

Plasmonics and Applications.

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Abstract:

The effect of localised surface plasmon resonance (LSPR) in noble metal nanoparticles on incident light has been a subject of much recent interest. Potential applications include but are not limited to photovoltaic devices, spectroscopy and sensing and photocatalysis. In the Materials Department we have been investigating the absorption of visible light by spherical, cuboid and prism shaped Ag nanoparticles in two dimensional arrays using a Finite Difference Time Domain algorithm in the visible part of the spectrum. The results of the simulations show that for all shapes considered the absorption reduces as the packing density of the nanoparticles in the array increases. These effects are shown to be more pronounced for the cuboids and prisms. The localised field is also shown to be sensitive to the separation between the nanoparticles in the array and the electric field intensity increases significantly as the spacing reduces. It is considered that spherical nanoparticles are useful for applications where scattering is the important process, such as enhancing the coupling of light into a PV solar cell, whilst particles with sharp edges might find applications where a large localised field is important, such as spectroscopy, sensing and photocatalysis. Current work on novel plasmonics applications in the areas of solar energy harvesting and water splitting will be presented.

MIDP Programme

Following on from the technical talk a presentation on the Malaysian Imperial Doctorate Programme will be given. This is a programme that allows 25 Malaysian students a year to follow a programme of research at Imperial College. The student has a host Malaysian university (UTM, USM, UKM, UPM, UM) and spends a minimum of 1 year in London with the rest of the time in Malaysia. The student will have an Imperial and Malaysian supervisor and the objective is that, as well as gaining an Imperial PhD, the student will develop a research base in their Malaysian university from which they can advance their academic career. For the Imperial supervisor the aim is to develop long lasting research collaborations between their group and Malaysian Universities.