

# JOINT PROGRAM

## 17th Electromagnetic and Light Scattering Conference

and

## 11th Conference on Laser-Light and Interactions with Particles



Texas A&M University, College Station, TX, USA  
4–9 March 2018

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### Monday, March 5

**8:30–8:50**    **Opening of the conference** / G. Gouesbet, H. B. Maring, M. I. Mishchenko, and P. Yang

**8:50–9:00**    **Conference logistics** / P. Yang and P. Stegmann

**9:00–10:30**   **Plenary tutorial lectures** / P. Marston

- Marlan Scully, *Remote detection from black mold to black holes* (30 min)
- Lihong V. Wang, *Photoacoustic tomography: omniscale imaging in scattering media from organelles to patients* (30 min)
- Mathieu Francoeur, *Fluctuational electrodynamics and near-field thermal radiation* (30 min)

**10:30–11:00**   **Coffee break**

**11:00–12:00**   **Plenary tutorial lectures** / M. D. King

- Oleg Dubovik *et al.*, *Solving inverse problems of light scattering: sensitivity tendencies in remote sensing of atmospheric aerosols* (30 min)
- Brian Cairns *et al.*, *A polarized view of the world* (30 min)

**12:00–13:30**   **Lunch**

**13:30–15:00**   **Plenary tutorial lectures** / J. A. Lock

- Philip H. Jones and Onofrio M. Maragó, *Optical forces and applications* (30 min)
- Alexei V. Sokolov, *Coherent light scattering by molecular vibrations* (30 min)
- Jia J. Wang *et al.*, *Structured light interaction with small particles: GLMT and EBCM theoretical treatments* (30 min)

**15:00–15:30**   **Coffee break**

**15:30–17:30**   **Laboratory and field experiments** / C. M. Sorensen

- Justice Archer *et al.*, *Using linear electrodynamic quadrupole trap for drop pattern formation and nanoparticle aggregates production from drying colloidal microdroplets of suspension* (15 min)
- Ilia L. Rasskazov *et al.*, *Infrared spectroscopic imaging of complex samples* (15 min)
- Ivan Kassamakov *et al.*, *Light scattering by ultrasonically levitated particles: system design* (15 min)
- Osku Kempainen *et al.*, *In-situ atmospheric particle imaging with a portable digital holography instrument* (15 min)

- Kyle E. Fitch and Timothy J. Garrett, *Classification of riming extent in the Arctic with the Multi-Angle Snowflake Camera* (15 min)
- Zhiyong Gong *et al.*, *Measuring physical properties and heterogeneous chemistry of single airborne particles concurrently using optical trapping-Raman spectroscopy (OT-RS)* (15 min)
- Ankur Gogoi *et al.*, *Spectrally and angle resolved light scattering properties of graphite and expanded graphite particles* (15 min)
- Sanchita Roy *et al.*, *Light scattering tool to typify sub-micron particles in relevance to biomedical science* (15 min)

**17:30–18:30 LIP–ELS business meeting**

**19:00–22:00 Conference reception**

## Tuesday, March 6

**8:30–10:30 Electromagnetic scattering and optical characterization / P. Yang**

- *(Invited review)* Lei Bi, *The invariant imbedding principle applied to light scattering by nonspherical particles: a review* (25 min)
- *(Invited review)* Michael I. Mishchenko *et al.*, *Scattering by particles in an absorbing medium* (20 min)
- James A. Lock, *Negative extinction in one-dimensional scattering* (15 min)
- Maxim A. Yurkin and Michael I. Mishchenko, *Advanced topics related to the volume integral equation formulation of electromagnetic scattering* (15 min)
- Edward S. Fry and John Mason, *Integrating cavities and UV water absorption* (15 min)
- Hans Moosmüller and Christopher M. Sorensen, *Single scattering albedo of homogeneous, spherical particles in the transition region* (15 min)
- Dilan Avşar *et al.*, *Comparison of local absorption of core-shell nanoparticles with different core size and shell thickness* (15 min)

