

## Room E (107)

**Session Title** 28E2 / [T05] Plasmonics and Metamaterials IX  
**Date & Time** Friday, 28 August, 11:00 ~ 12:30  
**Session Chair** Hong-Gyu Park (Korea University, Korea)

[28E2-1] 11:00~11:15

### Fiberized Plasmonic Fresnel Zone Plate for Wavelength Dependent Position Tunable Optical Trapping

*Hyuntae Kim, Luis Alonso Vazquez-Zuniga, Jinseob Kim, Kyoungyoon Park, Dongyeul Lee, Seungsoo Hong, and Yoonchan Jeong*  
*Seoul National University, Korea*

We propose a Fresnel metal plate on top of a fiber facet for wavelength-dependent position tunable optical trapping. We achieved a tunable trapping range of 10.79  $\mu\text{m}$  among a wavelength shift of 505 nm.

[28E2-2] 11:15~11:30

### Analysis of Plasmonic Mach-Zehnder Modulator with Metal Taper Structure Embedded in FTC-EO Polymer

*Naoya Hojo, Tomohiro Amemija, Zhichen Gu, Nobuhiko Nishiyama, and Shigehisa Arai*  
*Tokyo Institute of Technology, Japan*

We analyzed a Mach-Zehnder plasmonic modulator with metal-insulator-metal structure embedded by the FuranThiophene Chromophore.  $\pi$ -phase shift between two Mach-Zehnder arms can be obtained with a device length of 6.5  $\mu\text{m}$  and the figure of merit of 3.1.

[28E2-3] 11:30~11:45

### Gain-assisted Propagation of Surface Plasmons in Nanodisk Resonator

*Genquan Han, Yan Liu, and Jing Yan*  
*Chongqing University, China*

Gain medium is introduced into the nanodisk resonator to enable loss-negligible surface plasmon polaritons propagation in near-infrared wavelengths, which benefits the applications of switches and lasers based on SPPs in the planar optoelectronic densely integration.

[28E2-4] 11:45~12:00

### Optical Properties of Metallic Nanocuboid Dimer Connected by Conductive Bridge

*Mingsi Zhang, Yudong Li, Jingjun Xu, and Qian Sun*  
*Nankai University, China*

When a conductive bridge is inserted into metallic dimer, the charge transfer and the bonding dimer plasmon mode can redshift and blueshift hundreds nanometers by shifting the bridge less than 50 nm, respectively.

[28E2-5] 12:00~12:15

### Layered Semiconductor GeS: a Metamaterial With Extremely Low Refractive Index

*Abdurrahman Ozturk<sup>1</sup> and Rauf Suleymanli<sup>2</sup>*  
*<sup>1</sup>Marmara University, Turkey, <sup>2</sup>Gebze Technical University, Turkey*

Reflection and transmission optical spectra of layered semiconductor GeS are investigated. It is shown, that this semiconductor can be considered as natural metamaterial with extremely low,  $n=0.14$ , refractive index in wide spectral region,  $\lambda=0.8-1.0 \mu\text{m}$ .

[28E2-6] 12:15~12:30

### The Meaning of Enhancement in Hybrid Horizontal Slot Microdisk Whispering Gallery Mode Resonator with Gold Particles

*Nabila Khrisna Dewi and Jung H. Shin*  
*KAIST, Korea*

Horizontal slot microdisk resonator attached with gold particles is simulated using FDTD resulting hotspot existence in the vicinity of gold. The field enhancement is detected, especially for diameter less than 8  $\mu\text{m}$ .

