CIE NEWS

COMMISSION INTERNATIONALE DE L'ÉCLAIRAGE
INTERNATIONAL COMMISSION ON ILLUMINATION
INTERNATIONALE BELEUCHTUNGSKOMMISSION

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CIE SESSION 2003

The United States National Committee (CIE/USA) is preparing to host the 25th Session of the CIE in 2003 in San Diego, California, USA. This is the first Session to be held in the US since 1967. The session will be divided into two parts: a conference from 26-28 June 2003, Thursday through Saturday with a reception on Wednesday evening 25 June 2003 and Divisional meetings from 30 June to 2 July 2003. Technical Committees will be encouraged to hold meetings throughout the session as adequate rooms are available for this purpose at no charge. There will be a variety of social activities in conjunction with the meeting. These include the opening reception, a banquet, a San Diego harbor cruise and for the Sunday between session parts, a special city bus tour with dinner at the world famous San Diego Zoo, and a closing cocktail. The visit to the San Diego Zoo on the Sunday between session parts is expected to be one of the highlights of the 2003 Quadrennium.

We have chosen the Town and Country Convention Center and Hotel as the venue for the session. The hotel has 1000 guest rooms and a park like atmosphere with beautiful rose gardens, palm trees, four swimming pools and scenic and tranquil walkways. For the first time, delegates will not be subject to travel to distant hotels after the day's sessions, thus creating extensive opportunity to interact with colleagues worldwide in informal gatherings on the beautiful grounds of the Town and Country. The Town and Country is situated near a trolley station offering easy access to the "Old Town", the San Diego city center and the harbor area. The Riverwalk golf club is just next door. A large American style shopping mall is just a short walk from the hotel and there are many restaurants in the area.

San Diego is one of the favorite vacation spots in the United States, situated on the shores of the Pacific Ocean and next to our neighbor, Mexico. San Diego's heritage is culturally diverse. Our Spanish and Mexican heritage is abundant as seen by the names of our streets and surrounding areas, as well as the many restaurants, and musical events in the San Diego Area.

The theme of our 25th Session, "Light, Dark-Skies and Space", is very appropriate as we have many famous astronomical observatories in the area, such as Mt. Wilson, Palomar and our own Mt. Laguna. San Diego also has a very large amateur astronomy club. San Diego has tried to maintain lighting which will offer the visual experience of the night sky with the kind of quality lighting which controls glare and puts light where it is needed. Our opening guest speaker is the former US Senator Dr. Harrison Schmitt. He was an Apollo 17 Astronaut and Geologist as well as one of the last men to visit the moon.

IN THIS ISSUE

California has led the way in the Space Program with NASA and the California Institute of Technology's Jet Propulsion Laboratory. It is also the home of many space programs, which includes sending probes to the moon, all the planets, the sun, comets and asteroids. The University of California at San Diego has on-going space research and direct involvement with the International Space Station as well. There will be opportunities for technical visits to some of these sites as well as visits to some of the other spectacular natural parks before and after this session.

A strong technical program is expected for the first part, the conference session, with invited speakers, selected papers, posters and workshops covering the broad spectrum of the CIE. This program is expected to include color and vision, light and lighting, optical radiation measurements, photobiological effects and imaging technology. In the second part, the division meetings will offer more opportunity for information exchange; expert opinions, and discussion at the frontiers of light and lighting research, with reports from the various Divisions' technical committees and reporterships, as well as progress on standards, and publications.

The 25th Session of the CIE promises to be a rewarding session for both its technical content and its personal interaction.

See you there,
Justin Rennilson
Chairman of the Organizing Committee

✉ News from the Divisions

The following items have been summarized from full Activity Reports and Meeting Minutes received at the Central Bureau.

Readers requiring more information are kindly requested to contact their National Division Representative through their National Committee.

Division 1 - Vision and Colour
http://nml.csir.co.za/~cie1/

Division 1 had its meeting on 22/23 June 2001 in Rochester, USA.

CIE Draft Standard DS 012 "Standard Method of Assessing the Spectral Quality of Daylight Simulators" (elaborated by TC 1-53) has been sent to Division and Board ballot, and will soon be circulated to National Committees for comments.

