

AVVISO DI SEMINARIO



Nanoantenne plasmoniche e loro modellizzazione con il software CST

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Abstract:

While radiofrequency and microwave antennas are widespread, optical antennas are much less explored. An optical antenna is a device that gives efficient conversion between the propagating light and the localized (sub-wavelength scale) light. At resonance, field enhancement is usually observed. It can be realized by nanometer-sized metallic structures, since they exhibit amazing properties at optical frequencies. When exposed to light, thanks to the coupling to localized collective oscillation of the free electron gas (localised plasmons), the local field near these metal nano-structures can be dramatically enhanced. The spectral range of the resonant frequencies due to the localized plasmon modes is very large to accommodate the bandwidth of light, which contains different colours. Therefore, the nano-structures act as an optical antenna because they can focus light in areas much smaller than the wavelengths, paving the way to achieve nanometric resolution even in optical microscopy/spectroscopy.

The aim of this seminar is to deliver a brief overview of the above mentioned progressive discoveries in the field of localised plasmons in metallic nanostructures. In particular, it will be illustrated how the electromagnetic behaviour of different kind of nanoantennas can be modelled by the software CST Microwave Studio, paying attention to the dependence of plasmonic effects on the shape and size of the nanostructure, as well as on the optical constants of the constituent material.

Fabrizio Gentili received his Laurea Degree from Università di Perugia (with distinction) in Electronic Engineering in February 2010. He spent the last six months of his period of study at the University of Bristol (UK) working on a project for his Master Thesis regarding the electromagnetic modelling of nanoantennas. In March 2010 he joined RF Microtech and worked on projects regarding radar antennas, array antennas and beam forming networks, as well as carrying out a research activity on printed patch antennas. In December 2010 he passed the PhD exam at the Università di Perugia and officially became a PhD student under the advice of Prof. Roberto Sorrentino and started his research activity on microwave filters.