Functionalized DNA-origami for photonic devices

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Optical sensors based on plasmonic nanoparticles allow the detection of low amount analytes with a high sensitivity. For this, novel sensor devices with an exact arrangement of nanoparticles and corresponding high local field-enhancement are necessary. The local field-enhancement depends on material, size, shape and distance of different metal nanoparticles. 2D-DNA-origami [1] is a suitable method to arrange these nanostructures with nanometer precision. Here we use different gold nanoparticles [2] to generate geometrically defined structures with predicted high field-enhancements. For nanolenses, a strong field-enhancement is predicted, thus three nanoparticles should be attached in a linear arrangement using thiolated DNA-oligonucleotides for conjugation. The aim is to variably attach nanoparticles in different sizes and geometries leading finally to the generation of a bow-tie antenna immobilized on DNA-origami rectangles. For the sensor concept, different synthesis and immobilization techniques for the DNA-origami will be presented [3,4].

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