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28 AUGUST-1 SEPTEMBER 2016

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Reflection, Scattering, and Diffraction from Surfaces V

Conference Chair: **Leonard M. Hanssen**, National Institute of Standards and Technology (USA)

Program Committee: **Gérard Berginc**, Thales Optronique S.A.S. (France); **Aristide C. Dogariu**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **John C. Fleming**, Ball Aerospace & Technologies Corp. (USA); **Brian G. Hoover**, Advanced Optical Technologies (USA); **Danhong Huang**, Air Force Research Lab. (USA); **Alexei A. Maradudin**, Univ. of California, Irvine (USA); **Michael A. Marciniak**, Air Force Institute of Technology (USA); **Richard N. Pfisterer**, Photon Engineering LLC (USA); **Benjamin K. Tsai**, National Institute of Standards and Technology (USA)

SUNDAY 28 AUGUST

SESSION 1

LOCATION: CONV. CTR. ROOM 23A SUN 1:30 PM TO 3:20 PM

Theory and Modeling I

Session Chair: **Brian G. Hoover**, Advanced Optical Technologies (USA)

1:30 pm: **Linking Rayleigh-Rice theory with near linear shift invariance in light scattering phenomena** (*Invited Paper*), John C. Stover, The Scatter Works Inc. (USA); Sven Schröder, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Christian Staats, Schmitt Industries, Inc. (USA); Vladimir V. Lopushenko, M.V. Lomonosov Moscow SU (Russian Federation); Eugene L. Church, Retired (USA) [9961-1]

2:00 pm: **Comparison of the GHS_{smooth} and the Rayleigh-Rice surface scatter theories**, James E. Harvey, Richard N. Pfisterer, Photon Engineering LLC (USA) [9961-2]

2:20 pm: **Interplay between electromagnetic and Coulomb couplings to plasmon excitations in graphene**, Danhong Huang, Air Force Research Lab. (USA) [9961-3]

2:40 pm: **Derivation of realistic surface and particulate scatter transfer functions and their application to incoherent imaging of high-contrast fine-detail scenes**, Alan W. Greynolds, Retired (USA) [9961-4]

3:00 pm: **Lateral shifts in the reflection of speckle fields at planar interfaces**, Sergio de la Cruz, Univ. Politécnica de Chiapas (Mexico); Eugenio R. Mendez, Héctor M. Escamilla, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico) [9961-5]

Coffee Break Sun 3:20 pm to 3:50 pm

SESSION 2

LOCATION: CONV. CTR. ROOM 23A SUN 3:50 PM TO 6:00 PM

Measurements and Instrumentation

Session Chair: **Michael A. Marciniak**, Air Force Institute of Technology (USA)

3:50 pm: **Mueller matrix bidirectional reflectance distribution function measurements and modeling of textured silicon surfaces** (*Invited Paper*), Thomas A. Germer, National Institute of Standards and Technology (USA); Martin Foldyna, Ecole Polytechnique (France); Zuzana Mrazkova, VŠB-Technical Univ. of Ostrava (Czech Republic); Guillaume Fischer, The Ile-de-France Photovoltaic Institute (France); Etienne Drahi, Total S.A. (France) [9961-6]

4:20 pm: **A novel image-based BRDF measurement system for human skin**, Jeffrey R. Bintz, Air Force Institute of Technology (USA); Michael J. Mendenhall, Air Force Institute of Technology (USA) and Air Force Research Lab. (USA); Michael A. Marciniak, Samuel D. Butler, Air Force Institute of Technology (USA); James T. Lloyd, Air Force Research Lab. (USA) [9961-7]

4:40 pm: **Goniometric and hemispherical reflectance and transmittance measurements of fused silica diffusers using three methods**, Paul Lemaillet, Heather J. Patrick, Thomas A. Germer, B. Carol Johnson, National Institute of Standards and Technology (USA); Georgi T. Georgiev, NASA Goddard Space Flight Ctr. (USA) [9961-8]

5:00 pm: **Study of a blackbody cavity using multiple methods of reflectance measurement**, Leonard M. Hanssen, National Institute of Standards and Technology (USA); Jinan Zeng, NASA Goddard Space Flight Ctr. (USA); Simon G. Kaplan, National Institute of Standards and Technology (USA); Joe A. Walker, Science Systems and Applications, Inc. (USA) [9961-9]

5:20 pm: **Photon-material interaction based on single slit diffraction**, Nithin Kumar Goona, Parne Saidi Reddy, Gijnjala R. Reddy, National Institute of Technology, Goa (India) [9961-10]