**10:30–11:00 Coffee break**

**11:00–12:00 Optical characterization / M. J. Berg**

- Petteri Helander *et al.*, *Light scattering measurements enabled by acoustic levitation with 3D orientation control* (15 min)
- William Heinson and Rajan Chakrabarty, *Light absorption properties of coated black carbon aggregates with increasing fractal dimension* (15 min)
- Mirza Karamehmedović *et al.*, *Active-subspace analysis of speckle patterns* (15 min)
- Justin B. Maughan and Christopher M. Sorensen, *Approximation to the diffraction limit of three-dimensional shapes using the scaling approach* (15 min)

**12:00–13:30 Lunch**

**13:30–15:30 Atmospheric remote sensing / H. B. Maring**

- Anthony J. Baran *et al.*, *The challenge of sub-millimetre-wave scattering* (15 min)
- Michael D. King *et al.*, *Spatial and temporal distribution of cloud properties observed by MODIS* (15 min)
- Alexandra Tsekeri *et al.*, *Detecting oriented dust with novel polarization lidar* (15 min)
- Rajan Chakrabarty and Benjamin Sumlin, *Effects of atmospheric photo-oxidation on brown carbon aerosol spectral optical properties* (15 min)
- Sergey Korkin and Alexei Lyapustin, *Atmospheric correction with polarization* (15 min)
- William G. K. Martin and Otto P. Hasekamp, *A 2D demo of adjoint methods for 3D remote sensing* (15 min)
- Benjamin Torres *et al.*, *Advanced characterization of aerosol size properties from measurements of spectral optical depth using the GRASP algorithm* (15 min)
- Romain Ceolato *et al.*, *Lidar depolarization ratio of soot fractal aggregates: spectral dependence over the visible-to-infrared spectrum* (15 min)

**15:30–16:00 Coffee break**

**16:00–17:30 Atmospheric and oceanic remote sensing / A. J. Baran**

- Feng Xu *et al.*, *Coupled retrieval of water cloud and above-cloud aerosol properties using AirMSPI* (15 min)
- Ryan Honeyager *et al.*, *Development of a common framework for handling particle scattering data* (15 min)
- Xiaodong Zhang *et al.*, *Optically resolving size and composition distributions of particles from the volume scattering functions* (15 min)
- Hong Chen *et al.*, *Validation of cloud optical parameters from passive remote sensing in the arctic by using aircraft measurements* (15 min)
- Chia-Pang Kuo and Ping Yang, *Inherent uncertainties in radiation simulations of the influence of clouds on the climate* (15 min)
- W. Reed Espinosa *et al.*, *The role of absorption in retrievals of aerosol optical and microphysical properties from measurements of absolute and polarized phase function* (15 min)

**Wednesday, March 7**

**8:30–10:30 Beam description, mechanical effects, and plasmonics / F. Onofri**

- James Lock and Philip Laven, *Cross-polarized scattering of an off-axis Gaussian beam by a spherical particle* (12 min)
- Gerard Gouesbet and Leonardo Ambrosio, *On localized approximations for helical beams* (12 min)
- Tan Qu *et al.*, *Scattering of a multilayered chiral sphere by high-order Bessel vortex beam* (12 min)
- Zhefeng Wu *et al.*, *Photonic nanojets generated by hemi-spheroid under on-axis Gaussian beam illumination* (12 min)
- Joonas Herranen *et al.*, *Scattering dynamics of non-spherical particles in optical tweezers: a numerical solution* (12 min)
- Philip Marston and Likun Zhang, *Insight into radiation forces on spheres from partial wave phase shifts* (12 min)
- Brian Stout *et al.*, *Egocentric physics: the sum of Mie* (12 min)
- Zhi-Wei Cui *et al.*, *Dynamical characteristics of Gaussian laser beam from right-handed material to left-handed materials* (12 min)
- Benjamin Sumlin and Rajan Chakrabarty, *A novel Mie theory inversion technique to retrieve the complex refractive index from optical measurements* (12 min)
- Mao-Kuen Kuo, *Plasmon-mediated assembly of tow gold nanorods* (12 min)