Division 5 - Exterior and Other Lighting Applications
http://www.cie.co.at/cie/div5/index.html

The following new TCs have been established:

TC 5-20: Guide for Sports Lighting (Chair: Thomas M. Lemons, USA)

Terms of Reference: To prepare a Guide for Sports Lighting that excludes lighting for TV and film. This guide will replace the present publications CIE 42-1978, CIE 45-1979, CIE 57-1983, CIE 58-1983 and CIE 62-1984.

TC 5-21: City Beautification (Chair: Müjgan Serefhanoğlu-Sözen, Turkey)

Terms of Reference: To prepare a Guide for City Beautification. The Guide shall be used whenever designing new or renewed creative lighting for city beautification. The Guide includes an integrated approach which takes into consideration functional lighting, floodlighting, decorative lighting and considers functional, aesthetic and emotional aspects of lighting design.

Division 6 - Photobiology and Photochemistry
http://physics.nist.gov/cie6/

CIE Draft Standard DS 013 "International Standard Global UV Index" (elaborated by TC 6-41) has been sent to Division and Board for ballot (deadline: 2001-10-20).

🕮 CIE Publications

The following publications are readily available at the CIE National Committees or the CIE Central Bureau in Vienna.

Retroreflection: Definition and Measurement

CIE 54.2-2001 **ISBN 3 900 734 99 2**

The purpose of this report is to update and replace CIE 54–1982 *Retroreflection: Definition and Measurement.*

This report is divided into nine main sections. These begin with chapter 2 which is concerned with general definitions of retroreflection, while chapter 3 defines geometrical terms.

Chapter 4 combines their collection into four geometric systems applicable for different elements of the retroreflection phenomena.

Chapter 5 defines the photometric terminology as did the original publication 54, but defines the photometric terms with reference to spectroradiometric concepts as is the current international standards procedure.

The corresponding laboratory calibration and measurement techniques are described in the next section, chapter 6, together with basic instrument requirements and traceability to national metrology laboratories.

To relate the driver's geometry to the four systems, vector notation and a series of typical examples are given in chapter 7. This approach will aid the transportation community in accessing the necessary discrete angles to assure procurement compliance and the field service life of retroreflective devices and materials.

An important section in the original publication 54, dealing with the colorimetry of retroreflectors, is expanded in chapter 8 to include new instrumentation presently available and to recommend standard test geometries for both daytime and nighttime measurements.

A new section, chapter 9, describes general field instruments available for in-situ measurements of retroreflectors. Included in this section is a guide for manufacturers to use in their specifications, listing important parameters of the instruments which can be a part of the data sheet.

Lastly, chapter 10 addresses the computer format for retroreflectance data in order to allow measurement results to be exchanged world-wide.

Four appendices complete the report with all the transformation equations between the four systems with examples, a list of keywords, data format examples and a treatise on aperture synthesis.

The Technical Report consists of 58 pages with 20 figures, among them 13 coloured ones and 9 tables.

Improvement to Industrial Colour-Difference Evaluation

CIE 142-2001 **ISBN 3 901 906 08 8**

In this Technical Report recommended practice for industrial colour-difference evaluation is presented. The recommended model is an extension of the CIE 1976 (L*a*b*) colour-difference model with corrections for variation in colour-difference perception dependent on lightness, chroma, hue and chroma-hue interaction. The corrections for the chroma dependence of chroma and hue differences in the CIE94 model have been retained and supplemented by several additional corrections based on new experimental data and analysis. Reference conditions define material and viewing environment characteristics to which the colour-difference model applies. Factors are introduced to correct for the parametric effects of various conditions of use.

The Technical Report consists of 15 pages with 2 tables.

International Recommendations for Colour Vision Requirements for Transport

CIE 143-2001 **ISBN 3 901 906 09 6**

This Technical Report details the official CIE Recommendations for requirements of colour vision that are necessary to ensure safe and reliable recognition of coloured signal lights and other colour coded visual information devices.

The aim of the report is to encourage international harmonisation in colour vision requirements in maritime, air, rail and road transport, and the use of valid methods for the assessment of colour vision.

