Valery Zwiller

Valery Zwiller is a head of the Quantum Nano Photonics group at Royal Institute of Technology (KTH) in Stockholm and the Chief Scientific Officer at Single Quantum company specializing in superconducting nanowire single photon detectors (SNSPDs) [1-3].

Quantum Nano photonics group focuses on studying emission from semiconductor nanostructures (in particular, III-V quantum dots – QDs, and nanowires) at the single photon level and its detection. The research on developing quantum emitters and quantum detectors is driven by quantum information processing applications.

He was involved in demonstration of bright non-classical light emission from single InAs/GaAs QDs and QDs in nanowires [4-6] including integration of two single photon sources within a waveguide circuit and demonstrated emission of indistinguishable photons with nearly 100% visibility [7] generation of nearly background free single photons [8] and strain-tunable integrated photonics [9].

Regarding telecom quantum dots within the group sources of single [10] and pairs of entangled photons [11,12] are developed based on InAs/GaAs quantum dots grown on InGaAs metamorphic buffer layer by metal-organic vapor-phase epitaxy. These sources are emission wavelength tunable due to integration with piezoactuators.

1. Superconducting nanowire single-photon detectors: A perspective on evolution, state-of-the-art, future developments, and applications: Applied Physics Letters: Vol 118, No 19 (scitation.org)
2. Fractal Superconducting Nanowire Avalanche Photodetectors with 84% System Efficiency at 1600 nm, 1.02 Polarization Sensitivity, and 29 ps Timing Resolution | IEEE Conference Publication | IEEE Xplore
3. Progress on large-scale superconducting nanowire single-photon detectors: Applied Physics Letters: Vol 118, No 10 (scitation.org)
4. Single quantum dots emit single photons at a time: Antibunching experiments |APL
5. Optically Bright Quantum Dots in Single Nanowires | Nano Letters
6. Single Quantum Dot Nanowire LEDs | Nano Letters
7. On-chip quantum interference between silicon photon-pair sources | Nature Photonics
8. On-demand generation of background-free single photons from a solid-state source: Applied Physics Letters: Vol 112, No 9 (scitation.org)
9. Strain-Tunable Quantum Integrated Photonics | Nano Letters (acs.org)
10. A stable wavelength-tunable triggered source of single photons and cascaded photon pairs at the telecom C-band: Applied Physics Letters: Vol 112, No 17 (scitation.org)
11. Strain-Controlled Quantum Dot Fine Structure for Entangled Photon Generation at 1550 nm | Nano Letters (acs.org)
12. On-Demand Generation of Entangled Photon Pairs in the Telecom C-Band with InAs Quantum Dots | ACS Photonics