

Advance Program

Special Symposium on Photonics in Mexico

Monday, 21 July 2008

ALL SESSIONS WILL BE HELD IN MARQUESA I & II

08.00 - 11.50

Session MA1: SPECIAL SYMPOSIUM ON PHOTONICS IN MEXICO

Session Chair:

08.00 - 08.20

WELCOME

MA1.1 08.20 - 08.40 (Invited)

Optical Tweezers: Manipulation of Matter with Light, R. R. Garcia, *Instituto Nacional de Astrofísica, Óptica y Electrónica, Puebla, Mexico*, J. C. Ramirez-San-Juan, E. Rodriguez-Aboytes and O. Baldovino-Pantaleon, *Instituto Nacional de Astrofísica, Óptica y Electrónica, Puebla, Mexico*

A review of our research activities on optical manipulation of microparticles will be presented. In particular we will describe an interferometric optical trapping device that allows efficient sorting of particles either by size or refractive index. The effect of light absorption will be discussed.

MA1.2 08.40 - 09.00 (Invited)

One-Photon Spin Injection in Semiconductor Surfaces, J. L. Cabellos, B. Mendoza, *Centro de Investigaciones en Óptica, A.C., Leon, Mexico*, F. Nastos, *University of Toronto, Toronto, ON, Canada*, T. Rangel, N. Arzate, *Centro de Investigaciones en Óptica, A.C., Leon, Mexico* and J. E. Sipe, *University of Toronto, Toronto, ON, Canada*

We present a study of optical electron spin-injection at the surface of semiconductors from direct optical excitation with circularly polarized light.

MA1.3 09.00 - 09.20 (Invited)

An Old Material Revisited from the Nanotech Perspective: Diamond, V. M. Castano, *Universidad Nacional Autónoma de México, D.F., Mexico*

ABSTRACT NOT AVAILABLE

MA1.4 09.20 - 09.40 (Invited)

Facile Synthesis and Optical Applications of Ceramic Nanophosphors, L. A. Diaz, E. De la Rosa, *Centro de Investigaciones en Óptica, A.C., Leon, GTO, Mexico*, P. Salas, *Universidad Nacional Autónoma de México, Queretaro, D.F., Mexico*, C. Angeles, *Instituto Mexicano del Petroleo, Cd. de Mexico, Distrito Federal, Mexico* and R. Rodriguez, *Universidad de Guadalajara, Lagos de Moreno, Jalisco, Mexico*

Facile wet synthesis methods for nanocrystalline rare earth doped oxide ceramics ZrO₂, YAG, Y₂O₃, and BaZrO₃ is presented. Visible emission under UV and NIR excitation is observed in all nanophosphors. Scintillating as well as dosimeter properties of ZrO₂ and YAG are reported.

MA1.5 09.40 - 10.00 (Invited)

Characterization of Elliptic Dark Hollow Optical Beams, J. C. Gutierrez, *Instituto Tecnológico y de Estudios Superiores, Monterrey, Nuevo Leon, Mexico*

We review the current state of research on elliptic dark hollow beams with particular emphasis on Mathieu and Ince-Gauss beams. The propagation properties and main applications are revised and discussed.

MA1.6 10.00 - 10.20 (Invited)

Nanometric and Subnanometric Quantum Wells of II-VI Compounds for Optoelectronic Applications, I. Hernandez-Calderon, *Cinvest Av, San Pedro Zacatenco, DF, Mexico*

ABSTRACT NOT AVAILABLE

10.20 - 10.50

COFFEE BREAK

MA1.7 10.50 - 11.10 (Invited)

15 Years of Optical Spatial Solitons in Mexico, M. D. Iturbe-Castillo, *Instituto Nacional de Astrofísica, Óptica y Electrónica, Tonantzintla, Mexico*

In this paper we present a review of the main contributions in the field of optical spatial solitons made by different Mexican research groups in the last 15 years.

