

Optical Trapping Applications (OTA)

OSA Topical Meeting and Tabletop Exhibit

Collocated with

[Digital Holography and Three-Dimensional Imaging \(DH\)](#)
[Fourier Transform Spectroscopy \(FTS\)](#)
[Hyperspectral Imaging and Sensing of the Environment \(HISE\)](#)
[Novel Techniques in Microscopy \(NTM\)](#)

Technical Conference: April 26-30, 2009

Exhibition: April 27-29, 2009

[Sheraton Vancouver Wall Centre Hotel](#)

[Vancouver, BC, Canada](#)

PDP Submissions Deadline: April 2, 2009, 12:00 p.m. noon, EDT (16.00 GMT)

[Housing Deadline](#): March 25, 2009

[Pre-Registration Deadline](#): April 1, 2009

2009 Meeting Chairs

Carlos Lopez-Mariscal, *NIST, USA*, Chair

David McGloin, *Univ. of Dundee, UK*, Chair

About Optical Trapping Applications

Different optical trapping schemes are widely used to uncover aspects of matter-light interactions in the microscopic and submicroscopic domains. A broad range of physical and biological phenomena are elucidated in more detail thanks to the use of these schemes. This meeting explores the applications of novel optical trapping and manipulation techniques, including the use of evanescent fields, plasmonics, microfluidics, integrated lab-on-a-chip technologies, parallel optical sorting, innovation in optical methods for cellular biology and the current state of the art in fundamental concepts of optical trapping.

Topics to Be Considered

- Sorting
- Microfluidics
- Plasmonic Interactions
- Optical Landscapes
- Parallel Manipulation
- Fundamental Concepts
- Manipulation of Biological Structures
- Novel Imaging
- Noise Suppression
- Particle Tracking
- High Accuracy Position Sensing

About Optical Trapping Applications

Different optical trapping schemes are widely used to uncover aspects of matter-light interactions in the microscopic and submicroscopic domains. A broad range of physical and biological phenomena are elucidated in more detail thanks to the use of these schemes. This meeting explores the applications of novel optical trapping and manipulation techniques, including the use of evanescent fields, plasmonics, microfluidics, integrated lab-on-a-chip technologies, parallel optical sorting, innovation in optical methods for cellular biology and the current state of the art in fundamental concepts of optical trapping.

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David McGloin; *Univ. of Dundee, UK*, **Co-Chair**

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Exhibitor Listings

ADVANCES in IMAGING

2009 OSA OPTICS
AND PHOTONICS
CONGRESS

April 26-30, 2009
Vancouver, BC
Canada

Collated Meetings:

Digital Holography
and Three-
Dimensional Imaging
(DH)

Fourier Transform
Spectroscopy (FTS)

Hyperspectral Imaging
and Sensing of the
Environment (HISE)

Novel Techniques in
Microscopy (NTM)

Optical Trapping
Applications (OTA)

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The organizers of the Advances in Imaging Congress and Tabletop Exhibit wish to acknowledge the following for their support:

Grants:

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Special Events

Meet the Applied Optics Editors Dinner

Date: April 28, 2009

Time: 7:00 PM

Where: The Relish Restaurant & Lounge, 888 Nelson ST. (Between Hornby & Howe), Vancouver, BC, Canada
(Website: <http://www.relishrestaurants.com/relish/index.asp>).

Don't miss this great opportunity to meet Applied Optics Information Processing Editors:

Prof. T.-C. Poon (Division Editor, Virginia Tech)

Prof. Partha P. Banerjee (Topical Editor, Univ. of Dayton)

Prof. ByoungHo Lee (Topical Editor, Seoul National Univ., Korea)

All conference attendees, especially students, are invited to this casual networking dinner. You can sign-up onsite at the OSA Registration Desk at the Grand Ballroom Foyer Coatroom. Please RSVP by Tuesday, April 28 by 1:00 pm. **Please note: Participants pay for their own dinners.**

2009 OSA Optics & Photonics Congress
Advances In Imaging
April 26-30, 2009
Vancouver, British Columbia, Canada

OSA GROUP DINNER

Have Dinner with *Applied Optics* Editors
Students are Welcome!

All OSA conference attendees are invited to a casual networking dinner where you will have the opportunity to meet
Applied Optics Information Processing Editors:

Prof. T.- C. Poon (Division Editor, Virginia Tech)

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Tuesday, April 28, 2009, 7:00 p.m.

THE RELISH RESTAURANT & LOUNGE

888 Nelson St. (between Hornby & Howe) Vancouver, BC

Website: <http://www.relishrestaurants.com/relish/index.asp>

Sign up at the OSA Registration Desk
[Grand Ballroom Foyer, Coat Room]
by 1:00 p.m. on Tuesday, April 28

Note: Participants pay for their own dinners

Sponsored by the OSA External Relations Advisory Group

Invited Speakers

Optical Trapping Applications (OTA) / Digital Holography and Three-Dimensional Imaging (DH) Joint Session

Three-Dimensional Imaging by Three-Dimensional Point Spread Function Encoding, Rafael Piestun; *Univ. of Colorado at Boulder, USA.*

Optoelectronic Trapping of Cells, Nanowires, and Nanoparticles, Ming C. Wu; *Univ. of California at Berkeley, USA.*

Invited Speakers

Microrheology of the Endothelial Glycocalyx and Extracellular Matrix, Elliot Botvinick; *Univ. of California at Irvine, USA.*

Advances in the Biological Applications of Optical Micromanipulation, Daniel Chiu; *Univ. of Washington, USA.*

Life at the Edge: Optical Force Probe Measurements of the Pericellular Coat, Jennifer Curtis; *Georgia Tech, USA.*

Optical Tweezers Shed Light on Cell Motility, Eric Dufresne; *Yale Univ., USA.*

Single Molecule Studies of DNA Hybridization Kinetics within Optically Trapped Femtoliter Droplets, Ana Jofre; *Univ. of North Carolina at Charlotte, USA.*

Optical Trapping and Manipulation of Aerosols, Jonathan Reid; *Univ. of Bristol, UK.*

Colloidal Statistical Mechanics in Optical Vortices, Yael Roichman; *Tel Aviv Univ., Israel.*

Optical Tweezers: From Matter Physics to Biological Applications, Giulia Rusciano; *Univ. of Naples, Italy.*

Insights into Statistical Physics by Optically Trapped Particles, Giovanni Volpe; *Inst. of Photonic Sciences (ICFO), Spain.*

	<i>Grand Ballroom A</i>	<i>Junior Ballroom D</i>	<i>Junior Ballroom C</i>	<i>Grand Ballroom B</i>	<i>Junior Ballroom A/B</i>
Sunday, April 26					
3:00 p.m.–6:00 p.m.	Registration Open, Grand Ballroom Foyer Coatroom				
Monday, April 27					
7:30 a.m.–6:30 p.m.	Registration Open, Grand Ballroom Foyer Coatroom				
8:30 a.m.–10:30 a.m.	DMA • Advances in Digital Holography	JMA • FTS/HISE Joint Session		NMA • Superresolution I	OMA • Transport, Guiding and Sorting
10:30 a.m.–11:00 a.m.	Coffee Break, Grand Ballroom C/D				
10:30 a.m.–4:30 p.m.	Exhibits Open, Grand Ballroom C/D				
11:00 a.m.–12:30 p.m.	DMB • Novel Technologies in Holography (ends at 1:00 p.m.)	FMA • James W. Brault Memorial Session	HMA • Climate Absolute Radiance and Refractivity Observatory	NMB • Superresolution II	OMB • Physics Insights by Means of Optical Trapping I
12:30 p.m.–2:00 p.m.	Lunch Break (on your own)				
2:00 p.m.–4:00 p.m.	JMB • DH/OTA Joint Session	FMB • Combs and Static FTS	HMB • Clouds and Aerosols I	NMC • Nonlinear Microscopy I	
4:00 p.m.–4:30 p.m.	Coffee Break/Exhibits, Grand Ballroom C/D				
4:30 p.m.–6:00 p.m.	DMC • Metrology by Digital Holography and Profilometry (ends at 6:15 p.m.)	FMC • Space and Flight Projects	HMC • Future Missions and Sensor Calibration	NMD • Nonlinear Microscopy II	OMC • Physics Insights by Means of Optical Trapping II
6:30 p.m.–8:00 p.m.	Conference Reception, Junior Ballroom Foyer				
Tuesday, April 28					
7:30 a.m.–6:30 p.m.	Registration Open, Grand Ballroom Foyer Coatroom				
8:30 a.m.–10:30 a.m.	JTuA • DH/NTM Joint Session: Digital Holographic Microscopy	FTuA • FTS for Astronomy and Astrophysics	HTuA • Interpretation of Hyperspectral/Multi spectral Data Through Observations and Simulations		OTuA • Biophotonics Applications
10:30 a.m.–11:00 a.m.	Coffee Break, Grand Ballroom C/D				
10:30 a.m.–6:00 p.m.	Exhibits Open, Grand Ballroom C/D				
11:00 a.m.–12:30 p.m.	DTuA • Holographic Microscopy	FTuB • Combs, Optical Fiber and Fast-Scanning	HTuB • Particle Scattering Models	NTuA • Phase Microscopy and Tomography	OTuB • Novel Uses and Applications
12:30 p.m.–2:00 p.m.	Lunch Break (on your own)				
2:00 p.m.–4:00 p.m.	DTuB • Holography Applications	FTuC • Gosat and Akari	HTuC • New Remote Sensing Perspectives	NTuB • Optical Coherence Tomography	OTuC • Dynamics of Multiple and Parallel Trapping (ends at 3:30 p.m.)
4:00 p.m.–4:30 p.m.	Coffee Break/Exhibits, Grand Ballroom C/D				
4:30 p.m.–6:00 p.m.	JTuB • DH/FTS/HISE/NTM/OTA Joint Poster Session, Grand Ballroom C/D				
6:00 p.m.–6:45 p.m.	DTuC • Optical Scanning Holography				