**10:30–11:00 Coffee break**

**11:00–12:10 Multiple scattering and radiative transfer / K. Muinonen**

- *(Invited review)* Johannes Markkanen *et al.*, *Light scattering by dense discrete random media of small particles: exact and approximate numerical solutions* (25 min)
- Ping Yang *et al.*, *Similarity relations in radiative transfer* (15 min)
- Bahareh Ramezanpour and Daniel Mackowski, *DDA/RTE hybrid method for predicting the scattering properties by densely packed media* (15 min)
- Huanting Huang *et al.*, *Multiple scattering of closely packed nonspherical objects using vector spheroidal waves and vector addition theorem* (15 min)

**12:10–13:30 Lunch**

**13:30–15:00 Optical particle characterization – multiphase flows / G. Gouesbet**

- Göran Maconi *et al.*, *Experimental light scattering by small particles: orientation-controlled  $4\pi$  levitating scatterometer* (15 min)
- Mariusz Woźniak *et al.*, *Sizing of a single evaporating droplet with near-forward elastic scattering spectroscopy* (15 min)

- Fabrice R. A. Onofri *et al.*, *Analysis of the rainbow scattering by homogeneous and inhomogeneous droplets in liquid-liquid systems* (15 min)
- Suttiya Chiewudomrat *et al.*, *Estimation of refractive index gradients by rainbow refractometry* (15 min)
- Fabrice Lamadie *et al.*, *Particle material recognition using digital-in-line-holography and the virtual/real images concepts* (15 min)
- Mohamed Talbi *et al.*, *Multi-view interferometric out-of-focus imaging of ice particles* (15 min)

#### 15:00–17:00 Poster session / P. Stegmann

- Jing Bai *et al.*, *Analysis of lateral binding force exerted on bi-sphere induced by high-order Bessel vortex beam*
- David Barrios *et al.*, *Determination of the optical constants of the active layer of a suspended particle device smart window with multilayer structure, at the clear and dark states, with and without applied voltage*
- Adam Bell *et al.*, *Application of submillimeter- and thermal-infrared measurements to retrieve ice cloud properties*
- Manash J. Boruah and Gazi A. Ahmed, *Interstellar dust analogue mixture of graphite and fayalite: computational and experimental light scattering properties*
- Lena Bressel *et al.*, *Inline photon density wave spectroscopy for the monitoring of growth of nanoscaled particles and droplets in concentrated liquid suspensions*
- James J. Coy *et al.*, *Using radiometric and polarimetric sensitivities of sub-mm/mm and infrared wavelengths to provide information on simultaneous ice water path and effective diameter retrieval*
- Anthony B. Davis *et al.*, *Generalized radiative transfer models for subpixel spatial & spectral variabilities in optically thin scattering media: application to aerosol profiling with the Oxygen A-band*
- Janna M. Dlugach *et al.*, *Retrieval of microphysical characteristics of particles in atmospheres of distant comets from ground-based polarimetry*
- Kristin Dooley and Jessica DeYoung, *Comparison of various mean field formulations for retrieving refractive indices of aerosol particles containing inclusions*
- Qingwei Duan *et al.*, *Investigation on the relation between the spatial evolution of a circular liquid jet and its rainbow distribution*
- Cheng-Xian Ge *et al.*, *Optical trapping properties of surface plasmon polariton exerted on nanoparticle induced by periodic structure metal film*
- Marco Giordano *et al.*, *Progress on an AERONET aerosol Opto-Physical Typology: defining the variable space and determination of a reference basis to produce a global aerosol climatology*
- Ankur Gogoi *et al.*, *Biological tissue quality assessment by using light scattering goniometry and oblique incidence reflectometry*
- Maria Gritsevich *et al.*, *Application of the multiple-scattering modeling pipeline for spectroscopy, polarimetry, and photometry*
- Boyan Gu *et al.*, *Improvements to the fast parameterization of atmospheric transmittances in RRTMG*
- Nikolai N. Kiselev and Dmitry V. Petrov, *Conjugated random Gaussian particles model and its application for interpretation of cometary polarimetric observations*
- Alexandre Kolomenskii and Hans Schuessler, *Scattering of microparticles stored in ring-type electrodynamic trap*
- Husi Letu *et al.*, *Retrieval of ice cloud properties from HIMAWARI-8 satellite measurements with Voronoi light scattering model*
- Robert C. Levy *et al.*, *Use of non-spherical aerosol models within the Dark Target aerosol retrieval over ocean*
- Lingxi Li *et al.*, *Light scattering from a drop with an embedded spherical particle*
- Hai-Ying Li *et al.*, *Scattering of vector Bessel vortex beam by plasma-coated conducting sphere*
- Ron Li *et al.*, *Laboratory measurements of light scattering properties of kaolin dust at 532 nm*
- Wushao Lin and Lei Bi, *A systematic comparison of the optical properties of spheroids and super-ellipsoids with implications in optical modeling of dust aerosols*
- Hannakaisa Lindqvist *et al.*, *Ray optics for absorbing particles with application to NIR scattering by ice crystals*

