

Waveguide Integrated Nanotube Light Sources (WINS)

Initiative: Integration molekularer Komponenten in funktionale makroskopische Systeme (beendet, nur noch Fortsetzungsanträge)

Bewilligung: 31.03.2014

Laufzeit: 3 Jahre

Projekt-Website: <http://www.int.kit.edu/krupke.php>

Based on the first funding period in which carbon nanotubes were successfully integrated into photonic waveguides structures as electrically-driven on-chip light source with tailored emission wavelength, emission linewidth, and as non-classical photon source advanced split-gate device architectures based on Silicon waveguides to enable light emission in the telecom band with high efficiency will be developed. The project will focus on developing electrically-driven on-chip single photon sources operating at room temperature and in the telecom band, which requires engineering of exciton traps. Furthermore, waveguide integrated detectors to demonstrate a complete photonic circuit with nanotube emitters and detectors operating at room temperature will be developed. The results expected potentially will constitute break-throughs with major implications for on-chip communication with light as well as for future applications in quantum cryptography and quantum computation.

Projektbeteiligte

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Waveguide-Integrated Light-Emitting Carbon Nanotubes

Directional couplers with integrated carbon nanotube incandescent light emitters

Cavity-enhanced light emission from electrically driven carbon nanotubes

Fully integrated quantum photonic circuit with an electrically driven light source

Sub-nanosecond light-pulse generation with waveguide-coupled carbon nanotube transducers

