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CIE Midterm Meeting and León 2005 International Lighting Congress

May 12-21, 2005 – León (Spain)

The Spanish National Committee on Illumination (CEI) is organizing the *CIE Midterm Meeting and León '05 International Lighting Congress* that will take place in León, Spain, in May 2005.

The CIE Midterm Meeting sessions will be held at the Hostal San Marcos from May 12 to 17; and the International Lighting Congress will take place at the Auditorium of the city of León, from May 18 to 21, 2005. The two places are very near from each other and they are within walking distance in León downtown.

The CIE Midterm Meeting time table is:

- May, 12 – Thursday: CIE Division Directors and Finance Committee meetings
- May, 13 – Friday: CIE Board Meeting
- May, 14 – Saturday: CIE General Assembly

Four CIE Divisions and TCs will meet in León during May 16 and 17.

The main theme of the Congress is "Lighting for the 21st Century". The Congress will cover many subjects in science and technology of natural and artificial lighting, as:

- Image Technology
- Photobiology and Photochemistry
- LEDs and Applications
- Economics of Lighting
- Lighting and Signalling for Transport
- New Light Application
- General Aspects of Lighting
- Indoor Lighting and Signalling for Transport
- Colour and Vision
- Lighting Instruments

These subjects will be discussed at conferences, presented papers, round tables and posters.

The Congress will bring together lighting scientists, research and professional people involved in the lighting field from different countries, to exchange scientific ideas and latest technology and innovation developments. The papers presented will be selected by the International Scientific Committee.

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León is a modern midsize city in the north-west of Spain. It was founded in the year 70 A.C. Consequently it has a very long and interesting history and very important Romanic, Gothic and avant-garde monuments. The Cathedral of San Marcos is one of the most famous in Europe, mainly because its very impressive colour glass windows.

Complete information about the CIE Midterm Meeting, the International Lighting Congress and the city of León, including tourist information and communication is to be found on the CEI website: <http://www.ceisp.com>.

The Final Program of the International Lighting Congress, with the distribution of scientific and technical sessions, will be shown on the website in January 2005. It will include information on the many social events that are included in the Registration Fee, as well as the Accompanying Persons Program.

We are looking forward to meeting you in León!

Fernando Ibáñez and Antonio Corróns
Comité Español de Iluminación

News from the Divisions

Division 1 - Vision and Colour

<http://www.bio.im.hiroshima-cu.ac.jp/~cie1>

The draft report of TC 1-38 "Recommended practice for tabulating spectral data for use in colour computations" was circulated for Division and Board ballot. Deadline for vote is: 2005-03-01.

The following new Reportership was established:

Definition of the Visual Field for Conspicuity (Nana Itoh, Japan).

The next Division meeting will be held in conjunction with the CIE Midterm Meeting in León/Spain, on 16/17 May 2005.

TC1-58 is planning to organize a "CIE Expert Symposium on Vision and Lighting in Mesopic Conditions" in conjunction with the Lighting in the 21st Century Conference, León (see page 9 of this newsbulletin).

The Division Meeting 2006 will be held in Ottawa, Canada in May 2006. The ISCC and the Canadian NC of CIE are planning to organize an Expert Symposium to celebrate the 75th Anniversary of the 1931 Standard Colorimetric Observer in conjunction with the meetings of Division 1 and the ISCC.

Division 2 - Physical Measurement of Light and Radiation

<http://cie2.nist.gov>

The next Division meeting will be held in conjunction with the CIE Midterm Meeting in León/Spain, on 16/17 May 2005.

The Division Meeting 2006 will be held in Braunschweig/Germany. A symposium on uncertainty will be linked to this meeting.

Division 3 - Interior Environment and Lighting Design

<http://www.ciediv3.entpe.fr>

The draft for the Division 3 part of the ILV was sent for Division and Board ballot. Deadline: 2004-12-01.

The draft report of TC 3-30 "Hollow light guides" was circulated for Division and Board ballot. Deadline for vote is: 2005-01-25.