5:40 pm: **Portable fluorescence meter with reference backscattering channel**, Dmitriy V. Kornilin, Vladimir N. Grishanov, Valery P. Zakharov, Dmitriy S. Burkov, Samara Univ. (Russian Federation) [9961-11]

MONDAY 29 AUGUST

SESSION 3

LOCATION: CONV. CTR. ROOM 23A MON 8:20 AM TO 9:50 AM

Theory and Modeling II

Session Chair: **Danhong Huang**, Air Force Research Lab. (USA)

8:20 am: **A simple model of the Knotts-Michel-O'Donnell one-dimensional randomly-rough non-Gaussian surface** (*Invited Paper*), Alexei A. Maradudin, Univ. of California, Irvine (USA) [9961-12]

8:50 am: **Evolution of the transfer function characterization of surface scatter phenomena**, James E. Harvey, Photon Engineering LLC (USA) [9961-13]

9:10 am: **Determination of the normalized surface height autocorrelation function of a two-dimensional randomly rough dielectric surface by the inversion of light scattering data in p-polarization**, Alexei A. Maradudin, Univ. of California, Irvine (USA) [9961-14]

9:30 am: **Analysis of wave optics BRDF model elements for a moderately rough surface**, Samuel E. Freda, Air Force Institute of Technology (USA) and Riverside Research (USA); Samuel D. Butler, Stephen E. Nauyoks, Michael A. Marciniak, Air Force Institute of Technology (USA) [9961-15]

Coffee Break Mon 9:50 am to 10:20 am

SESSION 4

LOCATION: CONV. CTR. ROOM 23A MON 10:20 AM TO 12:00 PM

Measurement Methods

Session Chair: **Gérard Berginc**, Thales Optronique S.A.S. (France)

10:20 am: **Measurement of the modulation transfer function by means of scattering from random media**, Michele Manfreda, Elettra-Sincrotrone Trieste S.C.p.A. (Italy); Marzio Giglio, Univ. degli Studi di Milano (Italy) [9961-16]

10:40 am: **Development of twin-illumination and subtraction technique for detection of concave and convex defects on steel surfaces**, Hiroaki Ono, Akihiro Ogawa, Takahiro Yamasaki, Takahiro Koshihara, Toshifumi Kodama, Yukinori Iizuka, Takahiko Oshige, JFE Steel Corp. (Japan) [9961-17]

11:00 am: **Enhanced sensitivity for optical loss measurement in planar thin-films**, Hua-Kang Yuan, Imperial College London (United Kingdom) [9961-18]

11:20 am: **Comparison of two integrating sphere methods for characterization of samples exhibiting anisotropic light scattering**, Annica M. Nilsson, Arne Roos, Uppsala Univ. (Sweden) [9961-19]

11:40 am: **The design of microscope type spectral reflectometry for the depth measurement of high-aspect-ratio through silicon via**, Hsiang-Chun Wei, Chun-Wei Lo, Chih-Shang Liu, Industrial Technology Research Institute (Taiwan) [9961-20]

Lunch Break Mon 12:00 pm to 1:30 pm

CONFERENCE 9961 · LOCATION: CONV. CTR. ROOM 23A

SESSION 5

LOCATION: CONV. CTR. ROOM 23A MON 1:30 PM TO 3:00 PM

Analysis Methods

Session Chair: **Alexei A. Maradudin**, Univ. of California, Irvine (USA)

1:30 pm: **Automatic construction of probabilistic dynamic bidirectional reflectance distribution functions from reflection screen images** (*Invited Paper*), Albert W. Bailey, Air Force Research Lab. (USA) and Engility Corp. (USA); Edward A. Early, Engility Corp. (USA); Paul K. Kennedy, Robert J. Thomas, Air Force Research Lab. (USA) [9961-21]

2:00 pm: **Two-dimensional point spread function computation or real multiple-reflection optical systems**, Kashmira Tayabaly, Politecnico di Milano (Italy) and INAF - Osservatorio Astronomico di Brera (Italy); Daniele Spiga, INAF - Osservatorio Astronomico di Brera (Italy) [9961-22]

2:20 pm: **Matrix methods for reflective inverse diffusion**, Kenneth W. Burgi, Michael A. Marciniak, Stephen E. Nauyoks, Mark E. Oxley, Air Force Institute of Technology (USA) [9961-23]

2:40 pm: **Zernike polynomials for mid-spatial frequency representation on optical surfaces**, Zahra Hosseinimakarem, Angela Davies, Christopher J. Evans, The Univ. of North Carolina at Charlotte (USA) [9961-24]

