

Building Nano-Lenses Based on DNA Origami Structures

When: Friday, 20 November (2015), 12:00h

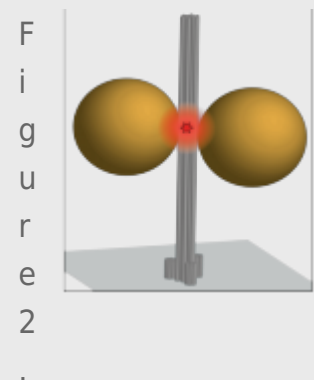
Place: Departamento de Física de la Materia Condensada, Facultad Ciencias, Module 3, Seminar Room (5th Floor).

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Abstract:



In this presentation, we will show how the DNA-Origami technique [1] (Figure 1.) can be introduced for plasmonic and photonic applications. Firstly, we employ DNA-Origami as a platform where metallic nanoparticles as well as single organic fluorophores can be organized with nanometer precision in three dimensions. With these hybrid structures we initially study the nanoparticle-fluorophore interaction in terms of the distance-dependent fluorescence quenching [2] and angular dependence around the nanoparticle [3]. Based on these findings, we build highly efficient nano-lenses (Figure 2.) based on 100 nm gold dimers [4] which are able to strongly focus light into the sub-wavelength region where the fluorophore is positioned and produce a fluorescence enhancement of more than two orders of magnitude [5].



Using this highly confined excitation field we were able to perform single molecule measurements in solution at concentrations as high as $25\mu\text{M}$ in the biologically relevant range. Additionally, we report on a controlled increment of the radiative rate of organic dyes in the vicinity of gold nanoparticles with the consequent increment in the number

of total emitted photons [6,7].

References

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