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Nota di contenuto	Part I Lectures -- Nanoplasmonics: Fundamentals and Applications -- Transformation Optics -- Localized Light-Matter Interactions with Optical Antennas -- Biosensing Instrumentation -- Ultrafast Photonics with Microstructures Fibers -- Prospects of Molecular Scale Logic Gates and Logic Circuits -- Tunability of Plasmonic Devices -- Novel Plasmonic Probes and Smart Superhydrophobic Devices, New Tools for Forthcoming Spectroscopies at the Nanoscale -- Narrow-linewidth Lasers on a Silicon Chip -- Integrated Optomechanics: Opportunities for Tunable Nanophotonic Devices -- Fluorescence-Based Studies of Nanoparticles -- Incandescent Lamp-Like White-Light Emission from Doped and Undoped Oxide Nanopowders -- An Approach in the Structural and Spectroscopic Analysis of Yb3+-doped YAG Nano-ceramics by Conjugation of TEM-EDX and Optical Techniques -- Taking Microcavity Label-free Single Molecule Detection deep into the Protein Realm -- Fluorescence and Raman Scattering in Plasmonic Nano-

structures: From Basic Science to Applications -- Principles and Applications of Rare Earth Ion-doped Nanoparticles -- Nanostructures in the Terahertz Range -- Nanomaterials for Lighting and Solar Energy Conversion -- Part II Interdisciplinary Lecture -- The Discovery of the Higgs Particle -- Part III Short Seminars -- Chemical and Strain Engineering of Functional Oxides -- Gold Photonic Crystals and Photonics Quasi-Crystals for Reproducible Surface-Enhanced Raman Substrates -- Mid-Infrared Surface Plasmon Polariton Sensors Resonant with the Vibrational Modes of Phospholipid Layers -- Structural and Spectroscopic Properties of Er3+:CdNb2O6 Phosphors -- Antibody Anchoring on QCM Gold Surfaces by UV Based Strategy -- Spectroscopic Properties of New Cubic Tungstates Doped with Eu3+ and Yb3+ Ions -- The Role of Surface Plasmon Resonance in Enhanced Transmission through Metallic Gratings -- Experimental Observation of Self-organized Nanostructures in Layered Crystals -- Nano-structuring for Molecular Motor Control -- Fingerprint Imaging Enhancement by Deposition of Columnar Thin Films Nanostructures -- Analytic Solution of the Rabi model -- Microscroll Invisibility Cloak -- The Identification of the Inorganic Pigments in the Cultural Heritage Objects using Surface-enhanced Raman Scattering -- Polymeric Microresonators for Biosensing Applications -- On the Possibility of Indicating Protein Conformational Changes via Energy Transfer between Intrinsic Fluorophores -- Part IV Posters -- Surface Plasmons and Strong Light-Matter Coupling in Metallic Nanoshells -- Photoluminescence and Electroluminescence Characterization of a-Si:H/c-Ci Interfaces -- Structural, Optoelectronic and Electrical Properties of GaAs Microcrystals Grown from (001) Si Nano-areas -- Plasmonic Sensors for Aromatic Hydrocarbon Detection -- Optical Annealing of Black Silicon -- Strongly Confined Gap Plasmon Modes in Graphene Sandwiches and Graphene-on-silicon -- Investigation of Polarized Light Emitting Diode -- Linking Optical Properties and Nanostructure of NiCrOx Cermet Nanocomposite for Solar Thermal Application -- Ultrafast Active Control of Plasmonic Resonances at THz Frequencies -- An Eigenvector Expansion Method for Localized Plasmon Modes: Application to Extinction and Electron Energy Loss Spectra of Isolated and Coupled Metallic Nanoparticles -- Characterisations of New Nd3+-Doped Scheelite-Type Molybdates for Laser Materials -- Cluster Implantation and Deposition Apparatus: Design and Capabilities -- Roles of Surface Pattern Morphology and Sunlight Incoherence on Solar Cell Optimization -- Processing and Characterization of Nanowire Arrays for Photodetectors -- Structural Analysis of Ge-Ga-Se/S-CsCl Glasses and Glass-ceramics for Application in Chalcogenide and Chalcohalide Photonics -- Regularities in Holographic Formation of Periodic Structures in the System Polymer-Metal Nanoparticles -- Modeling the Effect of Different Dimensions in High Contrast Grating Mirror -- InAs/GaAs Quantum Dots Covered by Graded GaAsSb Strain Reducing Layer -- Compact Wavelength- and Pulse-Duration-Tunable Ultrafast Laser System for Coherent Raman Microscopy -- Random Lasing in ZnSe and CdSe Semiconductor Powders -- Design of an Ultra-Broadband Super Absorbing Plasmonic Metamaterials -- High-order Harmonic Generation and Plasmonics -- Low Dispersion Propagation of Broad-band THz Pulses in a Two-Wire Waveguide -- Femtosecond Lase Micromachining of a-Si:H -- Low-level Monoclinic Content Detection in Zirconia Implants using Raman Spectroscopy -- Modeling Additive Color Effect in Natural Photonic Polycrystals using the Layer Homogenization Method: the Case of the Diamond Weevil -- Transformation of Optical Properties for gamma-Irradiated Lithium Fluoride Crystals under Transition from Bulk to Nanocrystals --

Characterization of Polyethylene Glycol Self-Assembled Monolayers by means of Sum-Frequency Generation Spectroscopy for Biosensor Applications -- InAs Quantum Dots Covered by GaAsSb Strain Reducing Layer -- Maximizing Intensity in TiO2 Waveguides for Nonlinear Optics -- An Improved Method for T-matrix Calculations of Light Scattering by Spheroidal Particles -- Automated Algorithms for Multilayer Thin Film Filter Design Using Metamaterials -- Surface Charge Effects on the Interaction Between a Solid-Supported Model Lipid Membrane and AuNPs Studied by SFG Spectroscopy -- Photoluminescence of colour centres in thermally-evaporated LiF films for radiation imaging detectors -- P3HT:PCBM Based Organic Solar Cells: Structure Optimization and Improving External Quantum Efficiency by Plasmonic Nanoparticles Incorporation -- Optical Properties Nanocomposite Composed of Ag Nanoparticles Embedded in a DLC Film -- Part V List of Participants.

Sommario/riassunto

The contributions in this volume were presented at a NATO Advanced Study Institute held in Erice, Italy, 4-19 July 2013. Many aspects of important research into nanophotonics, plasmonics, semiconductor materials and devices, instrumentation for bio sensing to name just a few, are covered in depth in this volume. The growing connection between optics and electronics, due to the increasing important role plaid by semiconductor materials and devices, find their expression in the term photonics, which also reflects the importance of the photon aspect of light in the description of the performance of several optical systems. Nano-structures have unique capabilities that allow the enhanced performance of processes of interest in optical and photonic devices. In particular these structures permit the nanoscale manipulation of photons, electrons and atoms; they represent a very hot topic of research and are relevant to many devices and applications. The various subjects bridge over the disciplines of physics, biology and chemistry, making this volume of interest to people working in these fields. The emphasis is on the principles behind each technique and on examining the full potential of each technique.