

Optical Radiation News

Published by the COUNCIL for OPTICAL RADIATION MEASUREMENTS (WWW.CORMUSA.ORG) to report items of interest in optical radiation measurements. Inquiries may be directed to the Editor, Daryl R. Myers, National Renewable Energy Laboratory 1617 Cole Boulevard, Golden CO 80401 Tel: 303-384-6768 Fax: 303-384-6391 e-mail: daryl.myers@nrel.gov

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CORM 2010
Annual Conference and Business Meeting

*Solid State Lighting, Display Metrology, Photovoltaics,
and General Topics in Optical Radiation Measurement*

May 9-11, 2010

Planet Hollywood Resort and Casino Las Vegas, NV

The CORM 2010 conference will be held in Las Vegas, NV – preceding the Light Fair International conference. The conference themes include **Solid State Lighting, Display Metrology, Photovoltaics, and General Topics in Optical Radiation Measurement**. The 2010 Annual CORM Technical Conference is structured to provide interaction between the optical radiation industry and National Metrology Institutes (NMI's) such as the National Institute of Standards and Technology (NIST), National Research Council (NRC) of Canada, and National Center for Metrology (CENAM) of Mexico.

Schedule

Sunday, May 9 1:00 PM: CORM Technical Committee Meetings

Monday, May 10 8:00 AM Session I: General Topics in Optical Radiation Measurement

10:00 AM Session II: Photovoltaics

1:00 PM Session III: Display Metrology

6:00 PM Reception

7:00 PM Franc Grum Memorial Lecture and Banquet

Tuesday, May 11 8:00 AM Session IV: Solid State Lighting

4:00 PM CORM Business Meeting

LODGING:

A block of rooms at the Planet Hollywood Resort and Casino have been reserved at special rates for conference attendees. The Group Rate is \$89/night Sunday - Thursday and \$119/night Friday and Saturday plus 12% county tax and \$4.99/night resort fee. The group code for this special rate is **ACORM**. Click on **BOOK A ROOM** under **CORM website News & Events – CORM 2010 Lodging**

Online Registration available at: <https://www.online-reg.com/corm/2010/registration.lasso>

Conference Coordinators

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CORM 2010 Annual Conference and Business Meeting

PRELIMINARY PROGRAM

Solid State Lighting, Display Metrology, Photovoltaics,
and General Topics in Optical Radiation Measurement

May 9-11, 2010 Las Vegas, NV

Sunday May 9th

CORM Technical Committees on Radiometry

11:00 **REGISTRATION OPEN**

12:00 LUNCH

13:00 **CORM Technical Committees on Radiometry**

(Detailed schedule to be announced)

Monday May 10th

8:00-8:30 **REGISTRATION OPEN - Continental Breakfast**

8:30 Opening remarks

Session 1 General Topics in Optical Radiation Measurement – *Chair: Bob Angelo*

9:00 **CQS – Test Results to Date**

Wendy Davis, NIST

9:25 **Silicon based Femtoamp measurement systems – measurement implications and applications**

Yuqin Zong, NIST

9:50 BREAK

Session 2 Photovoltaics - *Chair: Daryl Myers*

10:15 **Solar Datawarehouse: Measured Solar Radiation Data from 3000 US Stations for Renewable Applications**

James Hall, JHTech

10:40 **Optimizing tracking photovoltaic systems for performance under mostly cloudy conditions**

Nelson A. Kelly, General Motors Research Center

11:00 **Solar Resource Data and Uncertainties for Photovoltaic Systems Applications**

Daryl Myers, NREL

11:30 **LUNCH BREAK**

Session 3 Display Measurement – *Special Session*

13:00 **[Introduction to the new ICDM DM – Title TBA]**
Edward Kelley, KELTEK LLC

15:00 BREAK

15:30 **[Special Topics – Title TBA]**
Edward Kelley, KELTEK LLC

18:00 **Reception**

19:00 **Franc Grum Memorial Banquet and Lecture**

Tuesday May 11th

8:00- 8:45 **REGISTRATION OPEN Continental Breakfast**

8:45 **Introductions and Announcements**

Session 4 **SSL Measurements and Standards** - *Chair: Andy Jackson*

9:00 **LED Life Prediction**
Emil Radkov, Illumitex

9:30 **SSL Statistical Analysis of Models related to TM-21**
Eric Richman (PNNL-DOE)

10:00 BREAK

10:30 **Updated CALiPER Lifetime Testing**
Mia Paget U.S. Department of Energy Solid-State Lighting CALiPER Program

11:00 **Design of LED lifetime tests (or Update of DC and AC LED Measurement Techniques)**
Yuqin Zong, NIST

11:30 **Results, Finding, and Oddities from NVLAP SSL Proficiency Testing**
Cameron Miller, NIST

12:00 **LUNCH BREAK**

13:00 **Near Field Goniometric Measurement Systems for Solid State Lighting Systems:
Measuring Luminance, Intensity, Color, and Spectra as a Function of Angle**
Douglas Kreysar, Radiant Imaging