MA1.8 11.10 - 11.30 (Invited)

Dark Photonic Lattices in Nonlinear Media, E. A. Mendez, *University of Guanajuato, Salamanca, Mexico*

ABSTRACT NOT AVAILABLE

MA1.9 11.30 - 11.50 (Invited)

Phase-Space Optics, J. Ojeda-Castaneda, *University of Guanajuato, Salamanca, Mexico*

ABSTRACT NOT AVAILABLE

12.00 - 13.30

LUNCH BREAK

TOLTECA

18.00 - 19.30

Session MP: SPECIAL SYMPOSIUM ON PHOTONICS IN MEXICO - POSTER SESSION

Session Chair:

MP1 40 Gb/s Transmission System Over Standard Single Mode Fiber using CSRZ-DPSK Format and Adaptive Filtering, C. A. Chavez-Elorza, A. Garcia-Perez, O. G. Ibarra-Manzano, J. A. Andrade-Lucio, M. Trejo-Duran and E. Alvarado-Mendez, *University of Guanajuato, Salamanca, Mexico*

A numerical simulation investigation of a carrier-suppressed return-to-zero differential phase-shift keying (CSRZ-DPSK) with an Adaptive Recursive Least Square (RLS) filter at the receiver side is reported.

MP2 Comparative Analysis of PBG and PhDOS Maps for Precise Design of the Photonic Crystal Devices, I. V. Guryev, *National University of Radio Electronics, Kharkov, Ukraine*, J. A. Andrade Lucio, E. Alvarado Mendez, E. Cabal-Yepez and I. A. Sukhoivanov, *University of Guanajuato, Salamanca, Mexico*

In the work, there was carried out the comparative study of the performance and efficiency of two methods of the design of photonic crystal-devices.

MP3 Nonlinear Optical Characterization of 4-(4-Pentenyl)benzonitrile, C. E. Valencia-loredo, M. Trejo-Duran, E. Alvarado Mendez, J. M. Estudillo-Ayala, R. Rojas-Laguna, J. A. Andrade-Lucio, E. Vargas-Rodriguez and A. Perez-Garcia, *Guanajuato University, Salamanca, Mexico*

Auto-diffraction and nonlinear properties of organic material is presented. Develop of rings by 4-(4-pentenyl)benzonitrile after being irradiated by a laser beam while the power is increased and nonlinear refraction index measured by Z-scan technique was investigated.

MP4 Telecomm Tunable Fiber Laser Based on Multimode Interference Effect, A. A. Castillo-Guzmán, R. Selvas, *Universidad Autónoma de Nuevo León, San Nicolas de los Garza, Nuevo Leon, Mexico*, J. Estudillo Ayala, *University of Guanajuato, Salamanca, Mexico*, D. A. May-Arrijoa, *Instituto Nacional de Astrofísica, Óptica y Electrónica, Puebla, Mexico*, R. Rojas-Laguna, *University of Guanajuato, Salamanca, Mexico*, J. E. Antonio-Lopez, *Instituto Nacional de Astrofísica, Óptica y Electrónica, Puebla, Mexico*, E. Vargas-Rodriguez, *University of Guanajuato, Salamanca, Mexico* and A. Martinez-Rios, *Centro de Investigaciones en Óptica, A.C., Leon, Mexico*

A compact and all-fiber erbium-doped tunable fiber laser is presented. This can provide an optical power in excess of +3.85dBm with a tunability of 17nm within the region of 1558.33-1575.32 nm. The tuning mechanism is based on the multimode interference effect.

MP5 Refractometer and Pressure Sensor in Optofluidics Configuration, S. Calixto, *Centro de Investigaciones en Óptica, A.C., Leon*, M. Rosete-Aguilar, *Universidad Nacional Autónoma de México, D.F., Mexico*, D. Monzon-Hernandez, U. V. P. Minkovich, *Centro de Investigaciones en Óptica, A.C., Leon, Mexico* and L. Castaneda-Escobar, *Instituto Tecnológico Superior de Xalapa, Xalapa, Mexico*

We propose the use of two optofluidic configurations to measure refractive index and pressure of liquids. The first uses two fibers and a capillary and the second a pressure chamber with a membrane lens and two fibers.