The next meeting of Division 3 will take place on 22/23 September 2005 in Berlin.

Some TC meetings are planned for 7/8 December 2004 in Lyon/France.

Division 4 - Lighting and Signalling for Transport

<http://www.tut.fi/cie4/>

The draft for the Division 4 part of the ILV was sent for Division and Board ballot. Deadline: 2004-12-01.

The next Division meeting will be held in conjunction with the CIE Midterm Meeting in León/Spain, on 16/17 May 2005.

Division 5 - Exterior and Other Lighting Applications

<http://www.cie.co.at/div5/>

The draft for the Division 5 part of the ILV was sent for Division and Board ballot. Deadline: 2004-12-01.

The next Division meeting will be held in conjunction with the CIE Midterm Meeting in León/Spain, on 16/17 May 2005.

Division 6 - Photobiology and Photochemistry

<http://physics.nist.gov/cie6/>

The draft for the Division 6 part of the ILV was sent for Division and Board ballot. Deadline: 2004-12-01.

The draft standard of TC 6-32 "Photocarcinogenesis action spectrum (non-melanoma skin cancers)" (CIE DS 019.1/E:2004) was circulated for Division and Board ballot. Deadline for vote is: 2005-02-15.

Division 6 held its annual meeting on 28 September 2004 at the CIE Central Bureau in Vienna. TC meetings were held on 27 and 28 September.

The next Division meeting will be held in conjunction with the CIE Midterm Meeting in León/Spain, on 16/17 May 2005.

Division 8 - Image Technology

<http://www.colour.org/>

The draft for the Division 8 part of the ILV was sent for Division and Board ballot. Deadline: 2004-12-01.

From the National Committees

The UK lighting profession 95 years on

On 18 November 1909 a number of men gathered in London for a meeting which led to formation of the Illuminating Engineering Society. It was not the first; the North American Society had preceded it by a number of years. However, it was very influential for many years.

By the 1970s, there was strong pressure in the UK for fewer professional bodies, and partly as a result the IES agreed to join the Institution of Heating and Ventilating Engineers to form the Chartered Institution of Building Services Engineers. The IES became the CIBSE Lighting Division, but carried on most of its activities. What was lost was the ability to grant membership grades relevant to lighting.

By the 1990s it had been realised that the lighting profession in the UK had become far less prominent than when there had been an independent society. Something needed to be done. The result was that on 18 November 1999, 90 years on to the day, another meeting was held, to announce the setting up of the Society of Light and Lighting as a free-standing society within CIBSE.

Five years on, what has been achieved? First we now have a membership structure which recognises qualifications and experience specifically in light and lighting. This has been immensely important in promoting the status of lighting professionals. It is interesting that the period has also seen increased interest in the Society's Lighting Diploma. This is not a course, but a way of recognising qualifications and experience. The standard is somewhat tighter than that for Member of the Society.

Secondly, the Society is increasingly active in many areas, such as the annual Ready Steady Light events when teams of "lighters" are given a site in the grounds of Rose Buford College and selection of equipment, and three hours to design a lighting scheme on a specified theme. Lighting Masterclasses are being held regularly throughout the country. Regional lighting events are increasing after a long stagnant period. A successful international symposium on workplace lighting was held in April 2004 in Dublin.

Perhaps more important in the long run, the Society is now examining recent lighting research to see whether there is information which should influence our lighting recommendations. There is a strong feeling that the long lead time in producing guidance documents, whether CIE publications, European Standards or the Society's own recommendations, means that they can be out of date when they are published.

The Society also actively supports the Lighting Education Trust which supports and promotes lighting courses in the UK; and of course CIE-UK in its work of co-ordinating lighting research.

For more information about the Society go to www.cibse.org/lighting

New CIE Publications

Administrative Note

According to a recent decision of the CIE Board of Administration, the numbering of CIE publications is as follows: When a publication is withdrawn, the old number is kept, followed by the year of the new

edition (as part of the publication number). No version indication (.2, .3 etc.) is given any more. Thus the revised version of the old "CIE 15.2-1986" got the number "CIE 15:2004 (3rd edition)", the revised version of the old "CIE 88-1990" got the number "CIE 88:2004 (2nd edition)". This is in line with the practice of other standardization bodies.

