



ERASMUS MUNDUS



EUROPHOTONICS-POESII MASTER COURSE

PROPOSAL FOR A MASTER THESIS

Dates: 1st April, 2016 – 11th September, 2016

Laboratory : ICFO – Molecular NanoPhotonics, Niek van Hulst group
City, Country : Castelldefels, Barcelona

Title of the master thesis: SCANNING NANOLIGHT SOURCE

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Subject: SCANNING NANOLIGHT SOURCE

This project aims for *extreme resolution* microscopy using advance scanning antenna probes, for application in nano-imaging, especially the photosynthetic membrane. The nanolight source is built on a tapered fibre platform, which provides ample freedom for any shape of antenna, such as dipole and gap-antennas. Design and complexity of optical antennas is essentially only limited by nanofabrication technology. So far some prototypes have been realized by top-FIB-milling with an accuracy of ~5nm. So far most designs are based on two resonant particles in close nanometric proximity, with strong field enhancement in the gap. Choosing a rod or triangle the resonant field can be further engineered to maximize in the gap area of a dipole or a bow-tie antenna. Alternatively a local spike or notch on a resonant structure supports the field enhancement, such as “the E-antenna”.

Next the scanning nanolight source will be used in a scanning probe microscope, to try to resolve individual complexes in a photosynthetic membrane.

Keywords: nanoscale imaging; antenna probes; scanning probe microcopy; NSOM; single molecule detection.

Additional information :

* Required skills: experimental optics; interest in nanofabrication.

* Miscellaneous: initiative is appreciated.