MP6 3D Positioning of Micro-Spherical Particles by Using Genetic Algorithms, D. Moreno-Hernandez, V. Ayala-Ramirez and J. A. Guerrero-Viramontes, *Centro de Investigaciones en Óptica, A.C., Leon, Mexico*

We propose to use an automatic method for detecting and measuring the Central Spot Size (CSS) of a particle image to determine particle defocus position by using a genetic algorithm (GA) optimization process.

MP7 Optical Properties of Nanostructured Metamaterials, B. Martinez, *Universidad de Guadalajara, Mexico*, G. P. Ortiz, *Universidad del Nordeste, Corrientes, Argentina*, B. Mendoza, *Centro de Investigaciones en Óptica, A.C., Leon, Mexico* and W. Luis Mochan, *Universidad Nacional Autónoma de México, D.F., Mexico*

We employ a model based on recently proposed theoretical approaches to study optical properties of photonic crystals for the case of periodic three-dimensional nano-structured polymers.

MP8 Analysis of the Propagation of Low Dimensional Optical Wave, A. Luis-Ramos, L. C. Gomez-Pavon, J. L. Lampallas-Cruz, A. Vargas-Trevino and E. Marti-Panameno, *Benemerita University of Puebla, Puebla, Mexico*

In this work we present a theoretical and computational analysis of propagation of low dimensional optical waves using symbolic computational support (MAPLE). We also laid the foundations for late studies for more complex structures.

MP9 Multicavity Fiber Laser, L. C. Gomez-Pavon, J. G. Ortega Mendoza, C. Berrospe-Rodriguez, E. Marti-Panameno, A. Luis-Ramos, and S. Vergara-Limon, *Benemerita University of Puebla, Puebla, Mexico*

We report the experimental study of a multicavity fiber laser system conformed by an array of three Erbium-doped fibers laser cavities.

MP10 A MEM Actuator Based on a Membrane, Controlled by an External Heat Source, M. Tecpoyotl-Torres, E. Murphy-Perez, J. Varona-Salazar, *Universidad Autónoma del Estado de Morelos, Cuernavaca, Mexico* and A. A. Hamoui, *McGill University, Montreal, QC, Canada*

The MEM actuator is controlled by an external heat source, such as the heat gradients present in some electronic systems. As the substrate bottom is heated, the thermal expansion rises the membrane, which can be used as an actuator.

MP11 Design and Fabrication of a MEMS Thermal Actuator for 3D Optical Switching Applications, J. Varona, M. Tecpoyotl-Torres, J. Escobedo-Alatorre, *Universidad Autónoma del Estado de Morelos, Cuernavaca, Mexico* and A. A. Hamoui, *McGill University, Montreal, QC, Canada*

This paper presents a novel thermally-actuated vertical micromirror for optical communications. Fabricated in a standard surface micromachining process, this micromirror can achieve low insertion loss (< 1 dB) and is capable of operating at CMOS-compatible voltage levels.

MP12 Patch Antenna for 2.4 HGz, M. Tecpoyotl-Torres, *Universidad Autónoma del Estado de Morelos, Cuernavaca, Mexico*, J. G. Vera-Dimas, *Technological Institute of Morelia, Mexico* and M. Torres-Cisneros, *University of Guanajuato, Salamanca, Mexico*

The prototype of a rectangular patch antenna, for Wireless Fidelity and linear polarization, is presented. It was also realized cuts and grooves to improve its gain. A comparison of their theoretical performance is shown.