	<i>Grand Ballroom A</i>	<i>Junior Ballroom D</i>	<i>Junior Ballroom C</i>	<i>Grand Ballroom B</i>	<i>Junior Ballroom A/B</i>
Wednesday, April 29					
7:30 a.m.–6:30 p.m.	Registration Open, Grand Ballroom Foyer Coatroom				
8:30 a.m.–10:30 a.m.	DWA • Three-Dimensional Imaging and Display	FWA • Earth Sensing	HWA • Hyperspectral IR and Imager Data Analyses (ends at 10:00 a.m.)	NWA • New Techniques I	
10:30 a.m.–11:00 a.m.	Coffee Break, Grand Ballroom C/D				
10:30 a.m.–12:30 p.m.	Exhibits Open, Grand Ballroom C/D				
11:00 a.m.–12:30 p.m.	DWB • DH Poster Session, Grand Ballroom C/D				
11:00 a.m.–12:30 p.m.		FWB • Visible and Ultra Violet	HWB • Clouds and Aerosols II	NWB • Superresolution III	
12:30 p.m.–2:00 p.m.	Lunch Break (on your own)				
2:00 p.m.–4:00 p.m.	DWC • Computer-Generated Holograms	FWC • Spatial Heterodyne	HWC • Validation of Cloud and Aerosol Products	NWC • Endomicroscopy	
4:00 p.m.–4:30 p.m.	Coffee Break, Grand Ballroom C/D				
4:30 p.m.–6:30 p.m.	DWD • Electro-Holography and Computer-Generated Holography	FWD • Laboratory and Miniature FTS (ends at 6:00 p.m.)	HWD • Hyperspectral Applications (ends at 6:00 p.m.)	NWD • New Techniques II (ends at 5:30 p.m.)	
Thursday, April 30					
7:30 a.m.–10:30 a.m.	Registration Open, Grand Ballroom Foyer Coatroom				
8:30 a.m.–10:30 a.m.	FThA • Spectral Imaging, Grand Ballroom A				

Key to Shading	
DH Sessions	No Shading
FTS Sessions	
HISE Sessions	
NTM Sessions	
OTA Sessions	

Optical Trapping Applications (OTA) Abstracts

• Sunday, April 26, 2009 •

Grand Ballroom Foyer Coatroom

3:00 p.m.–6:00 p.m.

Registration Open

• Monday, April 27, 2009 •

Grand Ballroom Foyer Coatroom

7:30 a.m.–6:30 p.m.

Registration Open

OMA • Transport, Guiding and Sorting

Junior Ballroom A/B

8:30 a.m.–10:30 a.m.

Carlos Lopez-Mariscal; NIST, USA, Presider

OMA1 • 8:30 a.m. Invited

Microrheology of the Endothelial Glycocalyx and Extracellular Matrix, Samir Shreim, Maxwell Kotlarchyk, Elliot Botvinick; Univ. of California at Irvine, USA. Our lab is constructing photonic systems to seek correlates between cell signaling and laser-induced mechanical stresses as well as laser-based measurements of deformation and mechanical properties in engineered tissues.

OMA2 • 9:00 a.m. Invited

Advances in the Biological Applications of Optical Micromanipulation, Daniel Chiu; Univ. of Washington, USA. This presentation will describe some of our recent work at the interface of optics and microfluidics, the development of techniques at this interface, and application of these methods towards studying problems in chemistry and biology.

OMA3 • 9:30 a.m.

Calculations of Torques on Particles in Laguerre-Gaussian Beams, Stephen H. Simpson, Simon Hanna; Univ. of Bristol, UK. The angular momentum transferred by Laguerre-Gaussian beams is calculated using the T-matrix method, and a simple formula derived for the induced torque. Coupling mechanisms are compared for weakly absorbing spheres, non-absorbing spheroids, and birefringent spheres.

OMA4 • 9:45 a.m.

Optical Tweezers and Integrated Waveguide System for Cell Selection and Transport in Polymer Microfluidic Devices, Luc G. Charron, Duoaud Shah, Lothar Lilge; Princess Margaret Hospital, Univ. of Toronto, Canada. A laser-based optical system for cell selection and passive transportation inside a polymer microfluidic device is presented. Optical tweezers and integrated waveguides are used to select and transport multiple cells in a network of channels.

OMA5 • 10:00 a.m.

Using Holographic Optical Tweezers to Measure Forces with AFM-Like Probes, David M. Carberry¹, Leo Ikin¹, James A. Grieve¹, Simon Hanna¹, Graham M. Gibson², Miles J. Padgett², Mervyn J. Miles¹; ¹Univ. of Bristol, UK, ²Univ. of Glasgow, UK. We demonstrate the optical assembly and control of SPM-like probes, using holographic optical tweezers. We show that these probes can exert a force in excess of 60pN with a force sensitivity of 50fN.

OMA6 • 10:15 a.m.

Controlled Particle Guidance in a Liquid-Filled Single-Mode Hollow-Core Photonic Crystal Fiber, Martin K. Garbos, Tijmen G. Euser, Jocelyn S. Y. Chen, Philip St.J. Russell; Max Planck Inst. for the Science of Light, Germany. We present controlled optical trapping and guidance of silica microparticles in the fundamental mode of D2O-filled hollow-core PCF, and show that a particle can be held stationary against an opposing fluid flow using optical propulsion.

Grand Ballroom C/D

10:30 a.m.–11:00 a.m.

Coffee Break/ Exhibits

OMB • Physics Insights by Means of Optical Trapping I

Junior Ballroom A/B

11:00 a.m.–12:30 p.m.

David McGloin; Univ. of Dundee, UK, Presider

OMB1 • 11:00 a.m. Invited

Optical Tweezers: From Soft-Matter Physics to Biological Applications, Giulia Rusciano; Univ. of Naples, Italy. Optical tweezers have recently emerged as an interesting tool for performing advanced biophysical/biomechanical characterizations of biosystems. Here, we discuss on the application of this emerging technology to various systems, including erythrocytes, liposomes and starfish oocytes.

OMB2 • 11:30 a.m.

Optical Tweezing Red-Shifted from Resonance, Brooke C. Hester¹, Rani Kishore¹, Kristian Helmersen¹, Carly Levin², Naomi J. Halas²; ¹NIST, USA, ²Dept. of Electrical and Computer Engineering, Rice Univ., USA. We study the enhancement of optical forces associated with optical trapping red-shifted from resonance absorption. Particles with tunable resonances are manipulated using a single-focus optical trap with tunable wavelength, and studied using back- focal-plane interferometry.

OMB3 • 11:45 a.m.

Position and Intensity Modulations in Holographic Optical Traps Created by a Liquid Crystal Spatial Light Modulator, Astrid van der Horst, Benjamin P. B. Downing, Nancy R. Forde; Simon Fraser Univ., Canada. The addressing of the liquid crystals in spatial light modulators gives rise to temporal modulation of the phase pattern.

Here we investigate the effect of this on the intensity and position of holographic optical traps.

OMB4 • 12:00 p.m.

Multiple Trapping with Optical Bottle Beam, Vladlen G. Shvedov^{1,2,3}, Andrei V. Rode¹, Yana V. Izdebskaya^{2,3}, Anton S. Desyatnikov², Wieslaw Z. Krolkowski¹, Yuri S. Kivshar²; ¹Laser Physics Ctr., RSPHysE, Australian Natl. Univ., Australia, ²Nonlinear Physics Ctr., RSPHysE, Australian Natl. Univ., Australia, ³Taurida Natl. Univ., Ukraine. We report on multiple optical trapping of particles in air using random phase optical bottle beam. The particles were trapped in micro-cavities of a speckle pattern in a macro-trap formed by the bottle beam.

OMB5 • 12:15 p.m.

Radiation Torques and Forces in Scattering from Spheres and Acoustical Analogues, Philip L. Marston, Likun Zhang; Washington State Univ., USA. The radiation torque on a sphere in circularly polarized light is proportional to absorption [Marston and Crichton, Phys. Rev. A30, 2508 (1984)]. We note related developments concerning torques and forces of optical and acoustical vortices.

12:30 p.m.–2:00 p.m.

Lunch Break (on your own)

JMB • DH/OTA Joint Session

Grand Ballroom A

2:00 p.m.–4:00 p.m.

Christian Depeursinge; École Polytechnique Fédérale de Lausanne, Switzerland, *Presider*

JMB1 • 2:00 p.m.

