CO.CO.MAT

Carole Diederichs
(Ecole Normale Supérieure de Paris)

Generation of highly indistinguishable photons with cw resonantly driven quantum dots

Quantum information protocols require light sources emitting single indistinguishable photons. In this context, the semiconductor quantum dots are excellent candidates for the development of such sources in the solid state, with the great advantage that they could be integrated into on-chip devices. However, their interaction with the solid state environment reduces the photon coherence time and thus broadens their emission spectrum which makes the emitted photons partially distinguishable over time. A characteristic time of the photon indistinguishability is thus tightly linked to the photon coherence time of these emitters which is typically of the order of few hundreds of picoseconds and which makes difficult the use of conventional photodetectors with nanosecond time resolutions. In this talk, I will show that by performing a cw resonant excitation of quantum dots in the resonant Rayleigh scattering regime where the coherently scattered single photons inherit the coherence time of the excitation laser, photon temporal indistinguishabilities of more than a dozen of nanoseconds can be reached and controlled by simply varying the spectral width of the excitation laser.

17. Juli 2015, 14:00 Uhr

Universität Stuttgart, NWZII, Raum 2.136
Pfaffenwaldring 57, 70569 Stuttgart