## Room F (108)

**Session Title** 28F2 / [T07] Optical Metrology and Sensing X  
**Date & Time** Friday, 28 August, 11:00 ~ 12:30  
**Session Chair** In-Ho Bae (KRISS, Korea)

[28F2-1] 11:00~11:15

### Unfolding of Optical Singularities in Vector Laguerre-Gaussian beams

*Sunil Vyas<sup>1</sup>, Yuichi Kozawa<sup>2</sup>, Shunichi Satō<sup>2</sup>, and Yoko Miyamoto*

*<sup>1</sup>The University of Electro-Communication Tokyo Japan, Japan, <sup>2</sup>Tohoku University, Japan*

An analysis of unfolding of inhomogeneous polarization distribution of the vector Laguerre-Gaussian beam into polarization singular structure is presented. A linearly polarized Gaussian beam is used as a reference beam to probe the vector singular behavior of the beam. It is found that the singularity at the center of the beam disappears and it appears as the peripheral V-points with characteristic polarization distribution. Different kinds of V-point singularity is observed in the beam cross section. During propagation these vector singularities transformed into polarization singularity triplets. The present result have important implication in understanding the finer structural details of the cylindrically polarized vector beams.

[28F2-2] 11:15~11:30

### Estimation of Refractive Index of Crystal Plate from Haidinger Fringes

*Ryu Jun Yeol<sup>1</sup>, Choi Hee Joo<sup>1</sup>, Lee Choong Hwan<sup>1</sup>, Jin Jongha<sup>2,3</sup>, and Cha Myoungsik<sup>1</sup>*

*<sup>1</sup>Pusan National University, Korea, <sup>2</sup>KRISS, Korea, <sup>3</sup>Korea University of Science and Technology, Korea*

We proposed and realized an accurate method for measuring the refractive index and physical thickness of a transparent wafer by analyzing the Haidinger fringes. Simply, we took transmitted Haidinger fringes caused by multiple reflections at the back and rear surfaces of the wafer, which worked as a Fabry-Perot etalon. The refractive index was determined by analyzing the interferogram obtained in terms of an incidence angle at a single-shot. Based on the proposed method, the absolute value of the refractive index of a LiNbO<sub>3</sub> wafer was estimated with an overall uncertainty of  $10^{-4}$ .

[28F2-3] 11:30~11:45

### Cosine Apodization of In-Fiber Acousto-Optic Gratings for Sensing Application

*Kwang Jo Lee<sup>1</sup> and Hyun Chul Park<sup>2</sup>*

*<sup>1</sup>Kyung Hee University, Korea, <sup>2</sup>POSCO, Korea*

We present a novel cosine-apodization scheme for optical fiber-based acousto-optic gratings. The technique is based on the modulation of coupling strength by the combination of fiber twist and input acoustic polarization.

[28F2-4] 11:45~12:00

### All-Fiber Variable Polarization Rotator Based on Geometric Effects

*Il-Kyu Han, Jaekwon Ko, and Byoung Yoon Kim*  
*KAIST, Korea*

We demonstrate a simple all-fiber variable polarization rotator based on geometric effects. The device rotates the orientation of polarization minimizing the change in other parameters of the polarization state. The rotation angle is controlled by a simple mechanical adjustment.

[28F2-5] 12:00~12:15

### Strain Characteristics of a Photonic Crystal Fiber with Two Birefringent Cores in the Sagnac Loop

*Youngjoo Chung and Khurram Naeem*  
*GIST, Korea*

We experimentally investigated the strain sensing characteristics of two types of the high-birefringent two-core photonic crystal fibers (HB-TCPCF) in the Sagnac loop configuration using phase-monitoring method, where each elliptic core in a typical birefringent fiber independently forms a distinct Sagnac loop interferometer.

[28F2-6] 12:15~12:30

### Radiation in 45-Degree tilted Fiber Bragg Gratings

*Nai-Hsiang Sun<sup>1</sup>, Shih-Cing Lei<sup>1</sup>, Yu-Wei Liu<sup>1</sup>, Jung-Sheng Chiang<sup>1</sup>, and Wen-Fung Liu<sup>2</sup>*  
*<sup>1</sup>I-Shou University, Taiwan, <sup>2</sup>Feng Chia University, Taiwan*

Surface-normal radiation of 45° tilted fiber gratings are fabricated and measured. A 3-minute exposure time of tilted FBGs can cause -15 dB radiation efficiency, while a 1.5-minute exposure time can create the radiated efficiency of -16.2 dB.