- Jinjun Liu and Ping Yang, *Sensitivity study of the radiance to optical and microphysical properties of nonspherical dust aerosols*
- Artem R. Muliukov and Maxim A. Yurkin, *Hierarchical clustering of the precomputed signals database to solve the parametric inverse light-scattering problem*
- Fabrice R. A. Onofri et al., *On the influence of droplets non sphericity on their first rainbow pattern and our capability to correctly estimate their size and temperature*
- Veli-Matti Pelkonen et al., *3D radiative transfer code for polarized scattered light with aligned grains*
- Patricio G. Piedra et al., *Deep Learning for optical characterization of individual laser-trapped particles*
- V. Rosenbush et al., *Optical properties of dust in gassy comet 2P/Encke and in dusty comet 67P/Churyumov-Gerasimenko from observations and modeling*
- Masanori Saito and Ping Yang, *Retrieval of optical thickness and droplet effective radius over vertically inhomogeneous water clouds*
- Gabriel Seymour et al., *Insights into atmospheric aerosol particle morphology from simulations of single-particle light scattering*
- Bingqian Sun et al., *Single-scattering comparisons of large size faceted particles using physical-geometric optics method between surface and volume integral methods*
- Ivan Syniavskiy et al., *Snapshot imaging polarimeter for satellite aerosol remote sensing*
- Sequoyah Walters et al., *Measuring single-particle absorption from elastic light scattering patterns of complex aggregates*
- Guanglin Tang et al., *Improvement of the simulation of cloud longwave scattering in broadband radiative transfer simulations in climate models*
- Nereida L. Valdivia and Leonardo A. Ambrosio, *Analytical description of paraxial higher-order frozen waves in generalized Lorenz–Mie theory: the finite-energy case*
- Sing-Chun Wang and Yuxuan Wang, *Response of aerosols toward drought: a view from climate-chemistry model*
- Liguang Wang et al., *Intensity fluctuations of reflected wave from distributed particles illuminated by a laser beam in atmospheric turbulence*
- Yi Wang and Ping Yang, *Best-fit degree of ice particle surface roughness based on the reflection and polarization properties of clouds*
- Zhen-Sen Wu et al., *Dynamic analysis of a multilayered chiral sphere in laser fields*
- Siyao Zhai et al., *Improving the convergence of the invariant imbedding T-Matrix method*
- Jiaming Zhang and Renxian Li, *Optical forces of a vector Bessel beam on non-spherical particles using discrete-dipole approximation*
- Ruliang Zhong et al., *Fast and high precision measurement of the instability of circular jet by rainbow refractometry*