Colorimetry

CIE 15:2004 (3rd edition) ISBN 3 901 906 33 9

For over 70 years the International Commission on Illumination (CIE) has provided recommendations about the precise way in which the basic principles of colour measurement should be applied. CIE Publication 15:2004 "Colorimetry" represents the latest edition of these recommendations and contains information on standard illuminants; standard colorimetric observers; the reference standard for reflectance; illuminating and viewing conditions; the calculation of tristimulus values, chromaticity coordinates, colour spaces and colour differences; and various other colorimetric practices and formulae. This publication is consistent with the fundamental data and procedures described in the CIE Standards on Colorimetry.

This publication, which replaces CIE Publication 15.2 (and is not to be known as 15.3!), includes details of the CIE DE2000 colour difference equation; spectral power distributions for sets of halophosphate lamps, DeLuxe type lamps, three-band lamps, multi-band lamps, high pressure sodium lamps and high pressure metal halide lamps. The nomenclature for the recommended geometries has changed, and there are even changes to the equations defining the parameters of the CIELAB colour space!

The publication is accompanied by a CD-ROM that contains all the tables of standard and recommended spectral distributions and a program (for Windows operation systems) to perform interpolation of spectra related to reflection or absorption measurements.

Thus this publication represents the colorimetric state-of-the-art and should find a place on the bookshelf of every colour scientist.

The report consists of 79 pages with 17 tables.

Guide for the Lighting of Road Tunnels and Underpasses

CIE 88:2004 (2nd edition) ISBN 901 906 31 2

After having reviewed and defined the various factors to be taken into consideration with regard to the lighting of tunnels and road underpasses, the present document sets out recommendations concerning the daytime and night-time lighting. It also describes the measures to be taken into consideration in order to adapt this lighting to the fluctuations in the external lighting or in the case of failure of the normal electrical power supply of the lighting installations. Attention is also given to maintenance which has to be carried out in order to ensure the lasting quality of the installations.

It is also important to note that while this publication is part of a general activity aimed at improving road safety, safety depends on a large number of factors among which lighting is only one particular constituent. The contribution of lighting in this context is to enable the road user to perform his visual tasks by ensuring a sufficient visibility of objects.

This publication replaces CIE 88-1990 "Guide for the Lighting of Road Tunnels and Underpasses".

The Report consists of 40 pages with 10 figures and 10 tables.

Proceedings of the 25th Session of the CIE

San Diego, USA, 25 June - 2 July 2003 (CD-ROM)

CIE 152:2003 ISBN 3 901 906 21 5

Vol. I (Part 1 and 2):

This volume contains on over 700 pages the texts of the Invited Papers, Presented Papers and Posters presented at the Session, as well as the introductions to the Workshops.

Vol. II:

The second volume of the Proceedings contains the text of the Welcome Addresses, Officers Reports, as well as a list of participants. It presents an overview on the technical work achieved during the quadrennium in the form of Quadrennial Reports, minutes of the Divisional Meetings and Workshop Reports.

A CD-ROM containing the full Proceedings (Vol. I and II) in pdf format is now available. It additionally contains a longer version of some of the papers included in Vol. I, as well as some pictures taken at the Session in the form of a slide show and movie presentation.

You can order the CD-ROM alone, or as a set together with the printed version of Vol. I.

A Review of Chromatic Adaptation Transforms

CIE 160:2004 ISBN 3 901 906 30 4

This report reviews a number of studies on chromatic adaptation. Four different experimental techniques are first described and their pros and cons are analysed. Eight experimental data sets commonly used to evaluate chromatic adaptation transforms are detailed. Thirteen chromatic adaptation transforms are also described and their equations are given in full. Finally, various studies for testing different transformations are reviewed. The

results show that there are four possible candidates for future CIE recommendation, CMCCAT2000, CMCCAT97, CAT02 and CIECAT94. Overall four formulae give quite similar performances and the TC members have not found it possible to agree on which if any of the four should be recommended.