Invited

Optoelectronic Trapping of Cells, Nanowires, and Nanoparticles, Ming C. Wu; Univ. of California at Berkeley, USA. The principle and recent experimental results of optoelectronic tweezers (OET) will be presented. Based on light-induced dielectrophoresis, OET can trap and sort colloidal particles, biological cells, nanowires and nanoparticles using a digital light projector.

JMB2 • 2:30 p.m.

Invited

Three-Dimensional Imaging by Three-Dimensional Point Spread Function Encoding, Rafael Piestun; Univ. of Colorado at Boulder, USA. Pupil-encoded point spread functions are implemented for three-dimensional image data acquisition. These systems are passive and work under broadband illumination. Applications include nanolocalization of small emitters and machine vision.

JMB3 • 3:00 p.m.

Invited

Optical Tweezers Shed Light on Cell Motility, Eric Dufresne; Yale Univ., USA. Optical tweezers are an elegant platform for the biochemical and mechanical stimulation of live cells. I will discuss the application of holographic optical tweezers to chemotaxis in neutrophils and mechanotransduction in neurons.

JMB4 • 3:30 p.m.

Motility-Contrast Imaging: Digital Holography of Cellular Motion in 3-D Tissues, David D. Nolte, John Turek; Purdue Univ., USA. We present the first three-dimensional assays of intrinsic cellular motion applied to tissues using motility contrast imaging (MCI), a new digital holographic imaging technique that detects sub-cellular motion as a novel fully-endogenous imaging contrast agent.

JMB5 • 3:45 p.m.

Application of 3-D Tracking, Multi-Wavelength Techniques and Color Imaging in Digital Holographic Microscopy, Björn Kemper¹, Patrik Langehanenberg¹, Sebastian Kosmeier¹, Xiaoli Mo¹, Sabine Przibilla¹, Angelika Vollmer¹, Steffi Ketelhut¹, Jinghui Xie², Gert von Bally¹; ¹Ctr. for Biomedical Optics and Photonics, Univ. of Muenster, Germany, ²School of Information Science and Technology, Beijing Inst. of Technology, China. In an overview results obtained by digital holographic microscopy demonstrate 3-D-tracking of cells without mechanical focus realignment, reduction of amplitude and phase noise by using multi-wavelength techniques and prospects for subsequent refocusing of color images.

Grand Ballroom C/D

4:00 p.m.–4:30 p.m.

Coffee Break/ Exhibits

OMC • Physics Insights by Means of Optical Trapping II

Junior Ballroom A/B

4:30 p.m.–6:00 p.m.

Brooke C. Hester; NIST, USA, *Presider*

OMC1 • 4:30 p.m.

Invited

Colloidal Statistical Mechanics in Optical Vortices, Yael Roichman, David G. Grier; Tel Aviv Univ., USA. Holographic optical tweezers can be used to create a variety of optical landscapes in which particles can be trapped and driven. We study particles driven by optical vortices in the framework of non-equilibrium statistical mechanics.

OMC2 • 5:00 p.m.

Thermal Motion of Optically Trapped Nanotools, Stephen H. Simpson, Mervyn J. Miles, Simon Hanna; Univ. of Bristol, UK.

Calculations of hydrodynamic resistance and mechanical susceptibility for complex particles held in multiple optical traps are presented. The subsequent thermal motion is quantified and the implications for a novel form of force microscopy are discussed.

OMC3 • 5:15 p.m.

High-Speed Camera Particle Tracking and Force Measurement, with Real-Time Haptic Feedback, Richard W. Bowman¹, Cécile Pacoret^{2,3}, D. Sinan Haliyo², Stéphane Régnier², Graham M. Gibson¹, Miles J. Padgett¹; ¹Dept. of Physics, Univ. of Glasgow, UK, ²Inst. des Systèmes

Intelligents et de Robotique, Pierre et Marie Curie Univ., France, ³CEA-LIST, Sensory Interfaces Lab, France. Modern cameras can provide real-time position and force measurement of multiple trapped particles at several kHz. We investigate the accuracy and stability of this method and use it to implement a force-feedback interface.

OMC4 • 5:30 p.m.

Optical Tweezers for Velocity Mapping in Microfluidic Channels, *Jing Wu, Daniel Day, Min Gu; Ctr. for Micro-Photonics, Swinburne Univ. of Tech., Australia.* We have successfully applied an optical tweezer for mapping the velocity profile in microfluidic channels. The velocity profiles for a straight and a u-shaped microfluidic channels were determined by direct measurement of the Stokes force.

OMC5 • 5:45 p.m.

Wavelength Dependence of Optical Tweezer Trapping Forces on Resonant Particles, *Mark J. Kendrick, David H. McIntyre, Oksana Ostroverkhova; Dept. of Physics, Oregon State Univ., USA.* Optical tweezers are typically used with transparent dielectric particles. Particles with optical resonances should experience a larger trapping force near resonance. We present a numerical and experimental study of the trapping forces on such particles.

Junior Ballroom Foyer

6:30 p.m.–8:00 p.m.

Conference Reception

NOTES

• Tuesday, April 28, 2009 •

Grand Ballroom Foyer Coatroom

7:30 a.m.–6:30 p.m.

Registration Open

OTuA • Biophotonics Applications

Junior Ballroom A/B

8:30 a.m.–10:30 a.m.

Giovanni Volpe; *Inst. of Photonic Sciences (ICFO), Spain, Presider*

OTuA1 • 8:30 a.m.

Invited

Optical Manipulation of Femtoliter Aqueous Droplets for Nanochemistry Applications, Ana Jofre, Ben Faulk, Jason Case; *Univ. of North Carolina at Charlotte, USA*. We control and observe femtoliter volume reactions within aqueous nanodroplets. Chemical reagents sequestered in the nanodroplets mix when the nanodroplets are fused via optical manipulation. The subsequent reaction is probed by means of fluorescence excitation.

OTuA2 • 9:00 a.m.

Invited

Life at the Edge: Optical Force Probe Measurements of the Pericellular Coat, Jennifer Curtis; *Georgia Tech., USA*. The pericellular coat plays a prominent and possibly mechanical role in modulating cell adhesion during cell migration and proliferation. We report on the cell coat's mechanics and structure evaluated using optical tweezer force probe studies.

OTuA3 • 9:30 a.m.

Probing the Elasticity of Short Proteins with Optical Tweezers, Benjamin P. B. Downing¹, Astrid van der Horst¹, Ming Miao², Fred W. Keeley^{2,3}, Nancy R. Forde¹; ¹*Dept. of Physics, Simon Fraser Univ., Canada*, ²*Molecular Structure and Function Programme, Hospital for Sick Children, Univ. of Toronto, Canada*, ³*Dept. of Biochemistry, Univ. of Toronto, Canada*. Probing relatively short proteins, such as elastin (~200 nm), with optical tweezers requires manipulating trapped polystyrene beads at very small separations. We discuss experimental complications arising from this proximity, and our efforts to minimize them.

OTuA4 • 9:45 a.m.

Transport of Multi-Particle Clusters by Motional Standing Wave Optical Traps, Martin Šiler¹, Tomas Čížmár^{1,2}, Pavel Zemánek¹; ¹*Inst. of Scientific Instruments, Acad. of Sciences of the Czech Republic, Czech Republic*, ²*School of Physics and Astronomy, Univ. of St Andrews, UK*. Upon illumination with a traveling standing wave, clusters of microparticles bound by scattered laser light can be transported much faster than a single particle.

OTuA5 • 10:00 a.m.

Spiral Beams Based Optical Traps, Kirill Afanasiev, Alexander Korobtsov, Svetlana Kotova, Nikolay Losevsky, Vsevolod Patlan, Eugenia Razueva, Vladimir Volostnikov, Evgeny Vorontsov; *P.N. Lebedev Physical Inst., Samara Branch, Russian Federation*. The possibility is shown to form light fields with the desired intensity distribution and non-zero angular momentum by means of phase-only diffractive elements based on spiral beams optics. Experimental applications for laser manipulation are presented.

OTuA6 • 10:15 a.m.

New Compact Optical Trapping Device by Using Bessel Beam with a Novel Hybrid Fiber Structure, Jongki Kim¹, Yoonseob Jeong¹, Sejin Lee¹, Woosung Ha¹, Rene-Paul Salathe², Fabrice Merenda², Yongmin Jung³, Junki Kim⁴, K. Oh¹; ¹*Yonsei Univ., Republic of Korea*, ²*Ecole Polytechnique Federale de Lausanne, Switzerland*, ³*Optoelectronic Res. Ctr., Univ. of Southampton, UK*, ⁴*Fraunhofer Inst., Applied Optics and Precision Engineering, Germany*. We simulated the Bessel beam generator with special fiber and lens and fabricated the device. We verified the Bessel beam profile and observed the optical trapping on the various Z-axis positions.

Grand Ballroom C/D

10:30 a.m.–11:00 a.m.

Coffee Break/ Exhibits

OTuB • Novel Uses and Applications

Junior Ballroom A/B

11:00 a.m.–12:30 p.m.

Nancy Forde; *Simon Fraser Univ., Canada, Presider*

OTuB1 • 11:00 a.m.