The recommendations take into account the complexity of the colour codes used, the observation conditions likely to be encountered and the importance of colour recognition to safety in the various transport modes. The report summarises the studies that document the kind of difficulties experienced by persons with defective colour vision and the studies that show defective colour vision is a risk factor.

The report defines three colour vision standards,

(1) normal colour vision,
(2) defective colour vision A where those with a mild colour vision deficiency can demonstrate their ability to see and recognise coloured signal lights, and
(3) defective colour vision B where those with defective colour vision can demonstrate their ability to recognise surface colour codes at a short distance, such as those used on colour coded computer screens.

The report also recommends test procedures for the assessment of colour vision. Detailed information on the recommended colour vision tests is given in an appendix.

The Technical Report consists of 47 pages, with 10 figures and 2 tables.

Proceedings of three CIE Workshops on Criteria for Road Lighting

CIE x019-2001 **ISBN 3 901 906 07 X**

CIE Division 4 “Lighting and Signalling for Transport” organised in the last years three workshops in conjunction with different conferences. The first was the Symposium on “Road Lighting for Developing Countries” held on 3rd September 1997 in Durban, South Africa. The next was the Workshop on “Warrants for Road Lighting” on 24th October 1998 in Bath, Great Britain, and the last one was the Workshop on “Criteria for Road Lighting” organised on 24th June 1999 in Warsaw, Poland. These proceedings contain a selection, aiming only to avoid duplication, of the papers read at the workshops.

There is a certain relation among the three workshops; even a clear progression can be seen in the topics that were discussed. The topics developed from the general discussion of “Road Lighting for Developing Countries”; they became more specific on “Warrants for Road Lighting” and ended in the area of practical application as “Criteria for Road Lighting”. The progression is from general to specific and from abstract to concrete. The developing countries were in all cases a major focal point.

Another aspect of progression is that in the past the question whether a road section needed road lighting, was considered as a matter for politicians to decide and CIE showed its involvement in road lighting only after such decisions were made. Even now it is still recognized that the decision “to light or not to light” is indeed a decision of policy makers but the lighting profession could give valuable contributions to the decision making process. This contribution might help to come to a better result where technical, humanitarian, ecological and economic factors all have their place.

The Proceedings contain the text of 17 papers read as well as a report on the discussions and general conclusions. The publication contains 114 pages.

Proceedings of the CIE Symposium 2001 “Uncertainty Evaluation – Methods for Analysis of Uncertainties in Optical Radiation Measurement”

CIE x020-2001 **ISBN 3 901 906 05 3**

Since the appearance of the ISO publication “Guide to the expression of uncertainties in measurement” (GUM), in 1993, many practitioners in metrology have realised its limitations already indicated in the guide. The guide was intended for general use, special requirements like that of radiometry, propagation of distributions, multiple output, etc. are not met by it. Therefore, CIE dedicated its 2001 Symposium to this hot topic and held a symposium at the CIE Central Bureau, Vienna, Austria, between 23 and 24 January 2001.

Two sections were organized:

- Advances in uncertainty evaluation;
- Key comparisons and the mutual recognition arrangement.

Papers in the first section used mainly theoretical approach to uncertainty and among others dealt with uncertainties of quantities derived from spectral sums, with numerical methods in colorimetry, with uncertainties in models having more than one output quantity, with correlations in photometric measurements and with GUM supplements. The second section was based on the practical implementation of photometric and radiometric measurements mainly in the frame of key comparisons. Papers were read on the BIPM key comparison database, on the objectivity of key comparison reference values, on heuristic and optimal estimators in photon counting and on the evaluation of photometric measurements in different national measurement laboratories.

The Proceedings contain on 83 pages the text of the nine papers read as well as reports on the discussions.

🕮 New Publications in the Field of Light and Lighting

Colour and Optical Properties of Materials

RJD Tilley

Wiley, Chichester, 1999
ISBN 0-471-85198-1

Tilley deals in his book with the fascination of colour, produced by different optical effects. It is remarkable work, dealing with the most different optical effects that can produce the sensation of colour in human beings. It discusses - on a rather elementary level - questions like polarization, diffraction, optical properties of different atoms and molecules, etc. and shows how these produce the sensation of colour. It can be recommended to those who would like to get some insight into the physics of interaction of optical radiation with matter.

