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DNA-directed assembly of complex plasmonic nanoantennas for controlled radiative properties at optical frequencies

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

Bewilligung: 01.12.2015

Laufzeit: 3 Jahre

Projekt-Website: N/A

Quantum emitters are important building blocks for future integrated quantum technologies as well as for subwavelength resolution microscopy in chemistry and biology. However, the emission properties of quantum emitters are usually rather poor. Plasmonic nanoantennas allow for counterbalancing this disadvantage, provided that the relative arrangements of emitters and antennas are controlled accurately enough. This is extremely difficult with conventional lithography processes, particularly regarding nanometer accuracy, and 2D or 3D nanostructuring. The project will combine expertises in DNA structural technology, plasmonics, and optical spectroscopy to demonstrate functional plasmonic devices fabricated by programmable DNA assembly of metal nanoparticles and quantum emitters in well-defined 2D or 3D architectures. The realization of such plasmonic devices at optical frequencies will enable a variety of potential applications including on-chip circuitry, efficient and bright luminescent markers for subdiffraction microscopy in biology and medicine, and reconfigurable signal routing among nanoscopic receivers via beam steering.

Projektbeteiligte

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