Invited

Optical Control of Aerosols, Jonathan Reid, Jonathan Wills; *Univ. of Bristol, UK*. Aerosols play a significant role in many areas of science. We will examine the latest developments in using light to control aerosol and to characterise individual particles, concentrating on optical tweezers and Raman spectroscopy.

OTuB2 • 11:30 a.m.

Laser Trapping in Air by Photophoretic Forces, Vladlen G. Shvedov^{1,2,3}, Anton S. Desyatnikov¹, Andrei V. Rode³, Wieslaw Z. Krolikowski³, Yuri S. Kivshar¹; ¹*Nonlinear Physics Ctr., Australian Natl. Univ., Australia*, ²*Taurida Natl. Univ., Ukraine*, ³*Laser Physics Ctr., Australian Natl. Univ., Australia*. We report on optical trapping of agglomerates of carbon nanoparticles in air. Stable positioning and guiding of nanoparticles is achieved by photophoretic forces in an optical trap created by two counter-propagating and co-rotating optical vortices.

OTuB3 • 11:45 a.m.

Modelling Aerosol Optical Tweezers, Daniel Burnham, David McGloin; *Univ. of Dundee, UK*. In this talk we discuss our recent work on the modelling of airborne optical traps, looking at the Brownian motion the particles, but paying particular attention to the optical forces that influence trap behavior.

OTuB4 • 12:00 p.m.

Optical Bottles: Using Light to Confine and Analyze Nanoparticle Suspensions, Joseph Junio, H. Daniel Ou-Yang; *Lehigh Univ., USA*. We present in this paper a new experimental method termed the optical bottle which uses optical trapping for the determination of the optical trapping energy per particle and the isothermal bulk modulus of the suspension.

OTuB5 • 12:15 p.m.

A Plasmonic Nano-Trap for the Optical Confinement of Quantum Dots, Colm Dineen¹, M. Reichelt¹, S. W. Koch², Jerome V. Moloney¹; ¹*Univ. of Arizona, USA*, ²*Philipps Univ., Germany*. We numerically compute the optical forces on a quantum dot, under excitonic resonance conditions, confined to a sub diffraction limited volume in the resonantly enhanced near-field of a suitably engineered metal nano-structure optical trap.

12:30 p.m.–2:00 p.m.

Lunch Break (on your own)

OTuC • Dynamics of Multiple and Parallel Trapping

Junior Ballroom A/B

2:00 p.m.–3:30 p.m.

Giulia Rusciano; *Univ. of Naples, Italy, Presider*

OTuC1 • 2:00 p.m.

Invited

Insights into Statistical Physics by Optically Trapped Particles, Giovanni Volpe; *Inst. of Photonic Sciences (ICFO), Spain*. An optically trapped Brownian particle moves under the effect of both the random thermal motion and the deterministic optical forces. Therefore it provides a powerful means for the experimental study of certain statistical physics phenomena.

OTuC2 • 2:30 p.m.

Particle Spin Manipulation by Four-Core Single Fiber Optical Tweezers, Zhihai Liu, Yu Zhang, Jun Yang, Libo Yuan; *Harbin Engineering Univ., China*. We present a novel four-core micro structured single fiber optical tweezers, which can trap, manipulate and even spin trapped micro-particle in 3-D. Simulation and experiment are carried out to support our options.

OTuC3 • 2:45 p.m.

Optically Bound Chain of Microparticles, Oto Brzobohatý¹, Vítězslav Karásek¹, Pavel Zemánek¹, Tomáš Čížmár^{1,2}, Veneranda Garcés-Chávez², Kishan Dholakia²; ¹*Inst. of Scientific Instruments of the Acad. of Sciences of the Czech Republic, Czech Republic*, ²*School of Physics and Astronomy, Univ. of St. Andrews, UK*. We present the first creation of extended longitudinally optically bound chains of microparticles in one dimension. Two counter-propagating Bessel beams were used to illuminate the submicrometer sized polystyrene particles immersed in water.

OTuC4 • 3:00 p.m.

Optical Pipeline for Transport of Particles, Vladen G. Shvedov^{1,2,3}, Andrei V. Rode¹, Yana V. Izdebskaya^{2,3}, Anton S. Desyatnikov², Wieslaw Z. Krolikowski¹, Yuri S. Kivshar²; ¹*Laser Physics Ctr., Australian Natl. Univ., Australia*, ²*Nonlinear Physics Ctr., Res. School of Physics and Engineering, Australian Natl. Univ., Australia*, ³*Taurida Natl. Univ., Ukraine*. We developed an optical pipeline for laser-guiding particles in air using vortex beams. Transport of agglomerates of nanoparticles forward and backward between two optical traps through the optical pipeline over a 60-cm distance was demonstrated.

OTuC5 • 3:15 p.m.

A New Optimized Trapping Method to Create Ultra-Cold and Degenerate Atomic Samples, Philippe Bouyer; *Inst. d'Optique Graduate School, CNRS et Univ. Paris Sud, France*. An atom laser represents an ideal atomic source for atom optics and interferometry. We present a simple all optical approach to create this atom source where a single laser source at 1560 nm is used.

Grand Ballroom C/D

4:00 p.m.–4:30 p.m.

Coffee Break/ Exhibits

JTuB • DH/FTS/HISE/NTM/OTA Joint Poster Session

Grand Ballroom C/D

4:30 p.m.–6:00 p.m.

JTuB30

The Study of Mechanism and Characterization of Cell Interaction in Blood Coagulation by Optical Tweezers, Bor-Wen Yang¹, Yu-Hong Mu², Kui-Teng Huang²; ¹*Dept. of Opto-Electronic System Engineering, Ming-Hsin Univ. of Science and Technology, Taiwan*, ²*Inst. of Electrical Engineering, Ming-Hsin Univ. of Science and Technology, Taiwan*. Patients with severe diseases like hemophilia, apoplexy and hemorrhage are dependent on the well function of platelets. Optical tweezers are configured to explore the mechanism of blood coagulation and the restoring effects of hemagglutination pharmaceuticals.

JTuB31

Research on Multi Particles Simultaneous Trapping by Single Fiber Optical Tweezers, Zhihai Liu, Yu Zhang, Zhongfu Wu, Jun Yang, Libo Yuan; Harbin Engineering Univ., China. We present an etched-tapered single fiber optical tweezers, which can trap and manipulate two yeast cells in water simultaneously and then the theory analysis, numerical stimulation and experiment implementation are employed to research the trapping.

JTuB32

Optical Trapping Efficiency Measured for Dielectric Particles by Using Cylindrical Vector Beams, Yuichi Kozawa, Shunichi Sato; Inst. of Multidisciplinary Res. for Advanced Materials, Tohoku Univ., Japan. Axial and transverse optical trapping efficiencies were measured by using cylindrical vector beams when a dielectric particle was trapped three-dimensionally. Radially polarized beams showed the highest axial trapping efficiency for a micrometer-sized glass bead.

JTuB33

Holographic Optical Manipulation of Motor-Driven Subcellular Structures, Arnau Farré, Carol López-Quesada, Jordi Andilla, Estela Martín-Badosa, Mario Montes-Usategui; Univ. de Barcelona, Spain. Intracellular transport is a fast mechanism required in different processes within cells. We show that dynamic holographic optical tweezers are desirable to block these driven cargos to mechanically interact with the associated motor proteins.

JTuB34

Multi-Beam Laser Manipulator Based on Diffraction Grating, Kirill Afanasiev, Alexander Korobtsov, Svetlana Kotova, Nikolay Losevsky, Evgeny Vorontsov; P.N. Lebedev Physical Inst., Samara Branch, Russian Federation. A simple technique for the formation of an array of laser traps on the basis of phase diffraction gratings is proposed. The array allows trapping transparent elongated micro objects at several points simultaneously and deforming them.

JTuB35

Volumetric Multiple Optical Traps Produced by Devil's Lenses, Walter D. Furlan¹, F. Giménez², MH Giménez², Juan A. Monsoriu²; ¹Univ. de Valencia, Spain, ²Univ. Politécnic de Valencia, Spain. We propose the use of a novel diffractive optical element, coined *devil's lens* as a multiple foci optical element to produce optical tweezers and vortices.

Posters JTuB1–JTuB7 can be found in the DH abstracts section.

Posters JTuB8–JTuB16 can be found in the FTS abstracts section.

Posters JTuB17–JTuB21 can be found in the HISE abstracts section.

Posters JTuB22–JTuB29 can be found in the NTM abstracts section.

