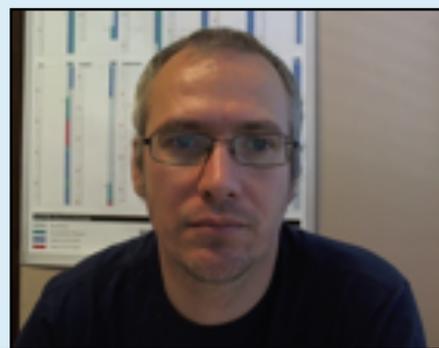


The Use of Optical Pump-Probe Spectroscopies to interrogate Ultrafast Processes in Materials

Dr. Patrick O'Keeffe

Istituto di Struttura della Materia, ISM-CNR

patrick.okeeffe@ism.cnr.it



A new femtosecond laser laboratory, situated in the CNR Research Area of Tor Vergata near Rome, will be presented. The present and future pump-probe spectroscopies employed in the laboratory such as transient absorption, fluorescence up-conversion, pump-probe SNOM microscopy and high harmonic generation, will be outlined. These spectroscopies are used to investigate the ultrafast dynamics of noble metal nanostructures such as dye stabilized gold nanoparticle (NP) aggregates in solution, 2D arrays of NPs on transparent substrates, NPs on SiO₂ nanowires, and variously shaped NPs in solution. We are particularly interested in thermoplasmonics, i.e. the study of the dynamics of how light absorbed by the nanostructure is converted into heat on the nanoscale. Other examples of how these spectroscopies can be employed for the study of dynamics of light absorption in systems such as perovskite solar cells and organic dye molecules will also be discussed.

Dr. Patrick O'Keeffe obtained his BSc degree in Chemistry from the University College Cork in 1996, and completed his PhD at the University of Edinburgh in 1999. After extended periods of postdoctoral work at the University of Oxford, the CNRS and the University "La Sapienza" in Rome, he joined the CNR as a permanent researcher in 2009. Much of his research interests in the above years were concentrated on charged particle gas phase spectroscopy making use of advanced detection systems together with optical lasers, synchrotron radiation and free electron lasers, to study the dynamics of atoms, molecules and clusters. More recently, he has changed his principal research interests to optical femtosecond pump-probe spectroscopy and manipulation of nanomaterials in solution and the study of their interactions with molecules, nanowires, surfaces etc.

Tuesday 18 July 2017, 14:30

ISOF 12 – Meeting Room (1st floor)

CNR Research Area

Via Gobetti 101, Bologna