Room I (203)

Session Title 25I2 / [T10] Plasmonics and Subwavelength Structures
Date & Time Tuesday, 25 August, 13:45 ~ 15:15
Session Chair Hyunyong Choi (Yonsei University, Korea)

[25I2-1] 13:45~14:15 Invited Talk

Localized Toroidal Dipole Moment of Spoof Surface Plasmon Polaritons

Sang Soon Oh[1], John J. Wood[1], Seong-Han Kim[2], Chul-Sik Kee[2], and Ortwin Hess[1]
[1]Imperial College London, UK, [2]GIST, Korea

At infrared wavelengths, we demonstrate subwavelength scale localization of spoof surface plasmon polaritons. Based on an analytical model and numerical simulations, we show that the defect mode has toroidal dipole moment and high Q factor.

[25I2-2] 14:15~14:30

Lossy Plasmonic Resonances in Nanoparticles for Broadband Light Absorption

Satoshi Ishii[1,2], Ramu Sugavaneshwar[1,2], Kai Chen[1,2], Thang Dao[1,2], and Tadaaki Nagao[1,2]
[1]National Institute for Materials Science, Japan, [2]JST, Japan

We show with experiments that localized surface plasmon resonances in conductive nitride nanoparticles result in broadband light absorption covering solar spectrum. The nitride nanoparticle dispersed water was warmed and generated vapor efficiently by sunlight illumination.

[25I2-3] 14:30~14:45

Optical Characterization of a Single Dielectric Nano-antenna Fabricated by Electron Beam-induced Deposition

Eun-Khwang Lee[1], Jung-Hwan Song[1], Kwang-Yong Jeong[2], Ju-Hyung Kang[2], Hong-Gyu Park[2], and Min-Kyo Seo[1]
[1]KAIST, Korea, [2]Korea University, Korea

We investigated the optical properties of a single dielectric nano-antenna fabricated by electron beam induced deposition. Polarization-resolved dark-field spectra showed that both transverse-magnetic and transverse electric resonances are supported and tuned over the visible wavelength range.

[25I2-4] 14:45~15:00

3D Plasmonic Focusing with a Spiral Taper Anchored on a Fiber Tip

Jiafang Li, Zhiguang Liu, Jiajia Mu, Xiaomei Gao, Wuxia Li, Changzhi Gu and Zhi-Yuan Li
Chinese Academy of Sciences, China

Based on a spiral taper that possesses polarization-insensitive three-dimensional (3D) plasmonic focusing properties, here we show that subwavelength 3D plasmonic focusing is readily achieved by integrating this spiral taper on a fiber tip. This portable fiber-integrated taper may find great potentials in near-field optics, high resolution fiber endo-devices, as well as bio-nanophotonic applications.

[25I2-5] 15:00~15:15

Photoluminescence Properties of Carbon-Nanomaterial Doped Solid Films Coupled to Plasmonic Optical Nano-Antennas

Chi-Tsu Yuan
Chung Yuan Christian University, Taiwan

Luminescent carbon based nanomaterials such as carbon dots and graphene quantum dots (GQDs) have attracted much attention owing to some unique properties, including wavelength-dependent emission, better photo-stability and chemical inertness, thus can be severed as efficient nano-scale light sources for promising applications in optoelectronics and bio-photonics. Despite aforementioned advantages, the main challenge is their moderate photoluminescence quantum yields, in particular, when they are brought away from their original solution to form solid films for optoelectronic applications such as light-emitting devices, thus need to be enhanced further for practical uses. Here, the photoluminescence (PL) properties of GQD doped solid films coupled to plasmonic optical nano-antennas are investigated using time-correlated single-photon counting technique, in particular, focusing on the modification of PL emission (including fluorescence, delayed fluorescence, and phosphorescence) by the excitation of surface plasmons and coupled plasmons.

Room J (204)

Session Title 25J2 / [T12] Silicon Photonics Integration
Date & Time Tuesday, 25 August, 13:45 ~ 15:15
Session Chairs Ken Morito (PETRA, Japan)
Hyo-Hoon Park (KAIST, Korea)

[25J2-1] 13:45~14:15 Invited Talk

Silicon Photonic Integration Platform for Optical Communications and Other Applications

Hiroshi Fukuda
NTT, Japan

This paper describes recent progress in silicon photonics integration technology and related developments in optical communications and other applications. A new design concept for integrated photonic circuits and an application for tera-hertz generation are discussed.

[25J2-2] 14:15~14:30

CMOS-compatible Athermal 400GHz-spaced MZI Interleaver

Jong-Moo Lee[1], Min-Su Kim[1], Claudio J. Oton[2,3], Maryse Fournier[4], Pierre Labeye[4], and Francesco Testa[5]
[1]ETRI, Korea, [2]Scuola Superiore Sant'Anna, Italy, [3]Consorzio Nazionale Interuniversitario per le Telecomunicazioni, Italy, [4]CEA Leti, France, [5]Ericsson, Italy

400GHz spaced MZI interleaver is designed and fabricated on a SOI wafer by fully CMOS compatible process. The width and length of the MZI are optimized to reduce the temperature-dependent wavelength shift without using a negative thermo-optic material.

[25J2-3] 14:30~14:45

Wideband Slow Light Effects in 25 Gbps Si Photonic Crystal Mach-Zehnder Modulators

Yosuke Hinakura, Yosuke Terada, Takuya Tamura, and Toshihiko Baba
Yokohama National University, Japan

We evaluated wideband 25 Gbps error-free operation of Si slow light modulators. The fluctuation in extinction ratio was 1 dB over the bandwidth. Larger group indices produce larger extinction ratios and lower bit error rates.

[25J2-4] 14:45~15:00

Avalanche Photodiode Operation of Si Photonic Crystal Modulator

Yosuke Terada, Kenji Miyasaka, Hiroyuki Ito, and Toshihiko Baba
Yokohama National University, Japan

We observed the avalanche photodiode operation through defect levels at telecom band in Si photonic crystal slow light modulator. Maximum responsivity was 0.71 A/W with 350 avalanche gain. The eye opened at 20 Gbps.

[25J2-5] 15:00~15:15

A Nanomembrane-Based Bandgap-Tunable Ge Microdisk for Si-Compatible Optoelectronics

Donguk Nam[1], David Sukhdeo[2], Ju-Hyung Kang[2], Mark Brongersma[2], and Krishna Saraswat[2]
[1]Inha University, Korea, [2]Stanford University, USA

We present a new, CMOS-compatible platform for inducing a large, spatially homogeneous biaxial strain in Ge microdisks. This platform can deliver substantial performance improvements to biaxially strained Ge lasers for silicon-compatible optical interconnects.