Vortragender: Prof. Dr. Alexander L. Efros  
Naval Research Laboratory, Washington DC

Gast von Prof. Winterer

Thema: Non-blinking semiconductor nanocrystals: suppression of nonradiative Auger processes

Abstract: Colloidal nanocrystals randomly turn their photoluminescence (PL) “off” and “on” under continuous light illumination, despite intensive research efforts aimed at suppressing this phenomenon. Today there is a consensus that the blinking is caused by extra electrons or holes that repeatedly charge, and then neutralize, the NC. When a charged NC is excited by a photon the additional energy is not re-emitted as PL, but instead triggers a process known as "non-radiative Auger recombination" during which this energy is acquired by an extra electron or hole. The rate of Auger recombination is orders of magnitude faster than the rate of radiative recombination that produces PL in neutral NCs. As a result, PL is completely suppressed, or "quenched," in charged NCs. Recently, the soft-confinement (CdZnSe/ZnSe) nanocrystals have been grown that show complete absence of single molecule photoluminescence blinking [1]. Other remarkable photophysical properties these nanocrystals exhibit include unique multi-peaked photoluminescence spectra, and unusually short photoluminescence lifetimes. These properties are consistent with the novel observation of charged exciton recombination in colloidal nanocrystals, and thus are quite unlike any of the typical nanocrystals currently being studied. We will explain why Auger processes are so efficient in standard NCs and how they have been recently suppressed in the non-blinking NCs [2].


Zeit: Donnerstag, 3. Mai 2012, 17:00 Uhr
Ort: Gebäude MD, Raum 349 (Campus Duisburg)  
Lotharstraße 1, 47057 Duisburg

Interessenten sind herzlich willkommen

Prof. Dr. A. Lorke (Sprecher SFB 445)  
Prof. Dr. Dr. h. c. H. Zabel (Sprecher SFB 491)  
Prof. Dr. M. Horn-von Hoegen (Sprecher SFB 616)