13:30 **(Title TBA)**
Michael Grather, LTL

14:00 **(Title TBA)**
Bob Berger

14:30 BREAK

15:00 **SSL End product Performance—correlation from Chip Performance**
Mia Paget U.S. Department of Energy Solid-State Lighting CALiPER Program

15:30 **Update of SSL standards – measurement and performance**
Eric Richman (PNNL-DOE)

16:00 **CORM Business Meeting**



NIST NEWS from the Optical Technology Division

NVLAP SSL workshop sponsored by Department of Energy

The NIST Optical Technology Division along with the National Voluntary Laboratory Accreditation Program held a two-day workshop on February 16 and 17th on Management Systems and Technical Requirements and Proficiency Testing for Solid State Lighting with respect to the Energy Efficiency Lighting Program. The workshop was attended by 35 participants representing 28 potential laboratories that could be accredited to measure solid state lighting products.

NIST scientists, NVLAP program managers, and EEL Program assessors gave tutorial presentations discussing the topics of Handbook 150: NVLAP Procedures and General Requirements (2006 edition), Handbook 150-1: Energy Efficient Lighting Products, Program Specific Handbook (2010 draft edition), the assessment process and proficiency testing. Handbook 150-1 (2008 edition) and Handbook 150-1A : Energy Efficient Lighting – Solid State Lighting Products, Program Specific Handbook (2009 edition) are in the process of being consolidated into one handbook. The NIST OTD also offered a tour of NIST photometry and colorimetry laboratories including our newly-built Spectrally Tunable Lighting Facility (STLF).

Following the workshop, a DOE CALiPER roundtable meeting was held at Gaithersburg Marriott on February 18th with many common participants from the NVLAP workshop. The meeting discussed issues on the current and future standards and quality issues of solid state lighting products.

Contact: Cameron Miller (c.miller@nist.gov)

Medical Imaging for Surgical and Clinical Applications

The Division is advancing the measurement science and standards infrastructure to accelerate the application of optical medical imaging for surgical and clinical applications. The effort is funded by the NIST Director's Innovations in Measurement Science Program and consists of two overarching technical goals:

- Provide standard, well-calibrated hyperspectral images of normal and diseased tissues to aid the development and demonstration of algorithms for quantifying disease and tissue status
- Develop advanced SI-traceable calibration and characterization technology and standards to assess and improve medical imaging instrument performance

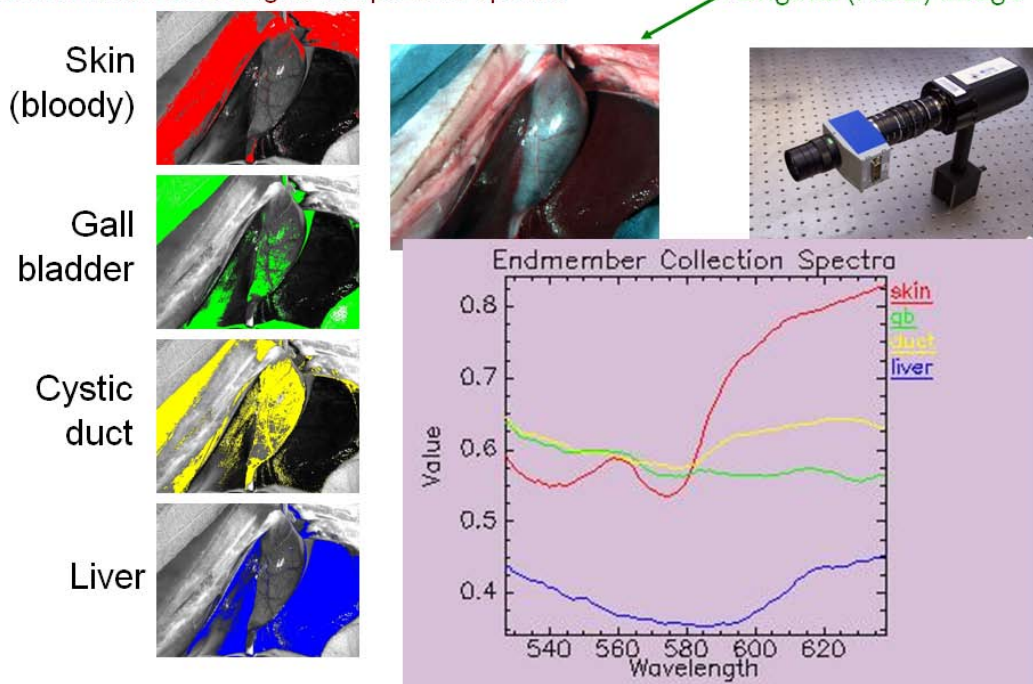
Optical medical imaging could complement and enhance conventional medical imaging modalities, including MRI, CT and PET-CT, which are too expensive for routine use and too complex and slow for surgical applications. By avoiding radiation exposure, optical medical imaging allows continuous monitoring during protracted surgical procedures and long-term monitoring for assessing treatment efficacy and disease progress. Optical medical imaging is of interest for regular clinical examinations as well as surgical, endoscopic, and laparoscopic procedures, and the present state of optical technology makes it both fitting and timely to strive to enlist optical medical imaging into the suite of tools used in medical practice.

