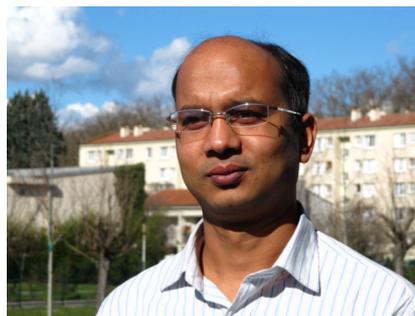


NEXT Invited Scientists

Guest name **Jadab SHARMA**
Position Assistant Professor
Affiliation Centre for Nanoscience and
Nanotechnology
Panjab University
Chandigarh-160014, India
Host laboratory in CEMES, Toulouse
NEXT Group Nanosciences
NEXT contact Dr. Erik DUJARDIN/
(name and e-mail) Erik.Dujardin@cemes.fr
Dates of stay 1 June to 31 July 2016



Brief Biodata

Jadab SHARMA has been associated with the Centre for Nanoscience and Nanotechnology, Panjab University since August 2014. He had completed his PhD degree from National Chemical Laboratory (NCL), Pune (2001-2007) under Prof. K. Vijayamohan Pillai. Prior to joining Panjab University, he was a visiting research collaborator (group lead by Prof. Yian TAI) at National Taiwan University of Science and Technology (NTUST), Taiwan (2013-2014). He had also worked as a senior research scientist at Alent India Research Center (formerly Cookson India Research Center), Bangalore during 2011-2013. He has post-doctoral research experience at CEMES, France (2009-2011), NTUST, Taiwan (2007-2009) and Padova University, Italy (2006-2007).

His current research interest is on third generation solar cells, surface treatment and self-assembly, anisotropic metal nanostructures for applications in nanoplasmonics. He has extensive research collaboration with various national and international teams (India, France, Japan, and Taiwan). He visited France, Italy, Japan and Taiwan for various research projects including visits to USA and UK on business assignments while he was working as a senior research scientist at Alent India Research Centre, Bangalore.

Research project during the visit at NEXT

Descriptive Title : **Effect of alien redox interlayers on the plasmonic properties of hybrid 2D crystals.**

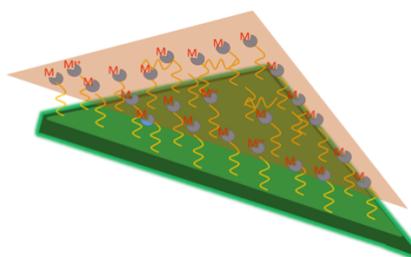


Figure 1. Schematic of an alien redox interlayer between two plasmonic nano-structures

The present stay at CEMES aims at initiating a new stage in the collaboration between J. Sharma's and E. Dujardin's team in which the surface functionalization of gold films and nanoparticles developed by the former would contribute to the functional design of plasmonic devices pursued by the latter.

The objective is to explore the tunability of plasmonic properties of designer metal nanostructures by creating hybrid 2D multilayered structures in which the plasmonic metal is coated with a planar interlayer with tunable and reversible redox properties. Triggering an electronic transition from the redox moieties would locally alter the carrier density and influence the SP-LDOS. The interlayer can also be confined for any volume change in the evanescent region near 2D metallic nanostructures, which will be further investigated for the modulation of the coupling of fluorescent nanoparticles, and thus their emission rate. With the design of the hybrid layered structures defined during the visit of J. Sharma, further systematic synthesis work will be performed afterwards in his laboratory in India, by a starting PhD student. If necessary, more experimental campaign in CEMES will be carried out with the possible visits of the PhD student thanks to student travel grant that J. Sharma will apply to. However, the main focus during the brief visit would be studies on plasmonic modal engineering using a redox interlayer. In addition, J. Sharma will also deliver lectures to degree students and a seminar on general interest.

