Tapered Optical Fibers be analyzed in situ, providing insight into the internal photo-physical radiation characteristics, we elaborate specifically how the orientation reverse simulations. Starting from basic considerations of the dipole tive OLEDs (i.e. in electrical operation) and corresponding optical by measurements of the far-field emission pattern generated by ac- internal luminescence quantum efficiency q) can be determined in situ sion zone, the orientation of the transition dipole moments and the are the internal electroluminescence spectrum, the profile of the emis- well known as the key parameter to improve OLED efficiency in order lighting applications. In this context, the light outcoupling problem is are spent to develop OLEDs towards competitive sources for general applications. This is to mount a single quantum emitter on an optical fibre. It integrates Fiber-integrated diamond-based single photon source implemented with gradient-index lenses — Philip Engl, Tim Schröder, and Oliver Benson — Nano Optics Group, Institut für Physik, Humboldt-Universität zu Berlin, Newtonstr. 15, 12489 Berlin, Germany Single photons play an important role for many quantum information technologies. Quantum cryptography schemes and other experiments with single photons have already been implemented in rather large where nanodiamonds containing single defect centres can be deposited via spin-coating. In this manner the GRIN lens serves as holder for single photon emitters as well as light collection objective. Furthermore a solid immersion lens like behaviour increases the emission of a dipole into the direction of the GRIN lens. Depending on the de- centre type we expect more than 100kcts/s of fibre coupled single...
photons. This high count rate combined with its easy experimental realisation, moderate cost for components and its small dimensions of about 3 mm by 3 mm by 30 mm makes this device interesting for robust and low cost single photon implementations.

HL 34.7 Tue 12:15 HSZ 02
A spintronic circularly-polarized single-photon source — Andreas Meier, Pablo Asshoff, Robin Schwerdt, Heinz Kalt, and Michael Hetterich — Karlsruhe Institute of Technology (KIT)
Diluted magnetic semiconductors (DMS) are among the most promising materials for efficient spin-injection into semiconductors. They are thus ideal materials for designing a spin-polarized single photon source pumped by an electrical current. As a model system we investigate a spin light-emitting diode with the DMS ZnMnSe and an InGaAs quantum dot as single photon source. With an applied magnetic field of 2 T, a pronounced spin-polarization of \( \sim 65\% \) is achieved, while at \( B = 6\) T it even approaches 95%. Autocorrelation measurements in pulsed operation mode prove the light emitted being non-classical.

HL 34.8 Tue 12:30 HSZ 02
On-demand single photon source in (311)A GaAs quantum dots — Snežana Lazić, Rudolf Hey, and Paulo Santos — Paul-Drude-Institut für Festkörperphysik, Hausvogteiplatz 5–7, 10117 Berlin, Germany
We demonstrate the generation of single photons on demand using an acousto-electric effect in GaAs/AlGaAs quantum well (QW) grown by molecular beam epitaxy on pre-patterned (311)A GaAs substrates. In this process, a surface acoustic wave (SAW) is employed to control the transfer of carriers, photogenerated in the QW, to an array of quantum dots (QDs) embedded at well-defined positions within the high-mobility QW transport channel. The embedded QD arrays form during the growth at the edges of etched triangular trenches due to monolayer fluctuations of the QW thickness. The photoluminescence from these acoustically-pumped arrays of QDs consists of a series of sharp lines which are attributed to the recombination of carriers in discrete quantum states. Time-resolved studies show that the population of the emitting states within the array, as well as the subsequent emission of single photons is governed by the SAW. The photons are emitted when the electrons captured within the array recombine with holes brought in a subsequent SAW cycle. The mechanism for the emission of non-classical light from QD arrays was investigated by analyzing the statistics of the emitted photons using the Hanbury Brown and Twiss approach.

HL 34.9 Tue 12:45 HSZ 02
Tunnel Injection in Electrically Pumped Single Photon Emitters — Alexander Dreismann¹, Murat Öztürk¹, Ole Hitzemann¹, Erik Stock¹, Waldemar Unrau¹, Askhat K. Bakarov², Aleksandr I. Toropov², Ilia A. Derebezov², Vladimir Haissler², and Dieter Bimberg¹ — ¹Institut für Festkörperphysik, TU-Berlin, 10623 Berlin, Germany — ²Institute of Semiconductor Physics, 630090 Novosibirsk, Russia
Electrically pumped InGaAs/GaAs quantum dot (QD) based Resonant-Cavity LEDs (RC-LEDs) represent powerful semiconductor based single photon and potential entangled photon emitters with high out-coupling efficiencies as required for quantum key distribution [1]. To achieve high photon emission rates the exciton luminescence intensity should be as high as possible; in the case of entangled photon sources exciton and biexciton luminescence intensities should be comparable.

To optimize the operation of our RC-LED in this regard we investigate the dependence of the luminescence intensity on the applied bias as well as on the temperature. We observe resonant tunneling injection of charge carriers into the QDs before the flat band condition of the diode structure is reached [2]. The influence of the dark state of the exciton on the luminescence is studied by comparing experimental data with a rate equation model. This work was partly funded by the SFB 787.