The Division program in optical medical imaging is initially concentrating on hyperspectral imaging, which shows great promise due to its broad spectral coverage and high spectral resolution. Hyperspectral imaging has successfully demonstrated robust instrument designs and data-processing algorithms in environmental and defense remote sensing. Hyperspectral optical medical imaging could potentially measure tissue status in the early stages of disease progression, because of its high spatial and spectral resolutions. Hyperspectral imaging passively measures infrared and optical light reflected or emitted from tissue, expanding the three-component palette native to human vision to hundreds of contiguous wavelength bands, significantly enhancing the potential for medical diagnosis and treatment.

Contact: David Allen (david.allen@nist.gov)

Image Decomposition - Visible

Classification according to components spectra



Original RGB image courtesy of Karel Zuzak, University of Texas at Arlington.

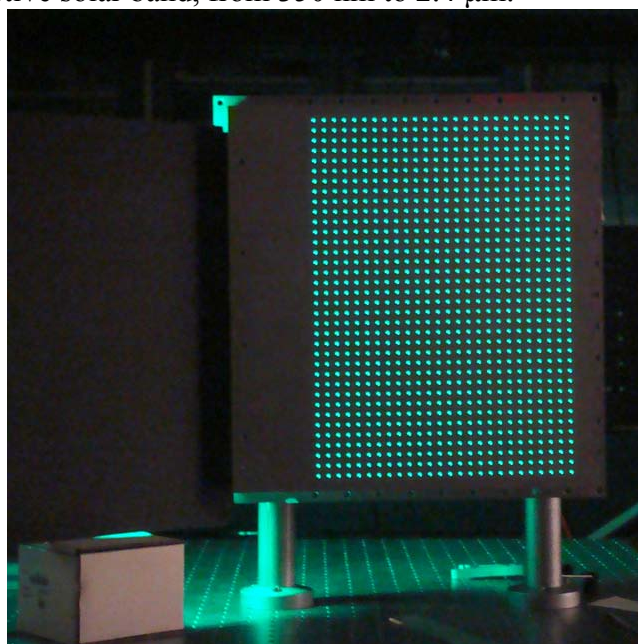
Flat-Plate Radiometric Source for Calibrating Satellite Sensors

In partnership with NASA and NOAA, a new radiometric source has been developed for the calibration of satellite optical sensors during the thermal-vacuum stage of testing. During this stage, the conditions on orbit are simulated. Conventional calibration approaches use large lamp-

illuminated integrating spheres. However, they would not only require excessively large vacuum chambers for testing, their flux levels and spatial profiles would replicate poorly the radiation field that a satellite sensor would see on orbit.

The interagency team developed a novel, low-profile, vacuum-compatible calibration tool to fit the need. It consists of a flat-plate illuminator fed by xenon arc lamps using optical fibers. Four filter radiometers were used to monitor the spectral radiance of the four quadrants of the flat plate. A diffuser is installed to provide an improved representation of reflected solar radiation, from Earth as seen by the satellite.

The source was demonstrated to have an absolute radiometric uncertainty of 1.9 % ($k = 1$), sufficient to meet the 2 % requirement of the Visible Infrared Imager Radiometer Suite (VIIRS) sensor being developed for the National Polar-orbiting Operational Environmental Satellite System (NPOESS). Additionally, the team showed that the source could be used at wavelengths as long as 2.4 μm by replacing the xenon lamps with a supercontinuum source. This allows the calibrator to be used throughout the full reflective solar band, from 350 nm to 2.4 μm .



Other applications are being explored, including the calibration of astronomical telescopes, where the space between the entrance aperture of the telescope and the roof of the dome is insufficient for integrating sphere sources. Additionally, the flat-plate system is scalable to large aperture telescopes, whereas integrating spheres would become prohibitively large and expensive.

Contact: Steven W. Brown (steven.brown@nist.gov)

Nationwide Comparison of Infrared Reflectance Measurements

In partnership with the Department of Defense, the Division led a campaign to assess the accuracy and comparability of infrared reflectance measurements routinely performed by government and aerospace industry laboratories. The large number of participating laboratories, 21, reflected the great interest in infrared measurements. They are critical to the interpretation of infrared signatures of ground, air, and space vehicles; to the measurement of temperature using passive, non-contact infrared thermometry; and to the development of calibration targets for ground- and space-based environmental sensors, measuring sea surface and atmospheric temperatures and cloud heights.

The campaign involved the exchange of sets of five infrared reflectance standards, three diffuse and two specular. Each of the participating organizations measured a set, with NIST measuring each of the sets both before and afterwards. Measurements covered the 2 μm to 14 μm wavelength range at a spectral resolution of 8 cm^{-1} and with near-normal geometries.