What your referee would have been glad to see would have been a clear distinction between optical properties and phenomena and the perception as

colour and light. The book deals in reality with the optical properties of materials, and not with colour. It is only always the consequence of the interaction of light with matter that we see colour. I.e. the author did not take the famous sentence into consideration "the rays are not coloured". This can annoy some of the readers.

Your referee has to confess that he is not an expert in many fields of atomic and molecular physics and chemistry and was unable to verify the correctness of the statements in those sections. In sections where he felt to be at home, however, he found some irritating errors and misconcepts. To enumerate just a few: On p. 5 the author writes: "Perception of the different wavelength is called colour", and he continues "the precise measurement of colour involves a determination of the energy...". As colour is a perception we can only determine the stimulus producing the colour perception. On p. 11 we read "the cone cells, which do not respond to colour ..., and the rod cells, which provide colour vision ..." . In reality just the opposite is true. On the same page brown is called a non-chromatic colour, and further down that "lightness, brightness or value, which describe the intensity of the colour, the number of photons reaching the eye". On p. 14 Tilley writes that by crushing a blue-green filter glass the "powder will also appear to be blue-green". Anybody can repeat this experiment easily by crushing a greenish wine bottle, and will find that the powder is almost pure white, only if he or she immerses this powder in water will the colour of the glass particles again be perceived as green.

It is a pity that in trying to explain things in a few words such misconcepts have crept into the manuscript.

One finds such oversimplifications also in other parts of the book, e.g. in introducing band theory, on p. 232 one reads "the highest energy attained by electrons in this band is called the Fermi energy or Fermi level", without stating at 0 K.

In discussing CRT one reads on p. 274 "the electrons emerge from the anode as a narrow collimated beam...", by anode the electron gun of the tube is meant.

Main chapters of the book are: refraction and dispersion, crystal optics (polarisation, birefringence, optical activity), reflection, transmission, scattering, diffraction, atomic and molecular transitions leading to absorption and emission, luminescence, fibre optics (both for optical transmission and visible optical effects), displays and lasers as well as a short introduction to holography. As can be seen from this enumeration of subjects, each section of this slightly above 300 pages long book can deal only with very brief introductions of the single phenomena, and no in depth comprehensive exposition can be expected. Each section ends with some introductory questions, further reading and exercises. All these could serve as an excellent introduction to the subject.

The book is a fascinating reading. In its present form, however, it can be recommended only to those who have a fundamental knowledge of physics and colorimetry and would like to get an overview of the subject. It is hoped that the publisher will soon bring out a revised version of the book, where the small, but annoying errors are corrected and then the book can be recommended to anybody who would like to get a first impression of the magnificent world of optical properties of materials, including not only those subjects we usually discuss under this heading, but finding the description how the colour stimulus on the wings of a butterfly are produced.

Lighting Engineering - Applied Calculations

RH Simons - AR Bean

Architectural Press, Oxford, 2001
ISBN 0 7506 5051 6

The book by Simons and Bean is an impressive work dealing with illuminating engineering calculations. The authors state in the preface that some basic knowledge of light and lighting is required, and this is true. The book goes into details on calculations, but the reader should be familiar with the fundamentals. If somebody would like to look behind the solutions a lighting program delivers, this book is a must for him.

The book starts with luminaire light field description and luminous intensity tables, discusses flux transfer, inter reflection calculation and everything one needs to be able to determine light distribution and illumination in interiors, exteriors, roads and special applications. An immense number of worked out examples help the understanding of the subject.

The strength of the book is in the calculations sections - in accordance with the title.

Sections dealing with related subjects are less detailed. Thus e.g. the section on light pipes could be more detailed. Other sections deal with colour, measurement and instrumentation. These chapters are, however, not of the same calibre as the main parts of the book. Thus, e.g. your reviewer found some smaller misprints and discussions deviating from normal text-book description in these chapters. The authors use the somewhat outdated rho, gamma, beta description instead of the now usual LMS for the long, medium and short wave sensitive cone fundamentals, and still call them yellow-orange, green and blue-violet sensitive. The introduction of the RGB system is also unorthodox and, as the

luminance of the fundamentals is not stated, also difficult to understand. Also the description of colour mixtures is not incorrect, only unusual and not a straight forward method. The equation of P_e on p. 288 has a small misprint, one can only hope that in the major part of the book, where it is much more difficult to follow every line of equations, there are not many misprints.