Coffee Break Mon 3:00 pm to 3:30 pm

SESSION 6

LOCATION: CONV. CTR. ROOM 23A MON 3:30 PM TO 5:10 PM

Imaging Methods and Applications

Session Chair: **Brian G. Hoover**, Advanced Optical Technologies (USA)

3:30 pm: **Optical 3D imaging and visualization of concealed objects**, Gérard Berginc, Thales Optronique S.A.S. (France); Jean Baptiste Bellet, Univ. de Lorraine (France); Ion Berechet, Stefan Berechet, SISPIA (France) [9961-25]

3:50 pm: **Extended-range AFM imaging for applications to reflectance modeling**, Pablo A. Reyes, Brian G. Hoover, Advanced Optical Technologies (USA) [9961-26]

4:10 pm: **Topography measurement of freeform specular surfaces using experimental ray tracing and radial basis functions interpolation**, Arash Alinoori, Mahmoud Essameldin, Friedrich Fleischmann, Thomas Henning, Hochschule Bremen Univ. of Applied Sciences (Germany) [9961-27]

4:30 pm: **On-axis reversal Hartmann method in aspheric surface testing with optical flat calibration**, Zhengzheng Xia, Mei Hui, Zhu Zhao, Ming Liu, Liqun Dong, Xiaohua Liu, Lingqin Kong, Yuejin Zhao, Beijing Institute of Technology (China) [9961-28]

4:50 pm: **Real-time diameter measurement using diffuse light**, Xiaohe Luo, Mei Hui, Qudong Zhu, Shanshan Wang, Beijing Institute of Technology (China) [9961-29]

LOCATION: CONV. CTR. BALLROOM 20C MON 5:30 PM TO 7:30 PM

Posters-Monday

Conference attendees are invited to attend the poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines at <http://spie.org/OPPPosterGuidelines>.

Proposal for study on IR light and glucose phantoms interaction for human glucose quantification applications, Gerardo S. Romo-Cardenas, Univ. Autónoma de Baja California (Mexico) and Univ. de Morelos (Mexico); Juan D. Sanchez-Lopez, Univ. Autónoma de Baja California (Mexico) [9961-30]

Inverse estimation of radiative properties from directional radiances by using statistical RPSO algorithm, Kuk-Il Han, Do-Hwi Kim, Jun-Hyuk Choi, Tae-Kuk Kim, Chung-Ang Univ. (Korea, Republic of) [9961-31]

Tomography method of processing biomedical image of retinal macular region of the eye, Sergei V. Pavlov, Vinnytsia National Technical Univ. (Ukraine); Valentina B. Vassilenko, Univ. Nova de Lisboa (Portugal); Dina V. Vovkotrub, Anna A. Poplavska, Oleg O. Kuzin, Vinnytsia National Technical Univ. (Ukraine) [9961-32]

Metrology for in-situ monitoring of roughness for diffusers for light-emitting device manufacturing, Wojciech J. Walecki, Peter S. Walecki, Eve S. Walecki, Abigail S. Walecki, Sunrise Optical LLC (USA) [9961-33]

Spatial attributes of diffraction free fields, Javier Muñoz López, Gabriel E. Martínez-Niconoff, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Patricia Martínez Vara, Benemérita Univ. Autónoma de Puebla (Mexico); Marco Antonio Torres Rodríguez, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [9961-34]

Modal power coupling in an active ZBLAN fiber doped by Pr⁺³ with controlled disorder in the fiber core, Elena I. Chaikina, Angel R. Vega-Matus, Eugenio R. Mendez, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico); Alexey Yamilov, Missouri Univ. of Science and Technology (USA) [9961-35]

Ehrenfest modes and its application to the analysis of coherence evolution, Marco Antonio Torres Rodríguez, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Patricia Martínez Vara, Benemérita Univ. Autónoma de Puebla (Mexico); Saúl Isaías De los Santos García, Gabriel E. Martínez-Niconoff, Carina Gutiérrez Ojeda, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [9961-36]

Fractal properties of optical fields, Saúl Isaías De los Santos García, Marco Antonio Torres Rodríguez, Javier Muñoz López, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Patricia Martínez Vara, Benemérita Univ. Autónoma de Puebla (Mexico); Gabriel E. Martínez-Niconoff, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [9961-37]

Use of optical skin phantoms for calibration of dermatological lasers, Maciej S. Wróbel, Anna Sekowska, Stanislaw Galla, Gdansk Univ. of Technology (Poland); Adam Cenian, The Szewalski Institute of Fluid-Flow Machinery (Poland) and Polish Academy of Sciences (Poland) [9961-38]