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(**Bold** denotes Presider or Presenting Author)

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Kaneda, Hidehiro—FTuC1
Kaneko, Atsushi—JTUB2
Kang, Hoonjong—DTuB7, DWA4
Kang, Hong—NWD2
Kang, Jin-mo—DWB1
Kangaslahti, Pekka—HWD4
Karásek, Vítězslav—OTuC3
Kariwala, Vinay—DTuB6
Kaspar, Roger—NWC1
Kasseck, Christoph—DMB6
Kassianov, Evgueni—HTuC4
Kattawar, George—HMB4, HTuB1
Katz, Barak—DMC2
Katzir, Abraham—FTuB4
Kawada, Mitsunobu—FTuC1
Kawashima, Takahiro—FTuC3
Keeley, Fred W.—OTuA3
Keilmann, Fritz—FTuB2
Kelly, Damien P.—DWB12
Kemper, Björn—JMB5

Kempkes, Michel—DTuB6
Kendrick, Mark J.—OMC5
Keppel-Aleks, Gretchen—JMA3
Kerber, Florian—JTUB12
Kern, Pierre—FTuB4
Kester, Robert T.—NWC7
Ketelhut, Steffi—JMB5
Khanam, Taslima—DTuB6
Kiire, Tomohiro—DWB11
Kikuchi, Yuichi—DWD4
Kim, Dong-Jin—DWB18
Kim, Dong-Wook—DWB21, DWB30
Kim, Dae-Chan—JTUB28
Kim, Eun-Soo—DWA3, DWB17,
DWB19, DWB20
Kim, Eun-Hee—JTUB7
Kim, Joohwan—DWB25
Kim, Jhoon—HTuA6
Kim, Jongki—OTuA6
Kim, Junki—OTuA6
Kim, Kum-Lan—JTUB19
Kim, Mijin—HTuA6
Kim, Myung K.—DMA, DTuA4,
DTuB4
Kim, Nam—DWB14, DWB31
Kim, Sung-Kyu—DWA
Kim, Seung-Cheol—DWB19,
DWB20
Kim, Sung-Kyu—DWB21, DWB24,
DWB30
Kim, Taegeun—DMB7
Kim, Younghoon—DWB25
Kim, Yunhee—DWB27
Kim, Yoonjae—JTUB19
Kimura, Kouhei—DWB10
Kindel, B.—HMA2
King, Michael D.—HWB1
King, Tom—HWC5
Kino, Gordon S.—NWC1, NWC2
Kishore, Rani—OMB2
Kitayama, Ryo—DWC4
Kivshar, Yuri S.—OMB4, OTuB2,
OTuC4
Kleinert, Anne—JTUB10, JTUB16
Knauer, M. C.—DMC4
Knuteson, Robert—JMA4, FMA2,
FMA4, JTUB17
Knyazikhin, Yuri—HTuC5
Köber, Sebastian—DMB6
Koch, S. W.—OTuB5
Kopp, Greg—HMA2, HMA3
Korobtsov, Alexander—JTUB34,
OTuA5
Kosmeier, Sebastian—JMB5
Kostuk, Raymond—DTuB5
Kotlarchyk, Maxwell—OMA1
Kotova, Svetlana—JTUB34, OTuA5
Kou, Shan S.—JTUB1
Koukourakis, Nektarios—DMB6
Kovacev, Milutin—JTUB8

Koyama, Takamasa—JTB2
Kozawa, Yuichi—**JTuB32**, NMA3
Kranitzky, C.—DMC4
Kreuzer, Jurgen—DWB9
Krolikowski, Wieslaw Z.—OMB4,
OTuB2, OTuC4
Krupinski, Elizabeth A.—DWB36
Kubasik-Thayil, Anisha—NWA1
Kubota, Toshihiro—JTB2
Kuehn, Ralph—HWC4
Kühn, Jonas—**DTuA3**, JTA3
Kukhtarev, Nickolai V.—**DMB1**,
DTuB3
Kukhtareva, T.—DMB1
Kumer, John (Jack) B.—**HMC5**
Kunde, V. G.—FMA3
Kunde, Virgil G.—FTuA5
Kuo, Ming-Kuei—DWB35
Kuporosov, Yury—**JTuB27**
Kustova, Natalia—HTuB4
Kuze, Akihiko—**FMC**, **FTuC2**
Kwon, Ki-Chul—DWB14
Kwon, Yong-Moo—DWB21, DWB30

L

Labby, Z.—FWC2
Labonnote, Laurent—**HWB2**
Lagueux, Philippe—FThA2
Lai, Xin-Ji—DTuB2
Lam, Edmund Y.—DMA3
Lambriqtsen, Bjorn—**HWD4**
Landau, Sara M.—**NWC7**
Langehanenberg, Patrik—JMB5
Lanman, Douglas—JTB5
LaPorte, Dan—FMA2
Lara, David—NTuA6
Larar, Allen M.—HTuA1, **HWD3**
Larigauderie, C.—FMC2
Lasser, Theo—NMB3
Last, Alan—FMC4, HWC6
Lattanzio, Alessio—HTuC3
Lauterbach, Marcel A.—NMA1
Lawler, James E.—**FWC2**
Lazarz, Evan—NMC6
Le Coarer, Étienne—**FMB4**, JTB9
Leblanc, Lisa—JTB11
Lee, Byoung-ho—DWB1, DWB25,
DWB27, JTB1, JTB7
Lee, Byung-Gook—DWB17, DWB18
Lee, Byung-Il—**JTuB19**
Lee, El-Hang—JTB28
Lee, Eun S.—**JTuB22**, **JTuB24**
Lee, Hyesog—NMA6
Lee, Jaehwa—HTuA6
Lee, Jae Y.—JTB22, JTB24
Lee, Kwang - Hoon—**DWB21**
Lee, Seungwon—HTuA3
Lee, Seung Gol—JTB28
Lee, Sejin—OTuA6
Lee, Sung J.—DWB3

Lee, Wai-Hon—**DWC5**
Lee, Yi-Ta—DTuB2
Lemonnier, Olivier—DWD5
Lengel, Anton—JTB16
Leroy, Stephen—HMA1, HMA4
Levene, Michael J.—**NMD2**
Levesque, Luc—FTuC3
Levin, Carly—OMB2
Lewi, Tomer—FTuB4
Li, Jianping—**FWB4**
Li, Jun—**HTuA2**
Li, Jinlong—HTuA2
Li, Jun—HTuA5, HWA2, JTB17
Li, Jingliang—NWD2, NWD3
Li, Siyuan—FTuB5
Li, Yong—**DWB7**
Liang, Xinan—DWB32
Liao, Ho-En—DWA2
Liddle, J. A.—NWB5
Lien, Chen-Hui—DWB29
Lilge, Lothar—OMA4
Liliana, L.—DWA3, DWB17
Lim, Daryl—**NWA4**, NWC3
Lim, Young-Tae—**DWB14**
Lim, Yongjun—**JTuB1**
Lin, Hermann—JTB26
Lin, Kuo-Kuei—DWA2
Lin, Li-Chien—**DWA2**, DWB29
Lin, Yuxiang—NWD4
Lin, Zhiping—JTA4
Liu, Jung-Ping—DWC2, **JTuB4**
Liu, Jonathan T. C.—NWC1, **NWC2**
Liu, Lin—NTuB3
Liu, Xu—**HTuA1**, HWD3
Liu, Xingpin—HWC5
Liu, Yan-an—JTB20
Liu, Zhihai—OTuC2, **JTuB31**
Liu, Zhaowei—**NMA6**
Livingston, John M.—HTuC4
Livschitz, Yakov—HMC2
Lloyd, James P.—FTuA4
Lobera, Julia—DWD3
Loesel, J.—FMB5
Loomis, Nick—**DMB4**
Lopez-Mariscal, Carlos—**OMA**
López-Quesada, Carol—JTB33
Losevsky, Nikolay—JTB34, OTuA5
Louradour, Frederic—NWC6
Love, Steven P.—**HTuC1**
Lu, Fake—NMC5
Luo, Yuan—**DTuB5**

M

Maddux, Brent—HWB1
Maddy, Eric—HTuC2, HWC5
Maejima, Kohei—**DMA2**
Magistretti, Pierre—DTuA2
Maheshwari, Sameer—NTuB6
Mahgoub, Ahmed—JTB13, **FThA5**
Maillard, Jean-Pierre—**FThA4**, **FTuA**

Makhlouf, Houssine—NWC4
Malinovskaya, Svetlana A.—**NMC2**
Mamoutkine, A. A.—FMA3
Mandella, Michael J.—NWC1,
NWC2
Mandon, Julien—FMB2
Märki, Iwan—**NMB3**
Marquet, Pierre—**DTuA2**, DTuA3
Marshak, Alexander—**HTuC5**
Marston, Philip L.—**OMB5**
Martin, Brigitte—DWD5
Martin, Guillermmo—FTuB4
Martin-Badosa, Estela—JTB33
Martinez, Christophe—**DWD5**
Matoba, Osamu—JTB2
Matthews, Thomas—NMC1
Maucher, Guido—JTB10
Maussang, I.—FMB5
Mazzotti, Marco—DTuB6
McClelland, Jabez J.—NWB5
McGloin, David—**OMB**, **OTuB3**
McIntyre, David H.—OMC5
McKay, H. A.—FMB3
McMahon, Matthew D.—NWB5
McMillan, Robert S.—FWC4
McWilliam, Richard—**DWB28**
Meade, Jeff—FWC4
Meerholz, Klaus—DMB6
Mehta, Shalin B.—**NTuA5**
Meng, Zhaokai—HMB4
Menon, Rajesh—NMA2
Menzel, Paul—**HWA1**, HWA2
Merenda, Fabrice—OTuA6
Mertz, Jerome—NMD3, NWA4,
NWC3, **NWD**
Meyer, Kerry—**HWB4**
Meyer, Michael—NWA2
Miao, Ming—OTuA3
Miao, Qin—**NWA2**
Michaelian, Kirk H.—FWD3
Mihajlovic, Nenad—**NWC5**
Miles, Mervyn J.—OMA5, OMC2
Milster, Tom D.—DWB36
Min, Sung-Wook—DWB25, **DWB26**
MIPAS-Team—JMA2
Mishina, Tomoyuki—DWA5
Mitchell, David L.—**HWA4**
Mo, Xiaoli—JMB5
Moerner, W. E.—NMA5
Moloney, Jerome V.—OTuB5
Monsoriu, Juan A.—JTB35
Montagner, Francois—HMC2
Montes-Usategui, Mario—JTB33
Montfort, Frédéric—DTuA3
Moon, Euclid E.—NMA2
Morand, Alain—JTB9
Moratal, Corinne—DTuA3
Moreau, Louis M.—**FMC3**, **FTuC3**,
JTuB11
Moreno, Fernando—JTB25