In the Measurement section your reviewer missed the CIE description of characterizing photometers and the NIST method of total luminous flux determination using integrating spheres, a method that could be used also with complete lighting systems. Based on those analyses the NIST staff came to different conclusions on paint reflectance of the sphere, baffle size and location, as shown in the book. Not everybody agrees to these new calculations, but a reference to them would have been of interest.

All the above does not subtract anything of the merits of the book. As stated already, if somebody would like to aquire detailed knowledge of lighting calculations, no better book can be suggested to him or her than this new book by Simons and Bean.

The Institute for Research in Construction (IRC) of the National Research Council Canada (NRC) is pleased to announce the recent upgrade of its Lighting Research website:

http://www.nrc.ca/irc/ie/light

The site describes the activities and interests of IRC's Lighting Research Group, highlighting recent projects and notable projects from the past. Visitors can also obtain more than 50 research papers, magazine articles and newsletter articles on IRC's lighting research work in full text; new publications are added continuously. There are also more than 80 links to other sources of technical information on the web.

☞ Future Meetings

International Lighting Conference

27-28 October, 2001
Dhaka, Bangladesh

This conference is organised by the Illumination Society of Bangladesh (ISB). The recommendations of the conference will be submitted to the Government of Bangladesh for implementation.

The following fields will be covered:

- Training and education in lighting design & application
- Standards, codes and safety measures in lighting Installation
- Lighting and architecture
- Rural and remote area lighting
- Road, traffic, monument and area lighting
- Lighting for entertainment and sports
- Renewable energy prospect in Bangladesh & world
- Problems and prospectus in manufacturing of light fittings and accessories
- Economics and optimum lighting

For further information please contact:

Syed M. A. Quddus
General Secretary, ISB and Member Secretary
International Lighting Conference,2001
M. N. Plaza, 1st floor, 2 New Eskaton Road
Baramaghbazar, Dhaka 1217
Bangladesh.
Tel: 880 2 8319603, 880 2 9348749
880 17560073 (Mobile)
Fax: 880 2 9335715
ieal@bdmail.net

9th Color Imaging Conference

Color Science and Engineering: Systems, Technologies, Applications

6-9 November 2001
Scottsdale, Arizona, USA

This Conference is the premier technical conference for engineers and scientists working in the areas of colour engineering, colour science, and their application to colour products and colour imaging technology.

Tutorials will be held on:

- Fundamental treasures of colour
- Colour appearance modeling and CIECAM97s
- Mechanisms & microstructures of colour imaging systems
- Spatial colour - vision, devices and imaging
- Visible spectrum imaging
- Colour image processing tools
- Colour management: the basics
- Colour imaging standards
- Digital still camera systems
- Colorsync framework and workflows
- Web colour management
- Colour in electronic displays

For further information, please contact:

IS&T
7003 Kilworth Lane
Springfield, VA 22151, USA
fax: +1 703 642 9094
e-mail: info@imaging.org

The United States (CIE/USA) and the Canadian (CNC) National Comittees of CIE announce their

2001 Joint Annual Meeting

15-17 November, 2001
Niagara Falls, Ontario, Canada

Program highlights include reports from the CIE Midterm Meeting in Istanbul, Turkey, the 2001 Division Meetings, a technical symposium on the subject of "Measurement Uncertainty" and an opportunity to join the opening festivities for the "Winter Festival of Lights" at Niagara Falls. The festival is billed as "Canada's largest light display".