The results demonstrated significant differences among the participants. Although a number of participants had results consistent with their calculated uncertainties, differences in reflectance units up to 0.1 (on a scale of 0 to 1) were not unusual, despite the participants' uncertainty analysis suggesting that they should be much smaller. Participants failed to account for some significant uncertainty components present in the NIST uncertainty budget. A number of participants procured a set of the standards to keep for future calibration purposes. Future work will involve more complicated reflectance measurements, including varying the angle of illumination and characterizing the full bidirectional reflectance distribution function.

Contact: Leonard M. Hanssen (leonard.hanssen@nist.gov)



Shape Evolution of Nanoscale Patterns

Division researchers successfully demonstrated the application of scatterometry to monitor, in situ, pattern profiles made by thermal embossing nanoimprint lithography. In addition to obtaining real-time measurement of pattern profiles, researchers also gained new insight into the evolution of patterns imprinted in polymers of different molecular weight.

Thermal embossing nanoimprint lithography uses a mold to stamp a nanoscale pattern into a polymer under heat and pressure. This simple process is a low-cost alternative to photolithography, with high throughput and high resolution. This research studies the process to better understand how the shape of the imprinted pattern evolves during thermal annealing, enabling optimization of the imprint process.

Researchers in the Optical Technology, Surface and Microanalysis Science, and Polymer Divisions collaborated to use scatterometry, which combines spectroscopic ellipsometry with rigorous coupled-wave analysis, to extract topographical information from the optical measurement. Scatterometry determines, in situ, the same information about pattern height and shape as the traditional ex situ methods, such as AFM, SEM, and spectral x-ray reflectivity. It also provides a

complete record of pattern evolution during annealing of a single sample, whereas ex situ methods require preparation of many samples, annealed for various times, to build up a picture of the pattern decay. Further, scatterometry may provide more sensitive measurements of nanoscale features in the pattern cross-section.

The researchers had expected that patterns imprinted in polymers of high molecular weight to change relatively slowly. However, they observed that the patterns in low molecular weight polymer initially appeared more resistant to change, while the patterns in high molecular weight polymer showed a much faster initial relaxation, consistent with measurements made using ex situ techniques. Furthermore, the scatterometry measurements indicated subtle differences in shape between the annealed high and low molecular weight polymers that were difficult to discern using other methods.

Contact: Thomas A. Germer (thomas.germer@nist.gov)

Spectroradiometry Short Course

The 6th Spectroradiometry Short Course is to be held on March 16th to 19th, 2010 at NIST. The 12 lectures cover the basics of spectroradiometry, measurement processes and measurements uncertainties are given by the NIST staff who specialize in the particular areas. The lectures are given in the mornings, and the hands-on experiments are performed in the afternoons. The experiments are meant to illustrate spectroradiometric examples, which include the measurement equations and uncertainty analyses for each of the experiments. Thus the material from the morning lectures is reinforced with practice in the laboratory sessions. <http://physics.nist.gov/Divisions/Div844/events/srsc.html>

For further information, contact Howard Yoon (hyoon@nist.gov, 301-975-2482).

Optical Technology Division Staff Members Honored

Lenard M. Hanssen of the Optical Technology Division received the Judson C. French Award for developing and maintaining a critical Standard Reference Material (SRM 1921) which is used in the wavelength calibration of infrared spectrometers. The French award, first presented in 2000, is granted for significant improvement in products delivered directly to industry, including new or improved NIST calibration services, Standard Reference Materials and Standard Reference Databases.

Wendy Davis, C. Cameron Miller, and Yoshi Ohno received the Department of Commerce Silver Medal Award for developing measurement methods and technical standards to accelerate the commercialization of energy-efficient, solid-state lighting products.

Alan L. Migdall of the Optical Technology Division received the Department of Commerce Bronze Medal Award for advancing photon-based metrology for applications in optical radiation measurement, fundamental physics, and quantum information.

Liaison Report from the Photometry and Radiometry Group

Update on NRC Quantum Candela Research Project

As reported in the Winter 2009 issue, a new facility has been developed at NRC to work in fundamental quantum metrology to explore the concept of reformulating the candela as a countable number of photons per second. This research facility has been used to measure the transverse wavefunction of a single photon directly. There are many methods that computationally reconstruct the wavefunction from a series of measurements on an identically prepared ensemble. In contrast, these experimental results have demonstrated that the quantum wavefunction can be measured directly, in that it appears as a reading on our measurement apparatus. This is of fundamental interest but is also of practical use since single photons play a central role in emerging technologies, such as quantum cryptography and computing. In these applications, producing single photons with well-characterized wavefunctions is crucial.

This experiment involves making a weak measurement (i.e. minimally disturbing) of the transverse position of each photon in an identical ensemble. This is accomplished by scanning a small birefringent element across the beam to create a small local rotation of the polarization. In this experiment, the photons that have zero transverse momentum are post-selected. This is done by taking the Fourier transform of the beam with a lens, and filtering the light with a slit set at the focus of the lens. The photons are subsequently analysed by measuring the imbalance of photons with $\pm 45^\circ$ polarization to determine the real part of the wavefunction, or the imbalance in right/left hand polarization to determine the imaginary part of the wavefunction.

