NONLINEARITY OF SINGLE GOLD NANOSTRUCTURE - DEPENDENCE ON AMBIENT MEDIUM

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KEY WORDS: Photothermal mechanism, nonlinear plasmonics, ambient medium.

Nonlinear plasmonics has potential applications in the field of super resolution microscopy, biosensing, medical diagnosis, thermo plasmonics etc. Optical nonlinearities are inherently weak but can be enhanced by plasmonic effects. Noble metal nanoparticles have well defined plasmonic resonance known as localized surface plasmon resonances (LSPR) are responsible for the enhanced light absorption and scattering. Adding nonlinearity to SPR opens up opportunities for controlling light confinement at nanoscale. We have recently discovered gigantic photothermal nonlinearity in nano plasmonic materials [1]. However the photothermal mechanism has not been understood in detail. As soon as the nanoparticle is heated the surrounding medium also subsequently affected. In the present study we will be demonstrating the effect of ambient medium in the nonlinear behaviour of a single plasmonic nanostructure. This work will pave way to the precise understanding of the physics of plasmonic heating.

[1] S.W. Chu, H.Y. Wu, Y.T. Huang, T.Y. Su, H. L., Y. Yonemaru, M. Yamanaka, R. Oketani, S. Kawata, S. Shoji, and K. Fujita,"Saturation and Reverse Saturation of Scattering in a Single Plasmonic Nanoparticle"*ACS Photonics* **1**, 32–37 (2014).