MP13 Time Self Focusing in Pulse Propagation Throughout Fiber Optics with Periodical Inhomogeneities, R. Parada-Alfonso, *Instituto Politécnico Nacional, Distrito Federal, Mexico*, V. Vysloukh, *Universidad Autónoma del Estado de Morelos, Cuernavaca, Mexico*, E. Marti-Panameno, *Benemerita University of Puebla, Puebla, Mexico*, D. Montes-Sanchez, *Instituto Politécnico Nacional, Distrito Federal, Mexico* and J. Jimenez Hernandez, *Benemerita University of Puebla, Puebla, Mexico*

In this work we study theoretically and numerically, the dynamics of a pulse train in a bimodal optical fiber whose refractive index varies periodically. The mathematical model is a coupled system of nonlinear Schrodinger-like equations.

MP14 Selftrapped Beam Propagation in a Nonlinear Metamaterial, E. Marti-Panameno, F. J. Dominguez G., A. Vergara-B., L. C. Gomez-Pavon, and A. Luis-Ramos, *Benemerita University of Puebla, Puebla, Mexico*

Results demonstrating the stable propagation of self-trapped light beams in a nonlinear Quadratic-Kerr metamaterial are presented. Both (1+1)D and (2+1)D beams are propagated for more than one thousand of diffraction lengths.

MP15 Reconfigurable 3-dB MMI Splitter, D. A. May-Arrijoa, *Instituto Nacional de Astrofísica, Óptica y Electrónica, Puebla, Mexico* and P. LiKamWa, *University of Central Florida, Orlando, FL, USA*

A tunable multimode interference (MMI) coupler is demonstrated. The device operates by modifying the phase of the multiple images that are formed around the midpoint of the MMI.

MP16 Intermixing Properties of InP-Based MQW's, D. A. May-Arrijoa, *Instituto Nacional de Astrofísica, Óptica y Electrónica, Puebla, Mexico*, N. Bickel, *University of Central Florida, Orlando, FL, USA*, M. Torres-Cisneros, *University of Guanajuato, Salamanca, Mexico*, J. J. Sanchez-Mondragon, *Instituto Nacional de Astrofísica, Óptica y Electrónica, Tonantzintla, Puebla., Mexico* and P. LiKamWa, *University of Central Florida, Orlando, FL, USA*

The intermixing characteristics of three widely used combinations of InP based quantum wells (QW) are investigated using the impurity-free vacancy disordering (IFVD) technique.

MP17 Cell Tracking by Normalized Cross-Correlation with Image Processing, E. Perez-Careta, M. Torres-Cisneros, *University of Guanajuato, Salamanca, Mexico*, O. Debeir, *Universite Libre de Bruxelles, Bruxelles, Belgium*, J. J. Sanchez-Mondragon, *Instituto Nacional de Astrofísica, Óptica y Electrónica, Tonantzintla, Puebla., Mexico*, J. G. Avina-Cervantes, O. G. Ibarra-Manzano, *University of Guanajuato, Salamanca, Mexico*, D. A. May-Arrijoa, *Instituto Nacional de Astrofísica, Óptica y Electrónica, Puebla, Mexico*, E. Perez-Pantoja and G. Negrete-Romero, *University of Guanajuato, Salamanca, Mexico*

Here, cell tracking task involves normalized cross correlation of the cell target and microscope images. The sensibility of this method was improved applying image processing algorithms prior to the cross correlation task.

MP18 Cell Recognition and Tracking Using Nonlinear Cross-Correlation, E. Perez-Careta, M. Torres-Cisneros, J. G. Avina-Cervantes, *University of Guanajuato, Salamanca, Mexico*, O. Debeir, *Universite Libre de Bruxelles, Bruxelles, Belgium*, O. G. Ibarra-Manzano, E. Aguilera-Gomez, E. Perez-Pantoja and G. Negrete-Romero, *University of Guanajuato, Salamanca, Mexico*

In this work we present a computational cell tracking task using nonlinear filtering joint with cross correlation technique. Nonlinear filtering technique increase tracking robustness respect suddenly shape and size cell changes.