**17:00–19:00 Excursion**

**19:00– 22:00 Conference banquet**

## Thursday, March 8

**8:30–10:45 Surfaces, agglomerates, and all that / L. Bi**

- *(Invited review)* Zhuomin Zhang, *Plasmonics in nanoparticles for solar energy conversion and thermal transport* (30 min)
- Matthew J. Berg et al., *Internal fields in soot fractal aggregates* (15 min)
- Layth Al-Gabori and M. Pinar Mengüç, *Effects of particle agglomerate deposits on the radiative response of heterogeneous coatings* (15 min)
- Peter A. Anderson et al., *Digital holographic imaging of rough surfaces* (15 min)
- Christopher M. Sorensen et al., *Light scattering and absorption by fractal aggregates including soot* (15 min)
- Kirk A. Fuller, *Some considerations on the design of micro-fabricated photovoltaics* (15 min)
- Eric J. Tervo et al., *Near-field thermal radiation in many-body nanosystems with the discrete dipole approximation* (15 min)

- Azadeh Didari and M. Pinar Mengüç, *Spectral and spatial near-field radiative transfer analysis in nature-inspired golden spiral nanostructures* (15 min)

**10:45–11:15 Coffee break**

**11:15–12:00 Van de Hulst session / D. W. Mackowski**

**12:00–13:30 Lunch, Business meeting of the JQSRT Editorial Board**

**13:30–15:40 Electromagnetic scattering / G. Videen**

- *(Invited review)* Amos Egel et al., *Efficiency and validity of the superposition T-matrix method: recent advances* (25 min)
- Philip L. Marston, *Humblet's angular momentum decomposition applied to terahertz radiation torque on metallic spheres in the Hagen–Rubens approximation* (15 min)
- R. Lee Panetta et al., *Internal traveling waves, energy trapping, and energy release in time domain simulations of incident Gaussian-pulse scattering by single particles* (15 min)
- Matthew J. Berg and Christopher M. Sorensen, *Diffraction, shadows, and scattering in electrodynamics: a new view* (15 min)
- Yevgen Grynko et al., *Simulation of light scattering from compact irregular particles in a wide range of sizes* (15 min)
- Dominik Theobald et al., *T-matrix simulations of light scattering by densely packed nonspherical particles* (15 min)
- Antigoni Kleanthous et al., *Light scattering by complex ice crystals using the Boundary Element Method* (15 min)
- Ines Fenni et al., *Numerically efficient direct solver-based full-wave model for EM scattering from complex-geometry particles* (15 min)

**15:40–16:10 Coffee break**

**16:10–17:40 Atmospheric remote sensing / H. Moosmüller**

- Mikhail D. Alexandrov and Michael I. Mishchenko, *Aerosol retrievals from proposed satellite bistatic lidar observations: accuracy and information content* (15 min)
- Jiachen Ding et al., *Dust aerosol optical depth and particle size retrieval using spaceborne lidar* (15 min)
- Meng Gao et al., *Joint retrieval of aerosol optical properties and water leaving reflectance over coastal waters based on multi-angle polarimetric observations* (15 min)
- Xiang Ni and Chuntao Liu, *Regional variations of ice microphysical properties near the tops of deep convective cores implied by the GPM dual frequency radar observations* (15 min)
- Yi Wang et al., *Retrieving dust refractive index in the thermal infrared from AIRS and MODIS observations: information content analysis and case studies* (15 min)
- Souichiro Hioki et al., *Spectrally and microphysically consistent ice particle model for application in the terrestrial troposphere* (15 min)