Morgner, Uwe—JTB8
Morrish, Dru—**NWD1**, NWD2
Mozina, Janez—DWB2
Mu, Yu-Hong—JTB30
Muirhead, Philip S.—FTA4
Mujat, Mircea—NTB5
Mulligan, Mark—JMA4
Murakami, Noriko—FTC1
Murata, Osamu—**DTA5**
Murison, Marc—FWC4
Murphy, Dominic F.—**FWD5**
Murray, Jon—FMC4
Muterspaugh, Matthew W.—FTA4

N

Nagle, Fred—FMA2
Nakadate, Suezou—**DWB11**
Nakagawa, Takao—FTC1
Nakajima, Masakatsu—FTC2
Nasiri, Shaima L.—**HWA3**
Naughton, Thomas J.—DTB6,
DWB12
Nave, Gillian—**FWB**, FWB2, **FWB5**,
JTB12
Naylor, David A.—FTC4, JTB15
Nehmetallah, George—DTB3
Nelleri, Anith—DTB1
Nelson, Alan C.—NWA2
Neubert, Tom—**JTuB10**
Neumann, Thomas—NWA2
Newbury, Nathan R.—FMB1
Newman, Stuart—HWC6
Nguyen, Thanh—FTA5, **JTuB13**
Nichols, Sarah R.—NMC4
Nilsson, Hampus—FTA3
Nishio, Kenzo—JTB2
Nitanai, Eiji—DWB33
Nixon, C. A.—FMA3
Nolte, David D.—**JMB4**
Nomura, Takanori—**DWB33**, **DWD**
Notholt, Justus—JMA3
Numata, Takuhisa—DWB33

O

O, Beom-Hoan—JTB28
Ogilvie, Jennifer P.—**NMC4**
Oh, K.—OTA6
Oh, Se Baek—**DWB4**, **JTuB5**
Okada, Yoko—FTC1
Okui, Makoto—DWA5
Olsson, Erik—**JTuB6**
Ono, Yuzo—**DMB2**
Onural, Levent—DTB7, DWA4
Ootsubo, Takafumi—FTC1
Orphal, Johannes—**FWA2**
Osten, Wolfgang—**DMC1**
Ostroverkhova, Oksana—OMC5
Ou, Mi-Lim—JTB19
Ou-Yang, H. Daniel—**OTuB4**

P

Pacoret, Cécile—OMC3
Padgett, Miles J.—OMA5, OMC3
Pagnoux, Dominique—NWC6
Pais, Andrea—FWD4
Palero, Virginia—DWD3
Pandey, Nitesh—DWB12
Panetta, R. L.—**HTuB3**
Pardo, Juan R.—**FTuA6**
Park, Gilbae—DWB25, **DWB27**
Park, Jae-Hyeung—**DMC**, **DWA1**,
DWB1, DWB14, DWB31
Park, Kyoung-Duck—**JTuB28**
Park, Soon-gi—DWB26
Park, Sang Seo—HTA6
Park, Se-Geun—JTB28
Park, Yongkeun—NTA1
Patlan, Vsevolod—OTA5
Pavani, Sri Rama Prasanna—**NMA5**
Pavelin, Ed—HMC4
Pavillon, Nicolas—DTA3, DWB5,
JTA3
Pavlonis, Michael—**HMB3**
Pearl, J. C.—FMA3
Péquignot, E.—FMC2
Perrin, L.—FMB5
Persson, Martin—**DWC3**
Peterhänsel, S.—DMC4
Pfeifer, Marcel—DWD6
Piao, Yongri—DWA3
Pickering, Juliet—FMC4, **FWB2**,
FWB3, HWC6
Picqué, Nathalie—FMB2
Pierangelo, C.—FMB5
Piestun, Rafael—**JMB2**, NMA5
Piletic, Ivan—NMC1
Pilewskie, Peter—**HMA2**, HMA3,
HWB
Pilorz, Stuart H.—FTA5
Pitter, Mark C.—NWB2
Piyawattanametha, Wibool—**NWC1**
Platnick, Steven—**HWB1**, HWB4,
HWC, HWC4
POLDER Aerosol/Cloud Teams—
HWB2
Poon, Ting-Chung—DMA3, DMB7,
DTuC1, DWC2, JTB4
Potcoava, Mariana—DTB4
Potvin, Simon—**JTuB14**
Pradhan, Prabhakar—NTB6
Praharaj, Sarat C.—DTB3
Przibilla, Sabine—JMB5
Psaltis, Demetri—**DTuA1**
Pu, Ye—DTA1
Puhan, Niladri B.—JTA4
Purvis, Alan—DWB28

Q

Qu, Weijuan—DWB23

R

Ra, Hyejun—NWC1
Rahn, J. R.—NWA2
Rairden, Rick L.—HMC5
Rajendran, Arvind—DTB6
Ralchenko, Yu.—JTB12
Ramirez, Freddy A. Monroy.—
DWB15
Rappaz, Benjamin—DTA2, DTA3
Raskar, Ramesh—JTB5
Razueva, Eugenia—OTA5
Redemann, Jens—**HTuC4**
Régnier, Stéphane—OMC3
Rehman, Shakil—NWB3
Reichelt, M.—OTB5
Reid, Jonathan—**OTuB1**
Revercomb, H. E.—FMA4, **FMA2**,
HMC, **JMA4**, JTB17
Reynolds, Jeremy—NWD1
Richter, C.—DMC4
Riedi, Jerome—HWB2
Riley, Zack—NMC6
Rinsland, Curtis—**FWA3**
Rizzoli, Silvio O.—NMA1
Roberts, Yolanda—HMA2, HMA3
Roche, Aidan E.—HMC5
Rode, Andrei V.—**OMB4**, **OTuB2**,
OTuC4
Rodriguez, Antonio—FMC1
Rodriguez, Oscar—**NTuA6**
Roebeling, Rob—**HMB**, **HWC3**
Roehrig, Hans—DWB36
Roesler, Fred L.—FWC1, FWC2,
FWC5
Roichman, Yael—**OMC1**
Romani, P. N.—FMA3
Rommelùère, Sylvain—FMB6
Rongen, Heinz—JTB10
Rosen, Joseph—DMC2
Ross, Amanda J.—**FWD1**, **FWD2**
Rouse, Andrew R.—NWC4
Rueda, Edgar—**JTuB3**
Ruehl, A.—FMB3
Rufus, James—FWB3
Rusciano, Giulia—**OMB1**, **OTuC**
Russell, Phil B.—HTC4
Russell, Philip S.—OMA6
Rytz, Daniel—DMB6

S

Saiz, Jose M.—JTB25
Sakamoto, Yuji—DWB8
Sakata, Hironobu—**DWB8**
Sakdinawat, Anne—**NMB5**
Salami, Houssam—FWD2
Salathe, Rene-Paul—OTA6
Salek, Mir Farrokh—NWD4
Salieres, Pascal—JTB8
Salvador, Michael—DMB6
Samenini, Prathyush—NMC1

Sams, Robert L.—FWA6
Samuelson, Sean R.—FWD4
Sansone, Craig J.—FWB5, JTUB12
Santos, Silvia—NWC3
Sasamoto, Masumi—DWB34
Sato, Kunihiko—DMA2, DTUA5
Sato, Shunichi—JTUB32, **NMA3**
Savary, Simon—JTUB14
Schmid, Beat—HTUC4
Schmit, Timothy J.—HTUA5
Schneider, Florian—DMA6
Schumann, Wolfgang—FMC1
Schutgens, Nick—HWC3
Seed, Luke N.—DWB28
Seibel, Eric J.—NWA2
Sejnowski, Terrence J.—NWA6
Serabyn, Eugene—FTUA6
Shaffer, Etienne—**JTuA3**
Shah, Duoaud—OMA4
Shanbhag, N.—HMA2
Shank, Charles—NMB1
Shao, Limin—FWA5
Sheetz, Kraig—NMD4
Shepherd, Neal—NTUA3
Sheppard, Colin—**JTuA1, NMA,**
NTUA5, **NWB3**
Sherlock, Vanessa—JMA3
Shibai, Hiroshi—FTUC1
Shibuya, Masato—DWB11
Shimobaba, Tomoyoshi—**DWB6,**
DWD1
Shimozato, Yuki—JTUB2
Shin, Dong-Hak—**DWA3, DWB17,**
DWB18
Shinozuka, Yohei—HTUC4
Shiu, Min-Tzung—DWB35
Shreim, Samir—OMA1
Shroff, Hari—NMB1
Shvedov, Vladlen G.—**OMB4,**
OTUB2, OTUC4
Šiler, Martin—**OTUA4**
Siméoni, D.—FMC2
Simon-Miller, A. A.—FMA3
Simpson, Stephen H.—**OMA3,**
OMC2
Sindbert, Simon—NWB1
Singh, Kehar—**DTUB1**
Singh, Satish K.—NWC3
Singh, Vijay Raj—JTUA2
Siniuk, Aliaksandr—HTUC4
Sinks, Louise E.—**NMC7**
Siskind, David E.—FWC1
Sjödahl, Mikael—**DTUC,** JTUB6
Skala, Melissa C.—**NTUB2**
Small, Alexander R.—**NMB4, NWC**
Smillie, Darren G.—FWB2
Smith, Peter L.—FWB2, FWB3
Smith, William L.—HTUA1, HWD3,
JTuB17
Sohn, Byung-Ju—**HWB3,** JTUB18

