Photonic Subwavelength Structures and Applications

Applications

• Ultrasensitive sensing
• Raman enhancement
• Surface plasmon enhanced photodetection
• Optical nanoantenna for nanoscale light emitter
• Photonic interconnect
• SPP modulation
• Superresolution imaging

Methodologies

Deep subwavelength photonic structure is an essential component for making metasurfaces/metamaterials with novel emerging optical properties, which proved to be useful for various applications including ultrasensitive sensing, molecular fingerprinting, Raman spectroscopy, optical nanoantenna, and surface plasmon mid-infrared photodetector. However, due to deep subwavelength nature in their dimensions, the fabrication of these metasurface remains challenging. This has become particularly challenging for visible spectrum.

Some Results

Large scale isotropic split ring resonator array

Surface Plasmon Enhanced Mid-IR Photodetector

Metasurfaces for SPP manipulation

Cogwheels for SPP vortex

Au, Ag and Al SRRs from IR to VIS

Metamaterial-based sensor

Group Members

Professor ZHANG Dao Hua
Dr. Landobasa Y. M. Tobing, Dr. Tong Jinchao, Dr. Ni Peinan, Xu Zhengji, Qiu Shupeng, Aaron Mueller, Qian Li

Email: edhzhang@ntu.edu.sg
Tel: +65 6790-4841

Acknowledgment:
Financial support from EDB, A*STAR, MOE, NRF, AOARD

Related Publications

• L. Y. M. Tobing, et al., Advanced Materials, DOI: 10.1002/adma.201504061
• S. Kou et al., Light: Science & Applications (2016) e16034
• Xu et al, Optics Express, 23(17), 22883-22889 (2015)
• Tong et al, to be published.

www.optimus.eee.ntu.edu.sg