The Report consists of 36 pages with 7 figures and 3 tables.

Chromatic Adaptation Under Mixed Illumination Condition when Comparing Softcopy and Hardcopy Images

CIE 162:2004

ISBN 3 901 906 34 7

The chromatic adaptation transforms used in most colour appearance models assume that observers are fully adapted to a given set of viewing conditions. Unfortunately, the condition of complete chromatic adaptation usually does not occur in the consumer market and in more casual industrial use. Instead, these users tend to view softcopy in a room with sufficient ambient illumination to allow comfortable viewing and examination of hardcopy imaging. Further, users often desire to compare hardcopy and softcopy images using rapid successive binocular observations. The focus of this report is to determine how colour imaging experts can best accommodate the desires and practices of these more casual observers. It shows that accounting for mixed and incomplete chromatic adaptation produces more accurate results in colour appearance than not accounting for them. It includes a mathematical model for chromatic adaptation and provides appropriate parameters for the chromatic adaptation model under such viewing conditions.

The report consists of 21 pages with 5 figures and 2 tables.

The Effects of Fluorescence in the Characterization of Imaging Media

CIE 163:2004

ISBN 3 901 906 35 5

The addition of fluorescence to either the inks or the substrate greatly increases the level of uncertainty in instrumental readings of the optical properties of printed images. CIE 76-1988 "Intercomparison on measurement of (total) spectral radiance factor of luminescent specimens" shows that even research and standards laboratories experience a degradation in their reproducibility of up to one order of magnitude (10x), in the readings of total spectral radiance factor of strongly coloured, fluorescent materials. There are no recent studies of this magnitude or reliability but it is the opinion of the Reporter who prepared CIE 163:2004 that the state-

of-the-art has significantly advanced in the 15 years since the approval of CIE 76-1988.

This report contains results from a study of the measurement of total spectral radiance factor of digital halftone printing over a range of substrates exhibiting various levels of fluorescence. Colorimetric properties were computed for CIE Illuminant D50 when the UV component was included and when the UV component was excluded from the measurement source. The results indicate and quantify that the fluorescence of the substrate can be measured in both solid ink areas and halftone ink area with the effect being far larger in the latter. The magnitude of the CIELAB colour differences indicate that a significant lack of reproducibility may be experienced between two imaging centers who attempt to apply colour management principles to their individual measurements of the same image printed on fluorescent substrates or between two laboratories who attempt to quantify the colour differences between images printed on fluorescent stock and measured using instruments with different sources. The preliminary reports of CIE TC 1-44 "Practical daylight simulators for colorimetry" have shown that significant variability exists among instruments claiming daylight simulations and an even greater difference between instruments with UV-rich pulsed xenon lamps and those with UV-poor incandescent lamps.

The report consists of 20 pages with 16 figures and 9 tables.

CIE Standard S 012/E:2004 Standard Method of Assessing the Spectral Quality of Daylight Simulators for Visual Appraisal and Measurement of Colour

This standard specifies a method of assessing the spectral quality of the irradiance provided by a daylight simulator to be used for visual appraisal of colours or for colour measurements and a method of assigning a quality grade to the simulator. It specifies the maximum permissible deviation of the chromaticity of the simulator from the chromaticity of the CIE Standard Daylight Illuminant or CIE Daylight Illuminant being simulated, for a simulator to be graded by this method.

The basis for the assessment is the special metamerism index for change in illuminant, using pairs of virtual (rather than real) specimens specified by their reflecting and fluorescing properties. The pairs of specimens are metameric matches under the CIE daylight illuminant, when evaluated with the CIE 1964 Standard Colorimetric Observer. The method described in this standard quantifies the mismatch when the pairs of virtual specimens are

illuminated by the simulator under test and evaluated by the same standard observer.

The standard is accompanied by a disk containing the spectral data of Tables 3-6 of the standard in MS Excel format.

A German (CIE S 012/D:2004) version is also available, a French version will be published within short.

