Seminar

Institute for Plasma Research

Title : Molecular sensing using nanoparticle arrays

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Date : 18th April 2018 (Wednesday)

Time : 10.15 AM

Venue : Seminar Hall, IPR

Abstract :

Millions of people around the world are affected by Diabetes which requires frequent monitoring of blood glucose level. Blood glucose levels are monitored by taking blood samples from the patient. So there is an urgent requirement for the development of noninvasive sensing techniques for glucose. Low concentration detection technologies are essential for the development of non-invasive glucose sensor. Noble metal (Silver and Gold) nanoparticles based Surface Enhanced Raman Scattering (SERS) has shown the possibility to detect molecules at very low concentration. SERS based detection of glucose, without using binder molecule, is difficult due to very small Raman scattering cross section of glucose and its very low affinity/ binding with metal nanoparticles. This was overcome by using coupled plasmonic arrays of metal nanoparticles, which produced large field enhancement responsible for higher SERS intensity. It has been observed that the Raman intensity of glucose deposited on patterned Si with silver nanoparticle arrays is higher compared to that on plane Si and plane Si with randomly ordered nanoparticles. The nanoparticle arrays on patterned Si can detect glucose concentration as low as $5x10^{-5}$ g/ml, which is much lower than blood glucose level. The method can be used for the development of low concentration detection technologies for glucose