



UNIVERSITÀ
DEGLI STUDI
FIRENZE

“Antennas for Light: Femtosecond Control on the Nanoscale”

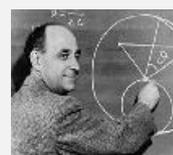
PROGRAMME

11:30: Colloquium

13:00: Lunch with the speaker (all participants are invited at LENS)

Enrico Fermi Colloquium

Friday 28 Nov. 2014 11:30 am



-LENS - Via Nello Carrara 1
-Sesto F.no (Firenze)
-Conference room Querzoli

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ABSTRACT

Antennas for light can be found both at the molecular scale in natural photosynthetic complexes and at the wavelength scale in the form of engineered plasmonic nanoantennas.

The natural antenna systems are efficient in capturing the light and remarkably quantum coherence plays a role in the transfer of the photon energy. Addressing these photosynthetic complexes is quite challenging as the energy transfer occurs on fs time scale over nanometric distances. In this presentation I will focus on the control of excitation, transfer and emission dynamics of molecular antenna complexes, both in space and time, by resonant optical nanoantennas and phase shaped fs pulses.

For spatial control, we scan resonant optical antennas which have local hotspots of 25-40 nm in size. The nanoantenna provides full command over rates, quantum efficiency, polarization, symmetry and even multipole parity of the emission. Exploiting resonant antenna designs the emission can be enhanced up to 1000 times and steered into a narrow forward angular cone.

For temporal control, we exploit phase shaped fs pulses to drive resonant antennas and single quantum systems to dynamically control both their fs response and nanoscale fields. Interestingly when applied to single photosynthetic antenna complexes we find surprisingly long coherent energy transfer times, even at room temperature.

In conclusion, with this presentation I hope to provide insight on the advances and potential of modern photonics at the cross-roads between nm and fs scales.

Klein Colloquium by Marco Mancini: "Direct Observation of coherent inter-orbital spin exchange dynamics"

