Frontiers in Optics + Laser Science 2025
Session Guide

Disclaimer: this guide is limited to technical program with abstracts and author blocks as of 22 October. For updated and complete information with special events, reference the online schedule or mobile app.

Implementation for Efficient Numerical Computation of Electron Beam Momentum Transfer Driven by Optical Excitations in Large Spherical Nanoparticles, Jorge L. Briseño-Gómez[1], Alejandro Reyes-Coronado[1]; [1]*Universidad Nacional Autónoma de México, Mexico.* This study explores how the electromagnetic field of a swift electron induces optical excitations in nanoparticles. This process generates a scattered electromagnetic field, leading to a net momentum transfer, a possible mechanism for nanomanipulation.

14:00 -- 15:30
Four Seasons Ballroom 4
JTu5A • Joint Poster Session II

JTu5A.1

Development of Advanced Sequential Ray Tracing Simulator and Utilization for Design of hybrid Meta-optic AR Glass, Dohyun Kim[1], Sun-Je Kim[1]; [1]*Soongsil Univ., Korea (the Republic of).* We introduce a sequential ray tracing simulator integrated as a UDS in Zemax Opticstudio, enabling rigorous diffraction efficiency analysis of multiplexed holographic optical elements, significantly advancing full-color hybrid meta-optic AR glasses development.

JTu5A.2

Anisotropy in the elastic response of standard optical fibers characterized via forward Brillouin scattering, Ana I. Garrigues Navarro[1], Martina Delgado-Pinar[1], Antonio Díez[1], Miguel V. Andrés[1]; [1]*Institut Universitari de Ciència dels Materials, Universitat de València, Spain.* Elastic properties of standard single-mode silica optical fiber under axial strain are investigated using forward stimulated Brillouin scattering. We show that the fundamental properties of elastic waves dramatically change due to elastic anisotropy and nonlinear elasticity.

JTu5A.3

Efficient Synergetic Simulation Method for Studying Soliton Molecule Formation on Laboratory Timescales, Sanzida Akter[1], Pradyoth Shandilya[1], Logan Courtright[1], Omri Gat[2], Curtis R. Menyuk[1]; [1]*Univ. of Maryland Baltimore County, USA;* [2]*Hebrew Univ. of Jerusalem (HUJI), Israel.* Solitons with large separations interact slowly in the temporal domain, making numerical approaches unsuitable for laboratory timescale modeling.We present a numerical framework that aims to efficiently model the dynamics of these slow processes.

JTu5A.5

Time Resolved Terahertz Spectroscopy in PbS quantum dots with sub-ps resolution, Giovanni Budroni[1], Zeke Liu[2], Jonathas d. Siqueira[1]; [1]*UNICAMP, Brazil;* [2]*Soochow Univ., China.* In this work we performed OPTP measurements on PbS colloidal quantum dots, extracting photoconductivity spectra, electron mobility just after excitation, and recombination constants, enabling insights into carrier dynamics with sub-picosecond temporal resolution.

JTu5A.6

Nonlinear optical spectroscopy of ternary Nb2O5-modified barium fluoride fluorophosphate glasses, Artur Barbedo[1], Jose Clabel[2], Leandro Olivetti[3], Lino Misoguti[2], Danilo Manzani[3], Cleber Mendonça[2]; [1]*USP-IFSC OPTICA Student Chapter, Brazil;* [2]*Instituto de Física de São Carlos, Brazil;* [3]*Instituto de Química de São Carlos, Brazil.* We investigated the dispersion of the nonlinear refractive index (n2) between 700 nm and 1500 nm in fluorophosphate glasses modified with Nb2O5, using the tunable femtosecond NER technique. The results reveal a high nonlinear response

JTu5A.7

Towards Terahertz Spectroscopy of Liquid Biosamples: A Focus on Methodology, Deborah Amos Adigun[1], Mikhail Gorbun[1], Aadya Menon[1], Janna Pennanen[1], Georgy Fedorov[1], Polina Kuzhir[1]; *[1]Department of Physics and Mathematics, Univ. of Eastern Finland, Finland.* This study establishes a reliable terahertz time-domain spectroscopy method using porous nitrocellulose membranes to replace cuvettes for liquid biosamples. Experimental transmission spectra and transfer-matrix simulations based on optical constants show optimal fit with potential applications in non-invasive diagnostics of hydrated tissues.

JTu5A.8

Precision THz Characterization: Evaluating Frequency Combs with Rydberg Atoms, Wiktor Krokosz[1,2], Jan Nowosielski[1,2], Bartosz Kasza[1,2], Sebastian Borówka[1,2], Mateusz Mazelanik[1,2], Wojciech Wasilewski[1,2], Michal Parniak[1,2]; *[1]Centre for Quantum Optical Technologies, Univ. of Warsaw, Poland; [2]Faculty of Physics, Univ. of Warsaw, Poland.* We utilize the sensitivity of Rydberg six-wave mixing to showcase a novel approach to mapping Terahertz frequency combs with GHz bandwidth, absolute calibration and spectral analysis, offering a new path to the challenging THz regime.

JTu5A.9

Full-Wave Simulation of Kerr Comb Generation Using FDTD, Chenchen Wang[1], Qingyi Zhou[1], Zongfu Yu[1]; *[1]Univ. of Wisconsin-Madison, USA.* We simulate early-stage Kerr frequency comb formation using FDTD, capturing finer spatiotemporal dynamics, and providing a unified, first-principles modeling framework.

JTu5A.10

Optical binding in the evanescent field of an optical nanofiber, Pramitha Praveen Kamath[1], Souvik Sil[1], Viet Giang Truong[1], Sile Nic Chormaic[1]; *[1]Okinawa Inst of Science & Technology, Japan.* Optical nanofibers are a fascinating platform for studying light-matter interactions due to their large evanescent field. This field allows stable trapping, propulsion, and binding of particles due to the strong confinement of the electromagnetic field.

JTu5A.11

Modeling Rydberg Atom-Based Microwave-to-Optical Conversion of THz Frequency Comb, Bartosz Kasza[1], Jan Nowosielski[1], Wiktor Krokosz[1], Mateusz Mazelanik[1], Wojciech Wasilewski[1], Michal Parniak[1]; *[1]Univ. of Warsaw, Poland.* Rydberg sensors offer powerful THz detection, but complex dynamics have prevented modeling. We present an efficient, experimentally validated framework finally capturing their behavior, with applications including microwave-to-optical conversion of THz frequency combs.

JTu5A.12

On-Chip Temporal Interleaving for Versatile Electro-Optic Frequency Comb Generation, Manal Arbati[1], Alexis Bougaud[1], Jérémy Saucourt[1], Bruno Pessoa Chaves[1], Thomas Bunel[2], Sébastien Février[1], Brent E. Little[3], Sai T Chu[4], David J Moss[5], Roberto