Two-Dimensional Optical Metasurfaces: From Plasmons to Dielectrics

Posted: May 6, 2019

Metasurfaces, kinds of planar ultrathin metamaterials, are able to modify the polarization, phase, and amplitude of physical fields of optical light by designed periodic subwavelength structures, attracting great interest in recent years. Based on the different type of the material, optical metasurfaces can be separated in two categories by the materials: one is metal and Read More...

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Optics in Computing: from Photonic Network-on-Chip to Chip-to-Chip Interconnects and Disintegrated Architectures

Posted: May 3, 2019

Following a decade of radical advances in the areas of integrated photonics and computing architectures, we discuss the use of optics in the current computing landscape attempting to re-define and refine their role based on the progress in both research fields. We present the current set of critical challenges faced by the computing industry and Read More...

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Enhanced Quality Factors of Surface Lattice Resonances in Plasmonic Arrays of Nanoparticles

Posted: April 22, 2019
The experimental demonstration of narrow resonances in arrays of metallic nanoparticles was more elusive due to limitations in the quality of samples and the use of focused beams. Kravets et al. reported ultranarrow plasmonic resonances in asymmetric (different refractive indexes in the upper and lower media) arrays of Au nanoparticles. Shortly after, Auguié and Barnes Read More...

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Laser-synthesized TiN nanoparticles as promising plasmonic alternative for biomedical applications

Posted: April 14, 2019
Exhibiting a red-shifted absorption/scattering feature compared to conventional plasmonic metals, titanium nitride nanoparticles (TiN NPs) look as very promising candidates for biomedical applications, but these applications are still underexplored despite the presence of extensive data for conventional plasmonic counterparts. Here, we report the fabrication of ultrapure, size-tunable TiN NPs by methods of femtosecond laser ablation Read More...

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Biosensor Could Scale New Sensitivity Heights

Posted: April 10, 2019
Researchers in Switzerland and Australia have brought together the physics of dielectric metasurfaces and hyperspectral imaging to create an ultrasensitive, label-free biosensing platform. The team believes that the platform—reportedly capable of detecting and analyzing samples at spatial concentrations of less than three molecules per square micron—could ultimately enable compact portable diagnostics for personalized medicine. It Read More...

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Toward Nanoparticle “Night-Vision Goggles”

Posted: April 1, 2019
Researchers in China and the United States have reported the creation of upconversion nanoparticles (UCNPs) that can latch onto retinal photoreceptors and serve as tiny antennae for otherwise invisible near-infrared (NIR) light, converting it into a visible signal. The research team found that mice injected with the photoreceptor-binding nanoparticles were able not only to perceive Read More...

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Magnetoplasmonics in nanocavities: Dark plasmons enhance magneto-optics beyond the intrinsic limit
of magnetoplasmonic nanoantennas

Posted: March 26, 2019
Enhancing magneto-optical effects is crucial for size reduction of key photonic devices based on non-reciprocal propagation of light and to enable active nanophotonics. We disclose a so far unexplored approach that exploits dark plasmons to produce an unprecedented amplification of magneto-optical activity. We designed and fabricated non-concentric magnetoplasmonic-disk/plasmonic-ring-resonator nanocavities supporting multipolar dark modes. The broken Read More...

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NIR Imaging System Could Help Identify Hard-to-Detect Cancers at Earlier Stage

Posted: March 17, 2019
CAMBRIDGE, Mass., March 12, 2019 — An optical imaging system developed by MIT researchers could enable physicians to identify tiny tumors deep within the body, leading to earlier detection and treatment of cancer. The researchers call their system DOLPHIN, which stands for “Detection of Optically Luminescent Probes using Hyperspectral and diffuse Imaging in Near-infrared.” The Read More...

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Light-controlled nanomaterials are revolutionizing sensor technology

Posted: March 11, 2019
Writing in Scientific American in 2007, Harry A. Atwater of the California Institute of Technology predicted that a technology he called “plasmonics” could eventually lead to an
array of applications, from highly sensitive biological detectors to invisibility cloaks. A decade later various plasmonic technologies are already a commercial reality, and others are transitioning from the laboratory to Read More...

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**Microchannel-based plasmonic refractive index sensor for low refractive index detection**

Posted: March 3, 2019

A microchannel incorporated photonic crystal fiber (PCF)-based surface plasmon resonance (SPR) sensor for detection of low refractive index (RI) at near-infrared wavelength is presented in this paper. To attain a simple and practically feasible mechanism, plasmonic material gold (Au) and sensing medium are placed outside the fiber. A thin layer of TiO2 is employed as Read More...

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