics

Abstract:
We investigate the lateral transport of excitons in ZnSe quantum wells by using time-resolved micro-photoluminescence enhanced by the introduction of a solid immersion lens. The spatial and temporal resolutions are 200 nm and 5 ps, respectively. Strong deviation from classical diffusion is observed up to 400 ps. This feature is attributed to the hot-exciton effects, consistent with previous experiments under cw excitation. The coupled transport-relaxation process of hot excitons is modelled by Monte Carlo simulation. We prove that two basic assumptions typically accepted in photoluminescence investigations on excitonic transport, namely (i) the classical diffusion model as well as (ii) the equivalence between the temporal and spatial evolution of the exciton population and of the measured photoluminescence, are not valid for low-temperature experiments.