ICFO Colloquium LUIS LIZ-MARZAN 'Metal Colloids and Assemblies for Nanoplasmonic Biodetection'

LUIS LIZ-MARZAN

February 03, 2017

Friday, February 3, 12:00, ICFO's Auditorium

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Luis M. Liz-Marzan has a Ph.D. from the University of Santiago de Compostela (1992) and was a postdoc at Utrecht University (1993-1995). More recently he has been visiting professor at Tohoku University, University of Michigan, Melbourne University, University of Hamburg, and the Max-Planck-Institute of Colloids and Interfaces in Golm. After holding a chair in Physical Chemistry at the University of Vigo (Spain) from 1995 to 2012, he is currently an Ikerbasque Research Professor and Scientific Director of CIC biomaGUNE in San Sebastian (Spain). He has been Senior Editor of Langmuir (2009-2016) and is currently Co-editor of ACS Omega, as well as editorial advisory board member of various other journals, including Science. He

received several national and international awards and has been listed by Thomson Reuters as Highly Cited Researcher in 2014 and 2015. His current interests include nanoparticle synthesis and assembly, nanoplasmonics, and nanoparticle-based sensing and diagnostic tools.

Metal nanoparticles display very interesting optical properties, related to localized surface plasmon resonances (LSPR), which give rise to well-defined absorption and scattering peaks in the visible and near-IR spectral range. Such resonances can be tuned through the size and shape of the nanoparticles, but are also extremely sensitive towards dielectric changes in the near proximity of the particles surface. Therefore, metal nanoparticles have been proposed as ideal candidates for biosensing applications. Additionally, surface plasmon resonances are characterized by large electric fields at the surface, which are responsible for the so-called surface enhanced Raman scattering (SERS) effect, which has rendered Raman spectroscopy a powerful analytical technique that allows ultrasensitive chemical or biochemical analysis, since the Raman scattering cross sections can be enhanced up to 10 orders of magnitude, so that very small amounts of analyte can be detected. In this communication, we present several examples of novel strategies to employ colloidal nanostructures comprising gold nanoparticles and porous materials in various morphologies, as substrates for ultrasensitive detection of a wide variety of analytes, including relevant biomolecules, which often requires the design of novel techniques for trapping them close to the metal nanostructures.

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