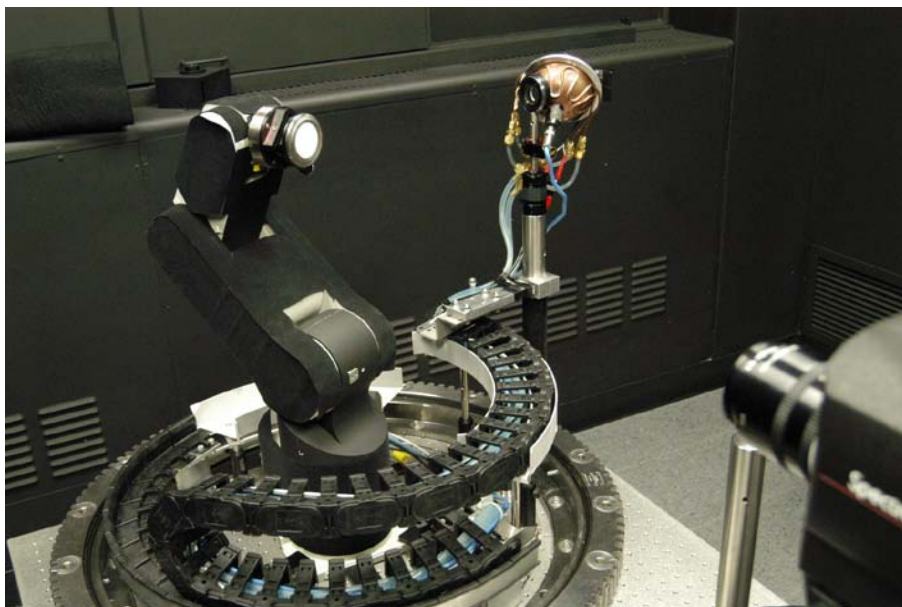
This measurement approach has been tested on a variety of wavefunction shapes using photons from a laser. The photons then emerge from a single-mode fiber, which initializes them to have a Gaussian wavefunction. This initial wavefunction is modified using lenses and windows to control the phase and grey-scale apertures to control the amplitude. The fidelity between the expected and measured wavefunctions has been found to be over 95%. Preliminary results of the experiments using a classical source were presented at the Single Photon Workshop 2009 in Boulder, Colorado. These experiments are now being repeated with a source of single photons based on spontaneous parametric downconversion.

For further information contact: Charlie Bamber, 613- 990-8990 or Jeff Lundeen, 613-993-8913

NRC Robot-based Gonioreflectometer for Spectral BRDF Measurement

A paper that describes the new instrument that has been developed at NRC to measure spectral bidirectional reflectance distribution functions (was recently published (Baribeau, Réjean, Neil, William S. and Côté, Éric(2009)'Development of a robot-based gonioreflectometer for spectral BRDF measurement',*Journal of Modern Optics*, 56:13,1497 - 1503). The system incorporates a five-axis robot manipulator that holds the sample, and a large rotation stage that holds an extended uniform light source of precisely known emitting solid angle. An array spectroradiometer is used to

measure the reflected spectral radiance from the sample, which is compared to the spectral radiance of the source itself, allowing the calculation of the BRDF from first principles. The system is currently being improved with the incorporation of a new high dynamic range spectroradiometer that increases the acquisition speed and allows the measurement of very dark samples. The system is designed in anticipation of a growing demand for traceable spectral BRDF measurements from sectors such as machine vision, remote sensing and color imaging. We seek to use the system for client measurements on a pay for fee basis, or for joint collaborations with other laboratories on research oriented projects.



For further information contact: Réjean Baribeau, 613 993-9351 rejean.baribeau@nrc-cnrc.gc.ca

Photoluminescence Efficiency of Ge Dots Self-Assembled on TiO₂ Films

Dr/ Nelson Rowell, in collaboration with the NRC Institute for Microstructural Sciences (D.J. Lockwood) and the Institut Matériaux Microélectronique Nanosciences de Provence, and Université Pierre et Marie Curie, in Paris Cedex, France, has carried out photoluminescence efficiency measurements of Ge dots on TiO₂ films. The self-assembled Ge dots were formed by in-situ thermal annealing of a thin amorphous Ge layer deposited by molecular beam epitaxy on a TiO₂ layer on Si(001). The dot photoluminescence (PL) appeared primarily as a wide near-infrared band peaked near 800 meV. Using various theoretical models, the PL spectrum have been analyzed in terms of the dot size distribution required to reproduce the observed asymmetric band shape, which includes the bandgap enlargement due to quantum confinement. The peak energy of the PL band reflects the average dot size and its shape depends on the dot size distribution. The observed size distribution determined from atomic force microscopy allowed the determination of the nonlinear increase in the PL quantum efficiency with decreasing dot diameter. It was also shown that it is possible to evaluate the size distribution of Ge dots from their PL energy dependence.

