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Plasmonics: Nanoimaging, Nanofabrication, and Their Applications IV

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Introduction

This proceedings contains papers presented at the 2008 SPIE Optics & Photonics conference titled Plasmonics: Nanoimaging, Nanofabrication, and Their Applications IV, held in San Diego, California, 10–14 August 2008. The aim of the conference was to bring together specialists from diverse research areas and to provide a forum for the exchange of information on latest progress of plasmonics, to accelerate their applications, and to look at the directions in which research in this field is leading us.

The conference and proceedings have been divided into 18 sessions. In the first session, papers are related to nanofabrication and lithography, such as designing hierarchical plasmonic materials, fabrication of metallic nanostructures with combination of laser nanolithography and selected surface metallization, fabricating plasmonic components for nanophotonics, and parallel architecture based on optical near-field interaction.

The second and third sessions are on plasmonic spectroscopy, including surface-enhanced Raman spectroscopy on nanolithography-prepared substrates, plasmonic interactions in surface-enhanced spectroscopy and microscopy, nanoscale characterization and spectroscopy of strained silicon, and probing the plasmonic local density of states with electron energy loss spectroscopy. The fourth and fifth sessions focus on nano-imaging, specifically on attosecond nanoplasmonic field microscope, ultrahigh resolution Raman imaging by optically trapped dielectric microsphere, nanofocusing and dispersion control in plamonic waveguides, nanoscale coupling effects on single particle microscopy, and imaging with a nanohole array.

The sixth session is on nanosensing. Plasmon hybridization at medal nanostructures as a route to sensitive optical detection was reported. The seventh, eighth, and ninth sessions deal with manipulation of plasmonic effects. Spectral and spatial mode engineering of plasmonic cavities and waveguides, nanoplasmonics in near-field optics and active coupling, integrated surface plasmon routing, nanophotonic components utilizing channel plasmon polaritons, surface plasmon generation and detection with integrated organic semiconductor devices, plasmonic waveguides with wavelength selective function, terahertz wave propagation in structured metals, and near-field optical phase antennas or long-range plasmon coupling were presented.

The tenth and eleventh sessions are on plasmonics, especially on nanoparticle optical property modeling, metallic nanoparticle arrays: a common substrate for both SERS and SEIRA, plasmonic coupling of silver nanoparticle arrays with sub-10nm gaps, beyond gold nanospheres for plasmonic applications, light-induced forces in plasmonic spheres, cooperative plasmon-mediated fluorescence near a

metal nanoparticle, surface plasmons, absorption and emission in gold-silica-dye hybrid nanoparticles, and surface plasmon resonance linear and nonlinear response in a single metal nanoparticle.

The twelfth, thirteenth, and fourteenth sessions are related to plasmonic materials, including color-imaging through plasmonic nanolens, controlling of the optical transparency of meta-materials with a strong DC magnetic field, optical studies of plasmonic matematerials, between the looking-glasses: negative refraction, superlensing, and field-effect modulation in metal-insulator-metal waveguides, squeezing optical signals through epsilon-near-zero plasmonic channels, plasmonic metamaterials and their applications in novel terahertz devices, and plasmonic metamaterials and their applications.

The fifteenth to eighteenth sessions are devoted to nanoplasmonic applications, including engineered surface plasmon resonances for biodetection, intergrated photonics and non-linear optics, design and fabrication of micro/nanoscale plasmonic waveguide devices aimed for VLSI photonic circuit application, configuration and evaluation of nanophotonics devices and systems, gold nano-stoves, controlled thermal emission of two-color polarized infrared light from arrayed plasmon nanocavities, nanoscale surface-emitting semiconductor plasmon lasers, the strength of surface plasmons, harnessing the photothermal response of plasmonic nanostructure for actuation applications: expanding options in cancer therapy, reduced scattering of a nanostructured particle of film, and plasmonic nanoparticle scattering for enhanced performance photovoltaic and photodetector devices.

However, please notice that some of the papers presented at the conference were published elsewhere; therefore, these proceedings only include partial contributions of the conference.

Satoshi Kawata
Vladimir M. Shalaev
Din Ping Tsai