For more information, consult the CIE/USA website at http://www.cie-usnc.org/ or contact

Terry Mc Gowan
Vice President CIE/USA
tel.: 216-291-1884
lighting@ieee.org

From the Lighting Journals

Lighting Design + Application

July 2001: Amusement & Attraction Lighting

Luce (in Italian)

Volume 40, Number 4, June 2001

La luce della Ragione
P. Preti

Che cosa è la luce ?
P. Preti

Termoluminescenza e fotoluminescenza nella datazione archeologica
R. Guanella, L. Marelli

Una luce, da lontano
R. Barbieri, P. Preti

Il "colore" della luce influenza la visibilità (Lamp color affects visibility)
I. Lewin

Luce, forma ideale dello spazio
M. Villa

The Lighting Journal

Volume 66, Number 4, July/August 2001

How to do it No.8: Amenity lighting
P. Wilson

Obtrusive light in sports lighting: some solutions
I. Major

Mackintosh's lighting legacy
A. Macgregor

Lighting design .... who cares ?
J. Lawrence

Mirror for our time
K. Greaves

Better information = better management
M. Clarke

For your Diary

Date	Title of Meeting	Organizer	Place of Meeting
2001			
Oct. 1-10	SANCI Congress: Lighting 2001	SANCI, fax: +27 012 460 4264 dcronje@mweb.co.za	Alberton, South Africa
Oct. 10-12	Light 2001	Slovak Light-Technological Soc. fax: +421 7 554 24983, dtb@ba.telecom.sk	Štrbské Pleso, Slovakia

Oct. 17-19	LED 2001 – 2nd annual summit for LEDs in illumination	Patricia Kinzer fax: +1 207 781 2150 pkinzer@intertechusa.com	San Diego, California, USA
Oct. 27-28	International Lighting Conference	Illumination Soc. of Bangla Desh fax: +880 2 933 57 15 ieal@bdmail.net	Dhaka, Bangla Desh
Nov. 5-6	48th Annual General Meeting and Congress of SANCI	SANCI, fax: +27 012 460 4264 dcronje@mweb.co.za	South Africa
Nov. 5-7	IV Jornada Electrotécnica del CEC	CEC, fax: +53 337 454 ott@ip.etecsa.cu	La Habana, Cuba
Nov. 6-8	Nat. Measurement Conf. NMC 2001 and BEMC 2001	D. Hall, fax: +44 020 8943 6821 nmp_sec@npl.co.uk	Harrogate, Great Britain
Nov. 6-9	9th Color Imaging Conference: Color Science & Engineering	IS&T, fax: +1 703 642 9094 info@imaging.org	Scottsdale, AZ, USA
Nov. 8	Nationaal Lichtcongres 2001	NSVV, Postbus 9035, NL-6800 ET Arnhem fax: +31 (026) 42 91 23 e-mail: a.rommers@kema.nl	Arnhem, The Netherlands
Nov. 15-17	Joint meeting CIE/USA and Canadian NC of CIE	T. McGowan, phone: +1 216 291 1884 lighting@ieee.org	Niagara Falls, Ontario, Canada
Dec. 3-6	Interlight	OWP, OWP-Weiden@t-online.de	Moscow, Russia
Dec. 4-5	Construction Products – Time ripe for CE marking	CEN, rue de Stassart 36 B-1050 Bruxelles	Bruxelles, Belgium
2002			
Feb. 24-26	ISCC Conference on Industrial Color Solutions	john.s.locke@usa.dupont.com	Philadelphia area, USA
March 5-7	International Conference on Light Pollution	Cerro Tololo Inter-American Observatory fax: +56 51 205212 light@ctio.noao.edu	La Serena, Chile
April 7-10	Image Processing, Image Quality, Image Capture, Systems Conference	IS&T, info@imaging.org http://www.imaging.org	Portland, Oregon, USA
May 6-8	Lighting for Places of Worship and Historical Sites	Assoc. of Eng. & Arch. of Israel fax: +972 3 523 5993 aeai@netvision.net.il	Jerusalem and Tel Aviv, Israel
Sept. 9-11	LuxPacifica 2002	ISLE, fax +91 11 46 56 739 isledel@vsnl.com	New Delhi, India
Sept. 22-25	Licht 2002	NSVV arommers@kema.nl, www.nsvv.nl	Maastricht, The Netherlands
Nov. 3-5	Light and Human Health	EPRI/LRO www.lightingresearchoffice.com	Orlando, Florida, USA

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Kegelgasse 27, A-1030 Vienna /Austria
Tel. +43 1 714 31 87 0
Fax +43 1 713 08 38 18
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