The figure below shows the PL and dot density variation with dot diameter for two samples comprised of Ge dots on TiO₂. In this figure the left panel contains the PL spectra versus dot size calculated from the PL spectra corrected for instrument response and by taking the PL emission to occur at the dot bandgap as estimated from the tight binding (TB) model. The right panel contains

the dot size distributions as histograms with 2.5 nm bin-widths. The best-fit Gaussian functions are superimposed on the distributions. The relatively strong PL emission lines that occur below 7 nm in the left hand panel are not dot-related but originate in the Si substrate. The least-squares fits for the size distributions in this figure provide convenient numerical forms from which the PL efficiencies are obtained versus dot size.

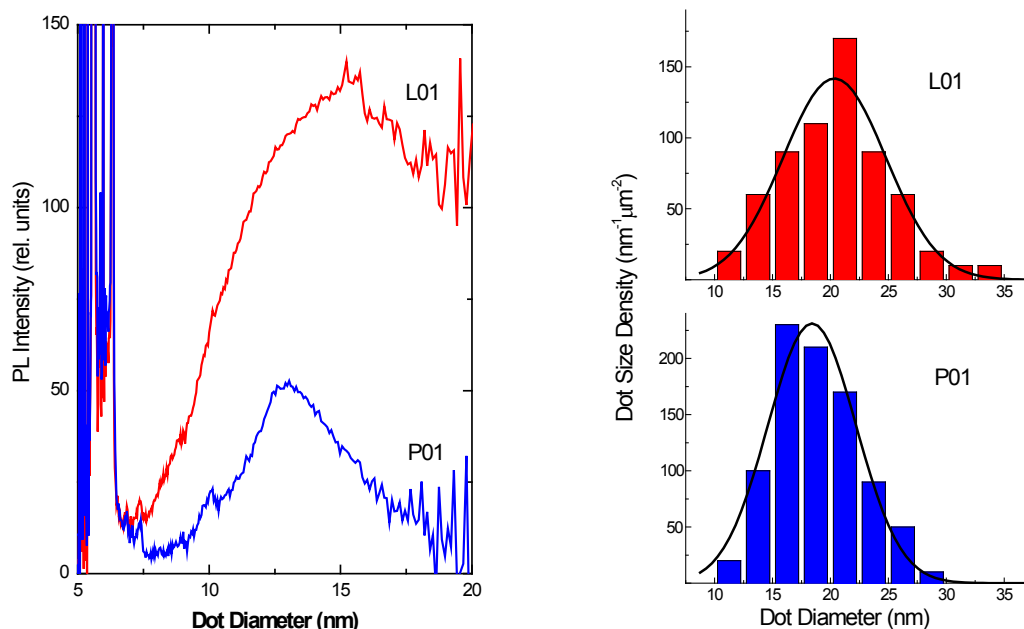


Figure PL and dot density variation with dot diameter for two samples of Ge dots, L01 and P01. The left panel contains the PL spectrum versus dot size; the right panel contains the dot size distributions (histograms - 2.5 nm bins).

For further information, contact Nelson Rowell, 613-993-2377.

NRC Participation in Round Robin Optical Measurement Testing for Standardization Purposes

The NRC Institute for National Measurement Standards is currently participating in two round robin testing of optical properties in support of standardization activities.

The first of these round robin testing is being conducted by the Department of National Defence Quality Engineering Testing Establishment to develop recommendations on the achievable “white” for the National Flag of Canada. The diffuse hemispherical reflectance factor of sample flags from several manufacturers are being measured with three different backgrounds: white, black and light trap, and with two different specimen thicknesses : 8 and 10 layers, to determine the optimum method for measuring the color white of these Canadian flags and to recommend the incorporation of this procedure in the associated Canadian General Standards Board Standards.

The second round robin testing is being conducted by the ISO Authorized Labs for ISO/TC6/WG3 - Paper, board and pulp – Optical Properties. This testing is being carried out on fluorescent papers

containing different optical brighteners with different excitation characteristics and comparing the measured CIE Whiteness and ISO brightness, with, and without, a proposed 320-nm cut-off filter in several different instruments that conform to current ISO 2469 requirements. NRC is carrying out measurements of these comparison fluorescent papers on its Reference Spectrofluorimeter to determine their instrument-corrected spectral excitation curves. This work is in support of a new work item for the revision of ISO 2469 (Measurement of diffuse radiance factor) to address UVA and UVB issues by including a filter or other means of eliminating source radiation below 300 nm where the CIE illuminants are not defined. The goal of this round robin testing is to provide comparison results for evaluating the practical benefits of implementing a more rigorous ISO standardization procedure for the UV source adjustment, i.e. determining the possible improvement in inter-instrument agreement.

For further information, contact Joanne Zwinkels, 613-993-9363 or Mario Noël, 613-991-1637

Research Cooperation between NRC and NPL

The NRC Institute for National Measurement Standards hosted Drs. Emma Woolliams and Peter Woolliams of NPL for a brief collaborative visit. This included general discussions with the staff of the Photometry, Radiometry and Thermometry Group and more focused work on bandwidth effects and microspectrophotometric measurements. Emma largely worked with Réjean Baribeau in connection with CIE TC 2-60 “Effect of Instrumental Bandpass Function and Measurement Interval on Spectral Quantities” and Peter worked with Joanne Zwinkels in gaining experience with the NRC microspectrophotometric equipment and preliminary testing of its metrological performance and potential for providing traceable optical characterization of nanomaterials.