Sohn, Eun-Ha—JTUB19
Solanki, Sanjeev—DWB32
Solgaard, Olav—NWC1
Somekh, Michael G.—NWB2
Son, Jung-Young—DWB30
Song, Byoung-Sub—DWB26
Song, Chul Han—HTUA6
Song, Fang—DWB7
Song, Hwan-Jin—JTUB18
Soucy, Marc-Andre—FTUC3, JTUB11
Spencer, Locke D.—**FTUC4, JTUB15**
Spray, John G.—FMC3
Squier, Jeff—NMD4
Stark, Glenn—FWB3
Stark, Hendrik—FMC1
Starr, David—**HWC1**
Steinmeyer, Günter—DMA6
Stevens, Michael H.—FWC1
Stuhlmann, Rolf—**FMC1, HMC4,**
HTUC3
Subramanian, Hariharan—**NTUB6**
Sun, Cheng—NMA6
Sun, Fengying—HWC5
Sun, Jingjing—NTUB3
Sung, Yongjin—NTUA1, **NTUA2**
Suran, Eric—NWC6
Suto, Hiroshi—FTUC2
Swann, William C.—FMB1

T

't Hooft, Gert W.—NWC5
Tahara, Tatsuki—JTUB2
Takahashi, Hidenori—FTUC1
Takahashi, Satoshi—DWB3
Takaki, Yasuhiro—DWD2
Tanbakuchi, Anthony A.—NWC4
Tanemoto, Yumi—**DWD2**
Tang, Guanglin—HTUB3
Tang, Jianyong—NMB1
Tang, Shuo—**NMC3**
Tanii, Jun—FTUC3
Tanner, Alan—HWD4
Taurand, Geneviève—FTUB1, **FTUB3**
Taylor, Joe—FMA2, **FMA4, JMA4**
Taylor, J. P.—HTUA4
Teixeira, João—HTUA3
Templier, Roseline—DWD5
Teranishi, Yusuke—DWB33
Teu, Andass C. K.—JTUA4
Thapa, R.—FMB3
Thelen, Jean-Claude—**HTUA4**
Thomas, B. K.—FMB3
Thompson, Lucy—FMC3
Thompson, Michael A.—NMA5
Thorne, Anne—FWB2, FWB3
Tippie, Abbie E.—**JTuA5**
Tjemkes, Stephen—FMC1, **HMC4,**
HTUC3
Tkaczyk, Tomasz S.—NWC7

Tobin, David C.—FMA2, FMA4,
HMC1, JMA4
Toge, Hiroyuki—DTUA5
Tomilin, Maxim—JTUB27
Toon, Geoff—**JMA3**
Toriz-Garcia, Jesus—DWB28
Torroba, Roberto—JTUB3
Tran, Alex K.—HTUC4
Trémas, T.—FMB5
Tremblay, Pierre—**FMB, FThA3**
Tromberg, Bruce—NMC3
Tsai, Chao-Hsu—**DWA6**
Tsai, Hsin-Yu—**NMA2**
Tsang, Peter—**DWC2**
Tsia, Kevin—NWC8
Tu, Han-Yen—DTUB2
Turek, John—JMB4
Turner, Daved—HWC4

U

Ura, Shogo—JTUB2
Ustun, Teoman—NTUB5

V

Valle, Pedro J.—JTUB23
van Blaaderen, Alfons—DWD7
van der Horst, Astrid—DWD7,
OMB3, OTUA3
van der Weide, Daniel—**FTUB2**
van Oostrum, Peter D. J.—**DWD7**
Varnai, Tamas—HTUC5
Vasudevan, Srivathsan—**JTuA4**
Vaughan, Mark—HWC4
Vaziri, Alipasha—**NMB1, NWB**
Veilleux, James—FTUC3
Veit, K.—DMC4
Villemaire, André—FThA2
Vincent, Frederic—FWC5
Vinogradov, Sergei A.—NMC7
Vollmer, Angelika—JMB5
Volostnikov, Vladimir—OTUA5
Volpe, Giovanni—**OTUA, OTUC1**
von Bally, Gert—JMB5
von Ribbeck, Hans-Georg—FTUB2
Vorontsov, Evgeny—**JTuB34,**
OTUA5
Vučinić, Dejan—**NWA6**

W

Wagner, Kelvin—NWA3
Wagner, Sebastian—HTUC3
Wakamatsu, Takeshi—JTUB2
Walker, Kaley A.—JTUB11
Wallrabe, Ulrike—DMA6
Wang, Chih-Ling—**JTuB26**
Wang, Hui—DWB7
Wang, Je-Chuang—DWB35
Wang, Tao—**DWB22**
Waquet, Fabien—HWC2
Warren, Warren S.—**NMC1, NMD**

Washenfelder, Rebecca—JMA3
Wei, Ming—**JTuB20**
Wei, Ruyi—**FTuB5**
Weisz, Elisabeth—**HWA2, JTuB17**
Wen, Qing—**FWD3**
Weng, Fuzhong—**HWD1**
Weng, Jiawen—DWB16
Wennberg, Paul—JMA3
Westphal, Volker—**NMA1, NMB**
Wicker, Kai—NWB1
Widengren, Jerker—NMB2
Wielicki, B. A.—HTuA1
Williams, Gavin L.—DWB28
Wills, Jonathan—OTuB1
Wilson, Tony—NWA1
Wind, Galina—HWB1
Wiscombe, Warren—HTuC5
Wishnow, Ed—FTuA4
Wong, Chee Howe—NWA5
Wright, Jason T.—FTuA4
Wu, Jing—**OMC4**
Wu, Lei—**FWD4, NTuB3, NWD1**
Wu, Ming C.—**JMB1**
Wu, Qiongshui—FTuB5
Wu, Zhongfu—JTuB31
Wunch, Debra—JMA3

X

Xie, Huikai—FWD4, NTuB3, NWD1
Xie, Jinghui—JMB5
Xiong, Xiaozhen—HTuC2
Xiong, Yi—NMA6
Xu, Chris—NMC, NMD1
Xu, Shuhong—**DWB32**
Xu, Xuewu—DWB32

Y

Yamaguchi, Ichirou—**DMA1**
Yamaguchi, Takeshi—DWC4
Yamamoto, Kenji—**DWA5**
Yamashita, Satoshi—DWB10
Yamashita, Yutaka—NTuA4
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UPDATE SHEET

Withdrawals:

NMC6	JTuB34
FTuA4	JTuB35
OTuA5	HTuC6
JTuB23	DWA3
JTuB29	DWB2
JTuB30	HWD4

Substituted Papers:

The paper **HTuC6** that is in your program will not be presented. During this time slot, the following postdeadline paper will be presented in its place: **PHTuC6, Airborne Radiometer Measurements of Above Cloud Reflectance in the Presence and Absence of Aerosols**, *Odele Coddington¹, Peter Pilewski¹, Tomislava Vukicevic¹, John Livingston², Steve Platnick³, Gala Wind³, Jens Redemann⁴, Philip B. Russell⁴*; ¹Univ. of Colorado at Boulder, USA, ²SRI Intl., USA, ³NASA GSFC, USA, ⁴NASA AMES, USA.

The poster **JTuB17** will be presented during the session **HWA • Hyperspectral IR and Imager Data Analyses** (April 29, 2009, 8:30 a.m.–10:30 a.m., Junior Ballroom C) as oral presentation **HWA5**.

Presider Updates:

Nickolai V. Kukhtarev; Alabama A&M Univ., USA, will preside over session **DMB • Novel Technologies in Holography**, on Monday, April 27, 2009, 11:00 a.m. –1:00 p.m. in Grand Ballroom A.

Yoshio Hayasaki; Utsunomiya Univ., Japan, will preside over session **DWC • Computer-Generated Holograms**, on Wednesday, April 29, 2009, 2:00 p.m.–4:00 p.m. in Grand Ballroom A.

Presenter Changes:

DTuA1, Harmonic Holography will now be presented by *Chia-Lung Hsieh^{1,2}*, ¹Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland, ²Caltech, USA.

NTuA5, Linear Phase-Gradient Imaging with Asymmetric Illumination Based Differential Phase Contrast (AIDPC), will now be presented by *Colin J. R. Sheppard, Natl. Univ. of Singapore, Singapore*.