CIE Draft Standard DS 014-1.2/E:2004 Colorimetry - Part 1: CIE Standard Colorimetric Observers

Colours with different spectral compositions can look alike. An important function of colorimetry is to determine whether a pair of such metameric colours will look alike. It has long been the practice in colorimetry to make use of sets of colour-matching functions to calculate tristimulus values for colours: equality of tristimulus values for a pair of colours indicates that the colour appearances of the two colours match, when they are viewed in the same conditions by an observer for whom the colour-matching functions apply. The use of standard sets of colour-matching functions makes the comparison of tristimulus values obtained at different times and locations possible.

This Draft International Standard specifies colour-matching functions for use in colorimetry. Two sets of colour-matching functions are specified:

Colour-matching functions for the CIE 1931 standard colorimetric observer

This set of colour-matching functions is representative of the colour-matching properties of observers with normal colour vision for visual field sizes of angular subtense from about 1° to about 4°, for vision at photopic levels of adaptation.

Colour-matching functions for the CIE 1964 supplementary standard colorimetric observer

This set of colour-matching functions is representative of the colour-matching properties of observers with normal colour vision for visual field sizes of angular subtense greater than about 4°, for vision at sufficiently high photopic levels and with spectral power distributions such that no participation of the rod receptors of the retina is to be expected.

The draft standard has been sent to CIE National Committees for comments and sales to interested parties. It is still subject to changes and may not yet be referred to as a CIE Standard. When approved by the CIE NCs, it will be published as a CIE Standard and later on as a joint ISO/CIE standard

CIE Draft Standard DS 014-2.2/E:2004 Colorimetry - Part 2: CIE Standard Illuminants

CIE standard illuminants are used in colorimetry to compute the tristimulus values of reflected or transmitted object colours under specified conditions of illumination. This Draft International Standard specifies two illuminants for use in colorimetry:

CIE standard illuminant A

This is intended to represent typical, domestic, tungsten-filament lighting. CIE standard illuminant A should be used in all applications of colorimetry involving the use of incandescent lighting, unless there are specific reasons for using a different illuminant.

CIE standard illuminant D65

This is intended to represent average daylight. CIE standard illuminant D65 should be used in all colorimetric calculations requiring representative daylight, unless there are specific reasons for using a different illuminant. Variations in the relative spectral power distribution of daylight are known to occur, particularly in the ultraviolet spectral region, as a function of season, time of day, and geographic location. However, CIE standard illuminant D65 should be used pending the availability of additional information on these variations.

The draft standard has been sent to CIE National Committees for comments and sales to interested parties. It is still subject to changes and may not yet be referred to as a CIE Standard. When approved by the CIE NCs, it will be published as a CIE Standard and later on as a joint ISO/CIE standard

New Publications in the Field of Light and Lighting

Fundamental Optical Design

Michael J. Kidger

SPIE Press, 2002
ISBN 0-8194-3915-0

Since the early 80's in the field of optical system design using ray-tracing programs Kidger Optics Ltd. is well known for their computer program SIGMA. Even now they belong to the leading companies in optical ray tracing programs and lens system design. The author of this volume is the founder of Kidger Optics, the subject is based on Michael Kidger's short course for SPIE entitled "Fundamental Optical Design".

This book strictly follows in all chapters the main idea: handle a design with geometrical optics and

analyze third order and if needed higher order aberrations expressing them exactly with mathematical formalism. Design examples include aberration data generated by SIGMA both in tables and graphically. Some of the designs are shown in the process of development, how the aberrations were corrected or partially corrected with different tools and how the image quality improved.

In Chapter 1 the basic geometrical concepts used in the book are introduced. Physical optics is mentioned only when it is absolutely necessary, since the rigorous derivations of image formation are rarely helpful in lens design. The next chapter considers the properties of optical systems in the paraxial region. Even in the time of modern, high capacity computers and fast ray-tracing algorithms paraxial optics remains very important, it can be referred as first order optics. In any well corrected lens the rays outside of this region have to intersect the image surface close to the points of the paraxial rays. Chapter 3 discusses ray-tracing that is used to calculate aberrations. Two of the three methods of handling aberrations are shown, transverse ray- and wavefront aberrations. All three provide essentially the same information, including the longitudinal one, it is mainly a matter of personal preference.

