Room E (107)

Session Title 27E1 / [T05] Plasmonics and Metamaterials VII
Date & Time Thursday, 27 August, 11:00 ~ 12:30
Session Chair Renmin Ma (Peking University , China)

[27E1-1] 11:00~11:30 Invited Talk

Scattering Superlens: Near-field Focusing and Imaging Exploiting Multiple Scattering in Turbid Media

Yong Keun Park

KAIST, Korea

We demonstrate that multiple scattering can be controlled via wavefront shaping in order to obtain a subdiffraction limited focus at an arbitrary position and the full-field dynamic sub-wavelength imaging. Due to the random structure of the highly scattering media there are no restrictions on the physical position of the focus giving the system a high degree of freedom. We also present that the full-field dynamic sub-wavelength imaging can be obtained by transferring the optical near-field intopropagating far-field components by multiple light scattering from disordered nanoparticles, which was previously demonstrated in microwave regime.

[27E1-2] 11:30~11:45

Numerical Demonstration of Deterministic Spatiotemporal Control of Localized Plasmon Pulses at Metallic Nanostructures by Light Wave Shaping

Yasuhiro Kojima, Yuta Masaki, Kazunori Toma, Kenichi Hirosawa, and Fumihiko Kannari

Keio University, Japan

We numerically demonstrate spatiotemporal control of ultrafast localized plasmon pulses at metallic nanostructures. This results confirm that more flexible spatiotemporal control can be achieved by femtosecond laser pulses combined with wave front and pulse shaping.

[27E1-3] 11:45~12:00

Focusing Surface Plasmon Polaritons through a Disordered Nanohole Structure

Eunsung Seo[1], Joonmo Ahn[2], Wonjun Choi[1], Hakjoon Lee[1], Young Min Jhon[2], Sanghoon Lee[1], and Wonshik Choi[1]

[1]Korea University, Korea, [2]KIST, Korea

Control of near-field waves is the key to going beyond the diffraction limit. Here we present the focusing of plasmonic waves, a type of near-field waves, by the wavefront shaping of far-field waves. We coupled far-field illumination to a disordered nanoholes on a thin gold film to generate speckled plasmonic waves. By controlling the phase pattern of the incident waves at the excitation wavelength of 637 nm, we demonstrated the focusing of surface plasmon polaritons (SPPs) down to 170 nm at arbitrary positions. Our study shows the possibility of using disordered nanoholes as a plasmonic lens with high flexibility in the far-field control.

[27E1-4] 12:00~12:15

Tunable Tamm Plasmon Modes at Metal-Photonic Crystal Interface

Che-Yuan Chang, Yi-Hsun Chen, Mong-Yin Lin, and Kuo-Ping Chen

National Chiao-Tung University, Taiwan

Tamm plasmon (TP) modes happening at photonic crystals with different metals are studied using admittance loci. At visible wavelength, silver TP provides ultra-sharp resonance with FHWM = 1.5 nm, which is tunable by using different photonic crystals.

[27E1-5] 12:15~12:30

Resonant Absorption and Amplification of EM Waves in Stratified Chiral Media

Seulong Kim and Kihong Kim

Ajou University, Korea

The mode conversion and the resonant absorption and amplification phenomena occurring in inhomogeneous chiral media are theoretically studied. Mode conversion is found to occur when the medium contains regions where at least one of the effective refractive indices corresponding to two circular polarizations vanishes. Resonant absorption and enhancement phenomena are useful for designing efficient absorbers and nonlinear photonic devices.

Room F (108)

Session Title 27F1 / [T07] Optical Metrology and Sensing VII
Date & Time Thursday, 27 August, 11:00 ~ 12:30
Session Chairs Labao Zhang (Nanjing University, China)
Kwang Jo Lee (Kyunghee University, Korea)

[27F1-1] 11:00~11:30 Invited Talk

Optical Observation of DNA Translocation Dynamics through Solid-State Nanopores

Hirohito Yamazaki, Shintaro Itoh, Keiko Esashika, and Toshiharu Saiki

Keio University, Japan

We report an optical nanopore detection system for investigating DNA translocation dynamics through a nanopore at sub-millisecond and sub-100-nm resolutions. The proposed optical nanopore detection scheme enables the observation of both the translocation process and the escape process. We found different correlation between the translocation time and the escape time, depending on whether the translocation occurs in a folded or unfolded configuration.

[27F1-2] 11:30~11:45

Wide-field Heterodyne En-face OCT System for Vibration Measurement of Internal Surfaces

Samuel Choi, Fumiaki Nin, Takamasa Suzuki, and Hiroshi Hibino

Niigata University, Japan

Multi-frequency-swept OCT adopting the wide field heterodyne detection technique is demonstrated for high-speed 3D Vibration measurements. The axial resolution and the accuracy of vibration amplitude measurement were estimated to be 2.5 μm and 1.3 nm, respectively.

[27F1-3] 11:45~12:00

Design and Simulation of Light Source Integrated Photonic Crystal Nanobeam Biosensor

Gyeyoung Kim and Jung H. Shin

KAIST, Korea

We report on design and simulation results of a SiN photonic crystal waveguide integrated with silicon quantum dot lights source for low-cost, high-performance biosensor on a chip.

[27F1-4] 12:00~12:15

Phase Relationship of Photodetected Signals of an Optical Feedback Interferometry Sensor

Jalal Al Roumy, Julien Perchoux, and Thierry Bosch

The Centre National de la Recherche Scientifique-Laboratory for Analysis and Architecture of Systems, France

Optical Feedback Interferometry signals can be acquired by photodetection either from rear or front facet of the laser. We present a model that links both signals to the injection current. The comparison with experimental results validates the model.

[27F1-5] 12:15~12:30

A Self-Mixing Effect Based Fiber-Optic Acoustic Sensor Using Oil Surface as an Optical Reflector

Lutang Wang, Nian Fang, and Zhaoming Huang

Shanghai University, China

A novel fiber-optic acoustic sensor based on the laser self-mixing effect is presented, which consists of an oil-immersible ferrule-type sensor probe capable of working inside the power transformer to detect the partial discharge induced ultrasonic waves. General principles are described and experimental results are presented.