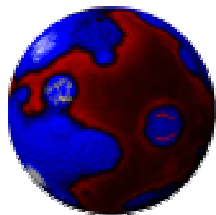
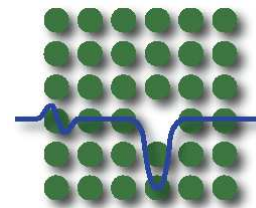


Prof. Dr. F. Cichos



Sächsische Forschergruppe FOR877



**Molecular
Nanophotonics**

MONA-/ FOR877- Seminar

Thursday, 5th July, 2012, 11:00 a.m., SR 224

Dipl.-Phys. Daniel Braam

Andreas Mölleken, Günther Prinz, Martin Geller, Axel Lorke
Universität Duisburg-Essen, 47057 Duisburg

Influence of the Environment on the Emission Characteristics of Single CdSe/ZnS Nanoparticles

In this talk I review our recent results in experimental investigations of single CdSe/ZnS nanoparticles and how their photoluminescence (PL) depends on their (dielectric or metallic) environment. The particles are embedded in PMMA to prevent fast photobleaching and are spin-coated on bare or aluminium-covered silicon substrates. The samples are analyzed with a custom-built μ -PL setup, using a LN₂-cooled CCD-camera and a 500 mm grating spectrometer in a temperature range from 8K to 300 K.

On bare silicon substrates we observe PL blinking as published in literature, whereas on rough aluminium layers and at low temperatures it changes to brighter and continuous emission with spectral jumps replacing the off-state. The statistics of the shifted states are comparable to those of the off-states, which indicates a plasmonic influence of the metal layer on the recombination processes of the excitons. Additionally, some particles show several distinct energy states, which might be explained by differently charged dots.

Substrate independent we observe a continuous blue shift under ambient conditions. Even though the nanoparticles are embedded in a PMMA matrix, oxygen from the atmosphere can still penetrate to some extent. This is confirmed by measurements in vacuum, in which any noticeable blue shift is suppressed.