## Friday, March 9

**8:30–10:30 Atmospheric and oceanic radiation / R. L. Panetta**

- Xiuhong Chen et al., *Modeling of spectral snow emissivity over the entire longwave band*
- Dmitry S. Efremenko et al., *Fast method for computing the scattered radiation in the O<sub>2</sub>A-band using the predictor-corrector approach* (15 min)
- Cenlin He et al., *Resolving size distribution of black carbon internally mixed with snow: impact on snow optical properties and albedo* (15 min)
- Yi-Hsuan Chen et al., *Influence of surface longwave emissivity and ice clouds longwave scattering on climate simulations* (15 min)
- Benjamin T. Johnson et al., *Status and development of the Community Radiative Transfer Model (CRTM)* (15 min)
- Patrick Stegmann et al., *Monte Carlo radiative transfer study of phytoplankton morphology and Brillouin scattering influence on polarimetric lidar measurements* (15 min)

- Deep Sengupta *et al.*, *Estimation of snow albedo reduction by light absorbing impurities using a Monte Carlo radiative transfer model* (15 min)
- Qiguang Yang *et al.*, *PCRTM-SOLAR model with multiple atmospheric scattering* (15 min)

**10:30–11:00 Coffee break**

**11:00–12:00 Multiple scattering and radiative transfer / M. Yurkin**

- Karri Muinonen *et al.*, *Multiple scattering in discrete random media using incoherent interactions* (15 min)
- Antti Penttilä *et al.*, *Multiple scattering modeling pipeline for spectroscopy, polarimetry, and photometry* (15 min)
- Timo Väisänen *et al.*, *Comparison of geometric optics and radiative transfer in discrete random media* (15 min)
- Lena Bressel and Oliver Reich, *Experimental boundary conditions for frequency domain PDW spectroscopy - a Monte Carlo study* (15 min)

**12:00–13:30 Lunch**

**13:30–15:00 Optical characterization / M. P. Mengüç**

- Christian Peest *et al.*, *Validating polarization implementations in 3D MCRT codes* (15 min)
- Tino Steinmetz *et al.*, *Estimation of projected particle envelope for disperse phase discrimination in hydrodynamic nuclei concentration technique* (15 min)
- Chao Liu, *The scattering and absorption properties of black carbon aggregates: from numerical aspect* (15 min)
- Hans Moosmüller and Evgenij S. Zubko, *Single scattering albedo of agglomerated debris particles and homogeneous spheres: a comparison* (15 min)
- Andrey V. Romanov *et al.*, *A spectral method to detect particle's non-sphericity from its light-scattering pattern* (15 min)
- Jehan Seneviratne and Matthew J. Berg, *Insight into power-law structure of scattering curve* (15 min)

**15:00–15:30 Astrophysical applications (Nikolai Voshchinnikov session) / O. Dubovik**

- Gorden Videen and Vladimir B. Il'in, *Nikolai Voshchinnikov (1951–2017)*
- Julia Martikainen *et al.*, *Spectroscopic, photometric, and polarimetric modeling of asteroid (4) Vesta* (15 min)

**15:30–16:00 Coffee break**

**16:00–17:30 Astrophysical applications (Nikolai Voshchinnikov session) / Antti Penttilä**

- Cihat Kurt and Mark T. Lemmon, *A model for analysis of fractal aggregate aerosols* (15 min)
- Gen Ito *et al.*, *Radiative-transfer modeling of spectra of planetary regoliths using cluster-based dense packing modifications* (15 min)
- Joonas Herranen *et al.*, *Scattering dynamics of dust in the interstellar medium* (15 min)
- Siteng Fan *et al.*, *Properties of haze particles in the atmospheres of Pluto and Titan from recent space missions* (15 min)
- Jessica A. Arnold *et al.*, *Radiation pressure forces and blowout sizes for particles in debris disks* (15 min)
- Carey Legett IV *et al.*, *Using MSTM to model geometrically complex space weathered particles* (15 min)

**17:30 Planning for the future / M. Woźniak and L. Bi**

**17:45 Farewell party**