



Sonderseminar

**Montag, 01. Oktober 2012
11:30 Uhr**

ZNN, Seminarraum EG 0.001

“Nanowire optics: Quantum light sources and detectors”

In this talk I will discuss recent results obtained from selectively grown nanowires with controlled shape and composition, which allow for very efficient single-photon sources and detectors to be achieved. Such functionality is required in future quantum technologies such as interfacing remote quantum bits in a large scale quantum computer.

We achieve a high efficiency single-photon source by precisely controlling the quantum dot position perfectly on the nanowire axis and growing a tapered nanowire waveguide around it. By implementation of a back-reflecting gold mirror, we achieve a 24-fold enhancement in the collected single photon flux in comparison to earlier work with no waveguide. The quantum dot can also be positioned in a nanowire p-n junction, which allows, due the large internal gain produced by the nanowire, the detection of a single photon resonantly absorbed in the quantum dot.

Finally, we discuss alternative light collection schemes that are compatible with complex nanowire devices. In these alternative collection schemes we circumvent the one-dimensional polarizing effect of the nanowire and access the intrinsic polarization properties of the quantum emitter. We also investigate unconventional solid immersion lenses similar to that used in light houses in order to achieve near-unity collection efficiency of our single-photon source.

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