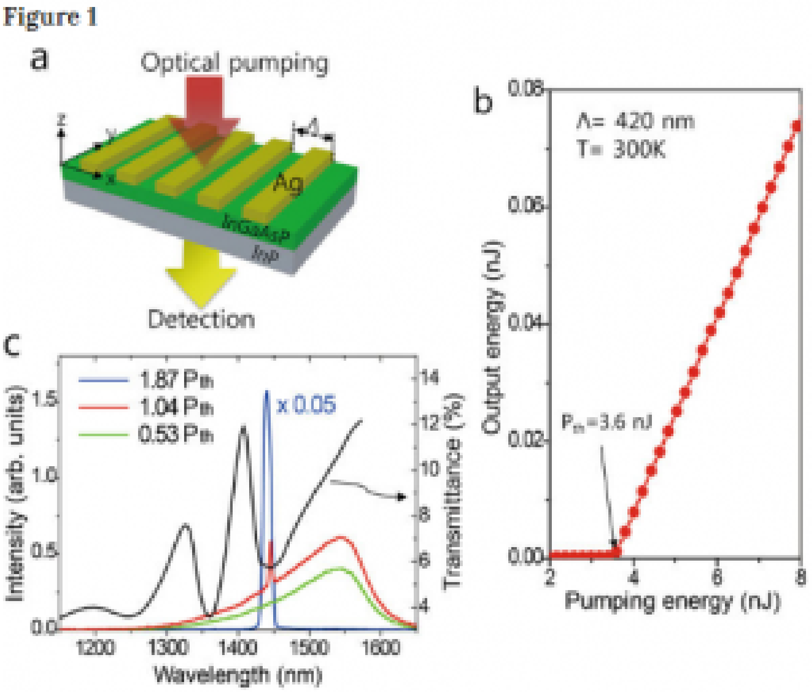
Broadband Surface Plasmon Lasing in One-dimensional Metallic Gratings on Semiconductor



They report surface plasmon (SP) lasing in metal/semiconductor nanostructures, where one-dimensional periodic silver slit gratings are placed on top of an InGaAsP layer. The SP nature of the lasing is confirmed from the emission wavelength governed by the grating period, polarization analysis, spatial coherence, and comparison with the linear transmission. The excellent performance of the device as an SP source is demonstrated by its tunable emission in the 400-nm-wide telecom wavelength band at room temperature. They show that the stimulated emission enhanced by the Purcell effect enables successful SP lasing at high energies above the gap energy of the gain. They also discuss the dependence of the lasing efficiency on temperature, grating dimension, and type of metal.

Source:https://www.nature.com/articles/s41598-017-08355-6

Related paper: Seung-Hyun Kim et al.,Broadband Surface Plasmon Lasing in One-dimensional Metallic Gratings on Semiconductor, *Scientific Reports* **7**, Article number: 7907,(2017).

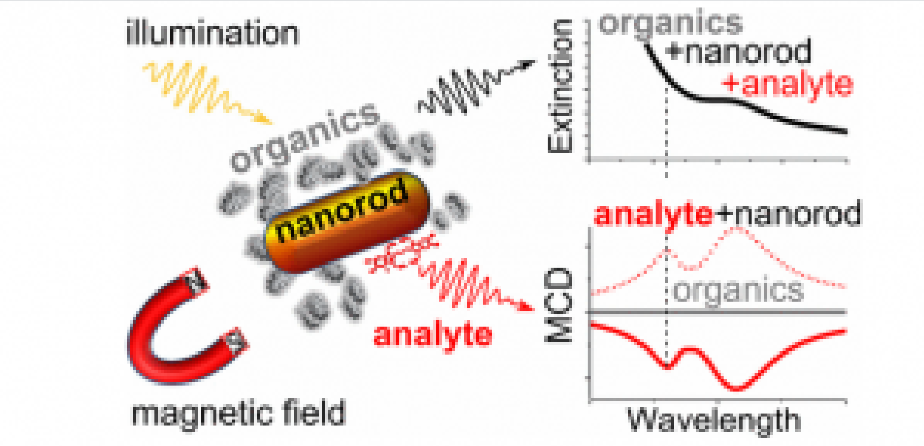
Congratulations on the acceptance of the paper "Localized to Propagating Surface Plasmon Resonance Transition in Ni-Au Magneto-Plasmonic Gratings"

The paper entitled **"Localized to Propagating Surface Plasmon Resonance**

Transition in Ni-Au Magneto-Plasmonic Gratings” is written by Morteza Alizadeh Oskuie under the direct supervision of Dr Seyedeh Mehri Hamidi and it is accepted in the **journal of Superconductivity and novel magnetism**. The abstract is as follows:

Magneto-plasmonic structures, which are the best candidates for different applications, have been the subject of intense research in recent years. In this paper, we proposed new magneto-plasmonic structures based on different uni-dimensional gratings to investigate the localized to propagative surface plasmon resonance transition. For this purpose, simulation of reflectance and also surface plasmon resonance coupling were used in three different fabricated samples compared with nickel thin film under different azimuthaly excitations. The fabricated samples show an enhanced magneto-optical rotation due to the transition of two types of plasmon in the sample with intermediate dimensions. The prospects of magneto-plasmonic response dependency on the azimuthaly excitation are discussed.

[Strong magneto-optical response of non-magnetic organic materials coupled to plasmonic nanostructures]



Plasmonic nanoparticles (PNPs) can significantly modify the optical properties of nearby organic molecules and thus present an attractive opportunity for sensing applications. However, the utilization of PNPs in conventional absorption, fluorescence, or Raman spectroscopy techniques is often ineffective due to strong absorption background and light scattering, particularly in the case of turbid solutions, cell suspensions, and biological tissues. Here they show that nonmagnetic organic molecules may exhibit magneto-optical response due to binding to a PNP. Specifically, they detect strong magnetic circular dichroism signal from supramolecular J-aggregates, a representative organic dye, upon binding to silver-coated gold nanorods. They explain this effect by strong coupling between the J-aggregate exciton and the nanoparticle plasmon, leading to the formation of a hybrid state in which the exciton effectively acquires magnetic properties from the plasmon. Their findings are fully corroborated by theoretical modeling and constitute a novel magnetic method for chemo- and biosensing, which (upon adequate PNP functionalization) is intrinsically insensitive to the organic background and thus offers a significant advantage over conventional spectroscopy techniques.

Source:http://pubs.acs.org/doi/abs/10.1021/acs.nanolett.6b05128

Related paper: Dzmitry Melnikau et al.,Strong Magneto-Optical Response of Nonmagnetic Organic Materials Coupled to Plasmonic

Nanostructures,*Nano Lett.*, 17 (3), pp 1808–1813,(2017).