MP19 System Search for Learning, R. Guzman-Cabrera, *University of Guanajuato, Salamanca, Mexico*, J. A. Gordillo Sosa, *Universidad Tecnologica del Suroeste del Guanajuato, Guanajuato, Mexico*, M. A. Hernandez Figueroa and M. A. Gomez Martinez, *University of Guanajuato, Salamanca, Mexico*

In this paper we present a new tool for WEB searching which starts from a small set of examples labeled by the user. From them a process of selection and weighting of words to form new queries ensures the recovery of more relevant documents.

MP20 A Line Cell Tracking System, G. Chavez Guzman, *Instituto Tecnologico Superior del Sur, Guanajuato, Mexico*, R. Guzman-Cabrera and M. A. Gomez Martinez, *University of Guanajuato, Salamanca, Mexico*

This work presents a system to compute a vector representation for a selected cell of an image. The representation is in bi-level raster image.

MP21 Complex Band Structure of 1D Dielectric Photonic Crystal within Thin Metallic Layers, A. Alejo-Molina, J. J. Sanchez-Mondragon, D. A. May-Arrijoa, D. Romero-Antequera, *Instituto Nacional de Astrofísica, Óptica y Electrónica, Puebla, Mexico*, J. Escobedo-Alatorre and A. Zamudio-Lara, *Universidad Autónoma del Estado de Morelos, Cuernavaca, Mexico*

We discuss the complex dispersion relation of One-Dimensional Metallo-Dielectric Photonic Crystal, produced by a Dielectric Photonic Crystal with extremely thin metallic insets with the same periodicity. We have carried out the analytical and numerical analysis.

MP22 Spherical Dielectric Photonic Crystal with Metallic Core, A. Zamudio-Lara, *Universidad Autónoma del Estado de Morelos, Cuernavaca, Mexico*, J. J. Sanchez-Mondragon, *Instituto Nacional de Astrofísica, Óptica y Electrónica, Tonantzintla, Puebla., Mexico*, J. Escobedo-Alatorre, *Universidad Autónoma del Estado de Morelos, Cuernavaca, Mexico*, A. Alejo-Molina, *Instituto Nacional de Astrofísica, Óptica y Electrónica, Puebla, Mexico*, M. Tecpoyotl-Torres, *Universidad Autónoma del Estado de Morelos, Cuernavaca, Mexico* and M. Torres-Cisneros, *University of Guanajuato, Salamanca, Mexico*

We discuss a 3D Spherical Dielectric Photonic Crystal with a Metallic Core. Previous works have shown a distinctive transmission characterization for such a system. We show a continuous evolution that is explained by its dispersion relation.

MP23 Coupled-Resonator Optical Waveguide Based on Layered Media, D. Romero-Antequera, J. J. Sanchez-Mondragon, A. Alejo-Molina,

F. Acuna-Bagana, *Instituto Nacional de Astrofísica, Óptica y Electrónica, Puebla, Mexico* and M. Torres-Cisneros, *University of Guanajuato, Salamanca, Mexico*

In this work, we propose a coupled-resonator waveguide, using an array of layered microrings instead of a photonic crystal. The structure itself will work as a 1D photonic crystal along the axis of the system.

MP24 Chirping, Switching and Transmit Time in a Nonlinear 1D Photonic Crystal, J. Escobedo-Alatorre, *Universidad Autónoma del Estado de Morelos, Cuernavaca, Mexico*, J. J. Sanchez-Mondragon, *Instituto Nacional de Astrofísica, Óptica y Electrónica, Tonantzintla, Puebla., Mexico*, A. Zamudio-Lara, *Universidad Autónoma del Estado de Morelos, Cuernavaca, Mexico*, D. A. May-Arrijoa, M. A. Basurto-Pensado, *Instituto Nacional de Astrofísica, Óptica y Electrónica, Puebla, Mexico* and M. Torres-Cisneros, *University of Guanajuato, Salamanca, Mexico*

Among nonlinear-phenomena in propagation through a nonlinear stack, switching describes change from an evanescent mode to a cavity stack mode. We use the analysis of Winful to extend previous results of a 1D Nonlinear Stack.

END OF PROGRAM