

HL 1: Invited Talk: Erik Stock

Time: Monday 10:15–11:00

Location: FOE Anorg

Invited Talk

HL 1.1 Mon 10:15 FOE Anorg

Self-organized quantum dots as single and entangled photon emitters — •ERIK STOCK¹, WALDEMAR UNRAU¹, ANATOL LOCHMANN¹, ANDREI SCHLIWA¹, MURAT ÖZTÜRK¹, ASKHAT BAKAROV², ALEKSANDR TOROPOV², ILIA DEREBREZOV², VLADIMIR HAISLER², and DIETER BIMBERG¹ — ¹Institut für Festkörperphysik, TU-Berlin, 10623 Berlin, Germany — ²Institute of Semiconductor Physics, 630090 Novosibirsk, Russia

We realized a highly efficient single photon source (SPS) based on a single electrically driven InGaAs/GaAs QD. Our resonant cavity light emitting diode (RLED) generates single polarized photons at a repetition rate of 1 GHz [1] exhibiting a second order correlation function $g(2)(0) = 0$. The operating temperature can be increased up to 80 K still preserving non-classical light emission.

To study the photon characteristic of the RCLED we used superconducting single photon detectors (SSPD). Photon cross correlation measurements on the exciton (X) and biexciton (XX) luminescence emission results in a time delay of less than 70 ps [2].

A promising candidate for the generation of entangled photons are QD grown on (111) GaAs substrate. Mikro-photoluminescence spectroscopy on single QDs demonstrates a fine structure splitting $< 10 \mu\text{eV}$ limited by the spectral resolution of our setup [3]. This work was partly funded by the SFB 787.

[1]D. Bimberg et al., IEEE Photonics Journal 1, 58 (2009) [2]E. Stock, et al Semicond. Sci. Technol. 26, 014003 (2011) [3]E. Stock et al., Appl. Phys. Lett. 96, 093112 (2010)

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