SFB/TRR 21 - Seminar

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Droplet epitaxial GaAs quantum dots as single photon sources on silicon

Droplet epitaxy (DE) is a non-conventional growth technique based on molecular beam epitaxy. This method, differently from strain-induced 3-dimensional nanostructures, enables the growth of lattice-matched and strain-free selfassembled III-V nanoemitters. Thanks to the versatility of the DE, different kinds of nanostructures can be realized: quantum dots, coupled quantum dots, quantum rings, multiple concentric quantum rings, quantum disks, as well as combinations of these different shapes. Moreover, DE enables the growth on different substrates orientations (such as the (100), (311)A, (111)A) and, most importantly, it makes possible the growth of bright III-V quantum emitters on substates made of Silicon and Germanium. In this seminar I will introduce some features of growth and photoluminescence spectroscopy of single GaAs/AlGaAs DE nanostructures. In particular I will concentrate on quantum dots and concentric rings addressing some electronic and optical features showing single and correlated photon emission. Finally I will introduce recent advances in the growth of hybrid III-V/IV-IV quantum dots for the implementation of single photon sources up to 80 K on silicon substrate.

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