For further information, contact Nelson Rowell, 513-993-2377.



Centro Nacional de Metrología, Mexico
National Center for Metrology, Mexico

CENAM news from the *División de Óptica y Radiometría (DOR)*, Mexico.

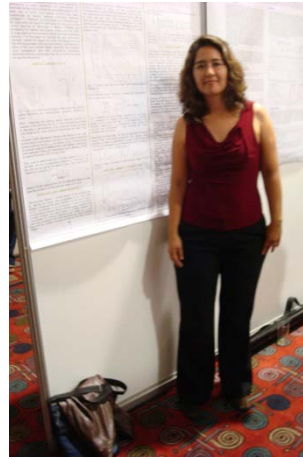
Proficiency Test for Illuminance Meters Calibration Finished

The *Grupo de Fuentes Ópticas* (Optical Sources Group) of the DOR published the final results for the first proficiency test on illuminance meters calibration for secondary laboratories in Mexico. Despite the good results obtained by the four participating laboratories, this proficiency test will allow them all to continue improving their measurement systems and procedures.



DOR Personnel Participation in Conferences

Last September, the contributions entitled “Development and implementation of photometric bench based on neutral optical density filters” and “New paradigms in LED photometry and colorimetry” were presented at the VII Symposium “Optics in Industry”; in order to report for the new measurement facilities developed at DOR; and to promote the appropriate measurement methods and techniques for low intensity LEDs.



The paper “Uncertainty component estimation for combined spatial non-uniformity of detector responsivity and 254 nm radiant field” was presented during the XXII Optics Annual Meeting; in which the increment to the currently declared Mexican standard for UV radiation dose was reported.

Specialized Training on Fiber Optics Metrology and Lighting Levels Measurement

As part of the continuous collaboration between DOR and the CFE, the Mexican agency for electrical energy administration, training courses were offered on use of the fiber optic standards for optical length and spectral attenuation, which were specially developed for CFE to support the network this agency established for the telecommunications industry.

Also training on lighting levels measurement is continuously offered to industry, academy and government agencies. This training is designed in order to promote the accomplishment of the Mexican Standard that specifies the minimum lighting levels in work places.

LEDs Measurement Training for Industry

DOR now offers training for industry involved with LEDs measurements. This training introduces the attendance with the basic theoretical aspects on photometry and radiometry applied to these solid state devices, as well as with the internationally recognized methods. The training also includes experimental sessions where total luminous flux, averaged LED intensity and emitted color measurements are performed by the participants for low intensity LEDs. The emitted color measurements comprise correlated color temperature for white LEDs and chromaticity coordinates for color LEDs.



Opacity Measurements at DOR

The *Laboratorio de Caracterización Óptica de Materiales* (Optical Properties Laboratory) is giving a strong support to opacity measurement capabilities of calibration laboratories and regulatory authorities, offering short training courses for the agents devoted to the measurement of vehicles pollutants emission, which are regulated, with the opacity of emissions as one of the parameters to be evaluated.

Simposio de Metrología 2010 to be held on October 27-29 at Querétaro

As every two years, the *Centro Nacional de Metrología* will organize this year the *Simposio de Metrología* on October 27 to 29 at the city of Querétaro, Mexico. The Metrology Symposium 2010 is an ideal scenario for the exchange of experiences within the national and international metrology community in all levels, either research, business, applications, educational, etc., to achieve successfully the objective of this edition:



Metrology, productivity and economical development

As in previous years, there will be important plenary speakers as well as an industry exhibition by our sponsors and sort courses that complement the activity.

This Symposium has also gained the interest of metrologists in other countries of our continent, thus providing an international atmosphere, enormously enriching the talks and discussions, serving as an opportunity to find technical collaboration. The expected attendance for this year edition goes over 400 people, many of who will be contributing the Symposium with either an oral or poster presentation. For more information, please visit the Symposium website at: <http://www.cenam.mx/simposio2010/>

CIE NEWS



COMMISSION INTERNATIONALE DE L'ECLAIRAGE

CIE Division 2 Meeting 2010

CIE Tutorial and Expert Symposium on „Spectral and Imaging Methods for Photometry and Radiometry”

30 – 31 August 2010, Bern, Switzerland

The field of lighting undergoes historical changes. Solid state lighting is replacing classical lighting products. New devices ask for advanced characterization and measurement methods.

The International Commission on Illumination (CIE) offers an one day tutorial on state of the art techniques in the field of photometry. For this purpose invited experts will present basic concepts and advances techniques.

On the second day a scientific symposium will feature contributed papers.

