University of Maryland NSF-MRSEC Highlight

Standing Plasmon Waves on Ag Grating Structures

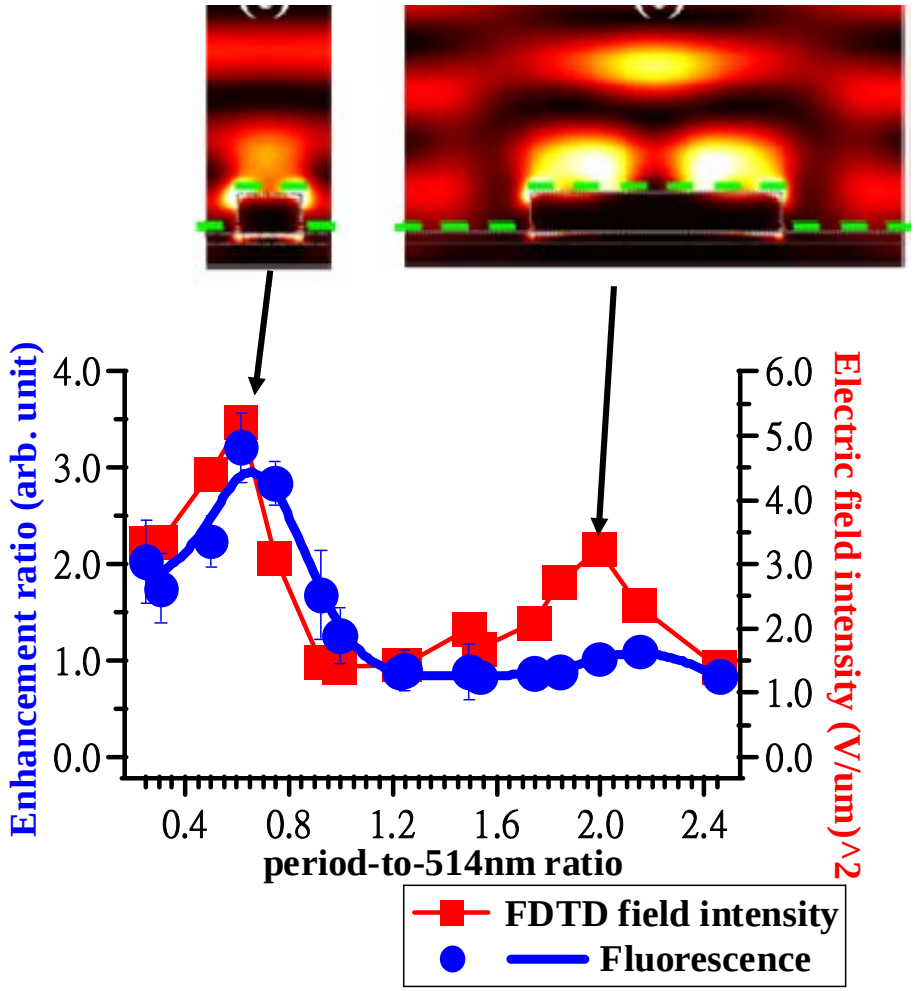
S.H. Guo, D. Britti, J.J Heetderks, H.C. Kan and R. J. Phaneuf

Surface plasmons are light-energy propagating electromagnetic modes trapped at the interface between certain metals (notably gold and silver) and a dielectric. They are also of interest for optical processes enhanced by strong local electric fields

We studied the ***plasmonic properties of silver nanowire gratings*** with varying widths whose center-to-center spacings equaled twice their width. We excite the plasmons by using light at 514 nm wavelength. As the emission intensity of a fluorophore is proportional to the intensity of the local electric field, we experimentally determined the local field intensity by measuring fluorescence from a molecular layer 8 nm above the metal's surface. We compared the experimental results with numerical calculations.

For light polarized along the wire's narrow dimension, the first peak in fluorescence corresponds to the lowest order ***plasmonic standing wave pattern*** across the wire. We find a secondary though smaller peak in fluorescence at what corresponds to the third order standing wave mode.

Calculated field patterns



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