Time Changes:

HWA will end a half hour later at 10:30 a.m.

Exhibits will end at 12:30 p.m. on Wednesday, April 29, 2009.

Postdeadline Paper Programs:

Post deadline Paper Programs are available at Registration.

Special Events:

Meet the Applied Optics Editors Dinner on Tuesday, April 28, 2009, 7:00 p.m. All conference attendees, especially students, are invited to this casual networking dinner. More information is available at Registration.

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POSTDEADLINE PAPERS

ADVANCES IN IMAGING

Digital Holography and
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Fourier Transform Spectroscopy (FTS)

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•Tuesday, April 28, 2009•

Junior Ballroom C

2:00 p.m.–4:00 p.m.

HTuC • New Remote Sensing Perspectives

Anthony Baran; Met Office, UK, Presider

PHTuC6 • 3:45 p.m.

Airborne Radiometer Measurements of above Cloud Reflectance in the Presence and Absence of Aerosols, *Odele Coddington¹, Peter Pilewski¹, Tomislava Vukicevic¹, John Livingston², Steve Platnick³, Gala Wind³, Jens Redemann⁴, Philip B. Russell⁴*; ¹Univ. of Colorado at Boulder, USA, ²SRI Intl., USA, ³NASA GSFC, USA, ⁴NASA AMES, USA. We present cloud retrieval results from SSFR measurements made in the presence and absence of aerosols and show comparisons to MODIS. A method for treating aerosol bias in retrievals as systematic model uncertainty is described.

Grand Ballroom C/D

4:30 p.m.–6:00 p.m.

JTuB • DH/FTS/HISE/NTM/OTA Joint Poster Session

PJTuB36

Automated Particle Characterization Using Holographic Video Microscopy, *Fook Chiong Cheong, David G. Grier; New York Univ., USA*. With an efficient particle identification algorithm, combine with hardware acceleration and software optimization, holographic microscopy data can be analysis in near real time with sufficient accuracy to enable unattended holographic tracking and particle characterization.

PJTuB37

Incoherent Optical Imaging Using Synthetic Aperture with Fresnel Elements, *Barak Katz, Joseph Rosen; Ben-Gurion Univ. of the Negev, Israel*. We present a new lensless incoherent holographic system operating in a synthetic aperture mode. Spatial resolution exceeding the Rayleigh limit is obtained by tiling several holographic elements into a complete Fresnel hologram of observed objects.

PJTuB38

CrIS Radiance Spectra Modeling and End-to-End Error Analysis, *Nikita Pougatchev, Gregory Cantwell, Gail Bingham; Space Dynamics Lab, Utah State Univ., USA*. We present the Cross-track Infrared Sounder (CrIS) end-to-end error model consisting of instrument model and Validation Assessment Model. Models' descriptions along with examples of application are presented.

PJTuB39

SPDM - Single Molecule Superresolution of Receptor Clusters in *E. coli* Bacteria, *Thomas Ruckelshausen¹, Paul Lemmer¹, Victor Sourjik², Christoph Cremer^{1,3,4}*; ¹Kirchhoff-Inst. for Physics, Univ. of Heidelberg, Germany, ²Ctr. for Molecular Biologie Heidelberg, Univ. of Heidelberg, Germany, ³Inst. for Pharmacy and Molecular Biotechnology, Univ. of Heidelberg, Germany, ⁴Inst. for Molecular Biophysics, The Jackson Lab, USA. In *E. coli* bacteria the chemotaxis phosphatase protein CheZ was labeled with YFP (yellow fluorescent protein). Their reversible photobleaching is used for an optical isolation in time. An average localization precision of 22nm was achieved.

•Wednesday, April 29, 2009•

Junior Ballroom C

8:30 a.m.–10:30 a.m.

HWA • Hyperspectral IR and Imager Data Analyses

Allen Huang; Univ. of Wisconsin at Madison, USA, Presider

PHWA6 • 10:15 a.m.

Investigations of Cirrus in the Far Infrared with the Tropospheric Airborne Fourier Transform

Spectrometer (TAFTS), *Caroline Cox¹, Neil Humpage¹, Paul Green¹, Juliet Pickering¹, John Harries¹, Jonathan Taylor², Anthony Baran², Alan Last¹, Jon Murray¹; ¹Imperial College London, UK, ²Met Office, UK*. An overview of the results of recent field campaigns performed with the Tropospheric Airborne Fourier Transform Spectrometer (TAFTS) to study the radiative properties of cirrus in the far infrared spectral region is presented.

Grand Ballroom C/D

11:00 a.m.–12:30 p.m.

DWB • DH Poster Session

PDWB37

Femtosecond Time-Resolved Off-Axis Digital Holography, *Tadas Balciunas, Andrius Melninkaitis, Andrius Vanagas, Valdas Sirutkaitis; Laser Res. Ctr., Vilnius Univ., Lithuania*. We present time-resolved off-axis digital holography for investigation of laser-induced plasma filaments in condensed media. An experimental setup with tilted reference pulse allows larger crossing angles to be used for recording of digital holograms.

PDWB38

A High-Definition Full-Parallax CGH Created by the Polygon-Based Method, *Kyoji Matsushima, Sumio Nakahara; Kansai Univ., Japan*. A large-scaled full-parallax CGH with 4 billion pixels is produced by a polygon-based method. The CGH reconstructs a fine 3-D image and gives a large sensation of depth owing to the silhouette-masking technique.

Key to Authors and Presiders
(**Bold** denotes Presider or Presenting Author)

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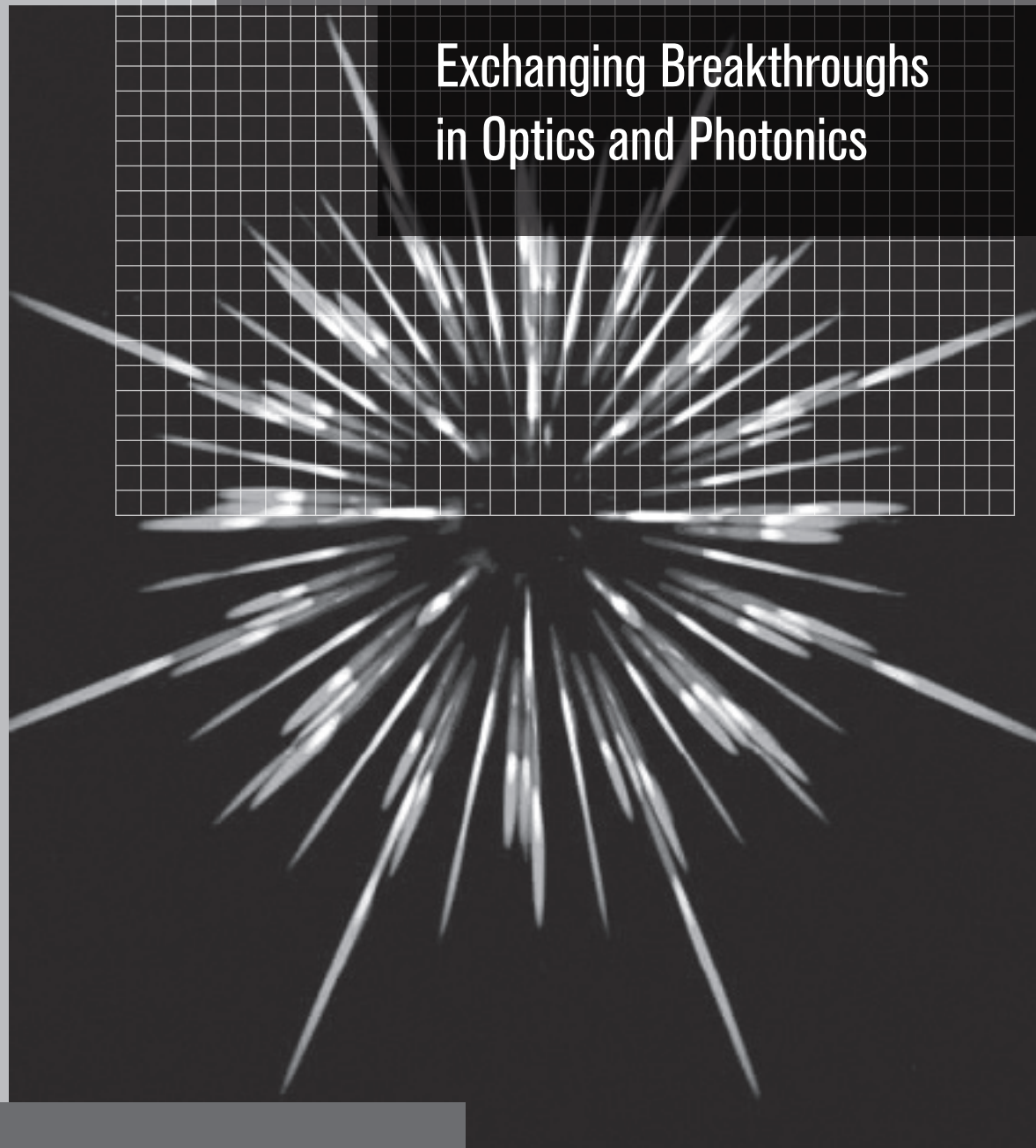
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