The event will be organized by the Swiss Lighting Society (SLG) and CIE Division 2 and be hosted at the Swiss Federal Office of Metrology (METAS). It will be held in connection with the annual meeting of CIE Division 2 and its technical committee

Visit <http://slg.ch/deutsch/veranstaltungstermine/cie-meeting-2010> for more details.

New TC 1-74 Methods for re-defining CIE D Illuminants

The following new TC has been approved and established in Division 1. Some of you may remember that we discussed this at D2 meeting in Turin, as this was proposed from TC2-57 (Robertson), and D2 supported creation of this TC in D1. Note that this TC will not revise any standards of D Illuminants but only to prepare a proposal for possible re-definition. If any of you are interested in contributing to this TC, please contact the TC chair, schandaj@gmail.com.

CIE TC 1-74: Methods for Re-defining CIE D Illuminants

Terms of Reference: To investigate the issue of smoothing the values of the D illuminants such as described in CIE 15:2004 Appendix C and to propose the calculation methods for new definitions of the D illuminants.

Chair: Dr. Janos Schanda

OBITUARY



Warren Ketola, 61, long time member and chairman of the Weathering and Durability Committee G03 of the American Society of Testing and Materials (ASTM) died Dec 3, 2009. Warren was a native Minnesotan of Finnish descent. He received his B.S. in Chemistry from Michigan Technological University in 1970. He worked for the Traffic Control Materials Division of 3M in St. Paul, Minnesota, from 1970 until he retired in 2008. The focus of his work and research was weathering of polymers and polymeric materials. Since 1982, he was an ASTM Fellow. He was a former member of the ASTM

Board of Directors. He chaired ASTM GO3 from 1990 to 1996 and again from 2002 to 2009. He was also a member of ASTM C24 on Buildings Seals and Sealants, D01 on Paint and Related Coatings, Materials, and Applications, D04 on Road and Paving Materials, D08 on Roofing and Waterproofing, D20 on Plastics, D35 on Geosynthetics, E06 on Performance of Buildings, and E44 on Solar, Geothermal and Alternative Energy Sources. He received awards as Outgoing Chairman of 2009, D20 Outstanding Achievement Award (2007), G03 Task Group Chairman Award (2001) and D20 Award of Recognition (2000). Warren edited and contributed to ASTM Special Publications STP 1202 on Accelerated and Outdoor Durability Testing of Organic Materials, STP 1385, Durability 2000 Accelerated and Outdoor Weathering Testing, and many other research papers in the field of materials degradation and performance. Warren was a Franc Grum Memorial Lecturer at the 2007 CORM annual meeting. Always professional, extremely well organized, and with strong leadership, technical, and people skills, Warren will be greatly missed.



Council for Optical Radiation Measurements

Purpose of the Council for Optical Radiation Measurements (CORM)

The Council for Optical Radiation Measurements is a non-profit organization with the following aims:

1. To establish and publish consensus among interested parties on national, industrial and academic requirements for physical standards, calibration services, and inter-laboratory collaboration programs in the fields of optical radiation measurement, including measurement of the transmittance and reflectance properties of materials, measurement of radiant sources, and characterization of optical detectors used for the measurement of these properties.
2. To establish national consensus on the priorities for these requirements.
3. To maintain liaison with the National Institute of Standards and Technology (NIST) and The National Research Council Canada (NRC) and to advise the Institute(s) of requirements and priorities.
4. To cooperate with other organizations, both public and private, to accomplish these objectives for the direct and indirect benefit of the public at large.
5. To assure that information on existing or proposed standards, calibration services, collaboration programs, and its own activities is widely disseminated to interested parties.
6. To answer inquiries about such standards activities or to forward such inquiries to the appropriate agencies.

Optical Radiation News Editorial Policy

Optical Radiation News (ORN) is published semi-annually in the April and October of each year. ORN reports upcoming technical meetings and news from NIST and other national metrology laboratories. News relating to the status and progress in optical radiation metrology from affiliated organizations, including, but not limited to, the *Commission Internationale De Éclairage* (International Commission on Illumination, CIE), Inter-Society Color Council (ISCC), Lamp Testing Engineers Conference (LTEC), etc., is welcome. No commercial advertising, endorsements, or contributions with commercial content are included in ORN. Unsolicited contributions are subject to review and approval by the editor, CORM publications committee, and /or executive board prior to publication. Anonymous contributions will not be accepted. Contact information for a submission is required and will be published. ORN is included free with CORM membership.

Instructions for Contributing Authors

ORN is published in English. Deadlines for submission of News items and announcements concerning optical radiation metrology are 1 March and 1 September. Items may be submitted to the editor in via fax or e-mail attachments in plain ASCII text or common electronic word processing file formats, preferably Microsoft Word® or Corel WordPerfect®. Contributions should be in 12 point Times New Roman font with simple formatting, e.g., the “Normal” style and template in Word. *Use of complex style templates and formatting is strongly discouraged.* Submissions with high quality pertinent electronic graphics are welcome, however digital photographs and graphics will be reproduced in black-and-white or grayscale. Graphics included in hardcopy submissions via fax will not be reproduced. Submissions are credited to organizations, rather than individuals.

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