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Blinking and spectral diffusion of CdSe/ZnS nanoparticles AXEL LORKE, DANIEL BRAAM, ANDREAS MÖLLEKEN, MATTHIAS OFFER, GÜNTHER PRINZ, MARTIN GELLER, Fakultät für Physik and CeNIDE, Universität Duisburg-Essen, 47048 Duisburg — Even though the tunable optical properties of colloidal nanoparticles have been studied extensively, their luminescent behaviour is still not fully understood. The random emission intermittency and the power-law of on- and off-times as well as shifts in the emission wavelength still lack a comprehensive understanding [1]. We investigate the excitonic structure of CdSe/ZnS core/shell nanoparticles using a micro-photoluminescence (PL) setup with confocal as well as imaging optics. The nanoparticles are dispersed in toluene with 1% PMMA and deposited by spin-coating on different substrates (bare Si/SiO₂ as well as Si/SiO₂ covered with different rough metallic layers). Depending on the substrate, we observe emission intermittency or nearly blinking-free emission with spectral jumps of 25 meV in the emission energy. Both can be assigned to excitonic transitions affected by additional charge inside or outside the nanoparticle [2]. Furthermore, we observe a phonon replica of 25 meV and smaller (<10 meV) energetic shifts of the emission lines, which are likely caused random charge variations in the environment of the nanoparticle.

- [1] P. Frantsuzov et al., Nature 4, 519 (2008).
- [2] A. Efros, Nature Mat. 7, 612 (2008)

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