Chapter 4 categorizes the aberrations from the power form of the wave aberrations as first order, the five monochromatic third order (Seidel) and the higher order aberrations. All of them are given mathematically and visualized graphically as a 3D image for wavefront aberration, in a coordinate system for transfer ray aberrations and as spot diagrams. The ways of balancing the Seidel aberrations are shown and the chapter concludes with the theory and practical calculation of modulation transfer function. The next chapter deals with chromatic aberrations due to dispersion. To handle the dispersion the Schott polynomial and the Abbe V-value are used and the phenomenon is described by the longitudinal chromatic aberration. The correction of chromatic aberrations is shown on simple doublets. The next two chapters are the most important ones in this volume: the analytical formulae of the basic principles of aberration corrections are derived that help to understand why third order aberrations arise and how to reduce them. The aberrations are demonstrated on simple optical systems, further the ways of corrections are analyzed on singlets, doublets and triplets both in finite conjugate and afocal applications. The correction of axial and lateral colour is shown on lens systems. As a last tool for aberration correction aspheric surfaces are introduced.

Chapters 8-11 show applications of the aberration corrections on different systems including cemented and split achromatic doublets, simple Petzval lenses with curved and flattened image surfaces, telephoto objectives, triplets, different types of eyepieces, afocal systems, etc. and the

effects of prisms and pupils on aberrations in the appropriate system. The systems are thoroughly analyzed with the help of SIGMA, but it is shown also that an optical designer program cannot undertake all the tasks, when fifth- and higher-order aberrations dominate, as they do at the larger apertures and field sizes often required, analytical dissection of the problem starts to fail, and optimization codes, experience and intuition become the principal factor.

Chapter 12 deals with the design of refractive systems for thermal imaging. Mostly the characteristics of infrared materials and simple systems, the counterparts of the visible systems mentioned above, are discussed. The last chapter is dedicated to catadioptric systems. Simple systems, used mainly in telescopes, and some examples of the corrections of the most important aberrations are described. Both classical, like achromatized or field flattened Schmidt cameras, and modern designs for example Ritchey-Chretien telescopes are shown.

This book is well written, its simplicity and clarity is of great advantage, but the nature of this applied science requires that one has to experiment with ray-tracing programs before the start of any practical design.

J.M.

Intermediate Optical Design

Michael J. Kidger

SPIE Press, 2004
ISBN 0-8194-5217-3

This book is the second of two volumes originating from Michel Kidgers short courses for SPIE. It is a compilation of material from these courses made by his student David M. Williamson after his death. These intermediate-level courses were aimed at students and practicing optical designers who already had a thorough knowledge of geometrical optics and third order aberration theory. This second volume does not review the material in the first volume; the assumption is that the reader is already familiar with it, preferably having already worked through the examples in that volume. The main topics of this volume are higher order aberrations due to higher numerical apertures and field sizes, as well as optimization.

While the first volume carefully avoided the subject of optimization, this volume starts with a general but wide-ranging discussion of it. Most of the lens design programs will find a local optimum based on the optimization strategy. Whether this solution is a global optimum or a local one depends on the choice of starting design, it is crucial to the success of the optimized design. Some of the conditions for

the optimization can be solved exactly, but some of them only in the sense of the sum of the least squares. Design examples are included to illustrate certain points, such as the effects of lens diameter and thickness constraints on aberration performance.

Chapter 2 is dedicated to the higher order (Buchdahl) aberrations. The most fundamental difference between third order and fifth order aberrations is that the latter one can be induced by beams aberrated through third order aberrations of previous surfaces. For the optimization the damped least square method is used in the examples. In the next chapter the synthesis of new lens design provides an overview how a lens is developed, beginning with the starting points for optimization until the final manufacturable product. While there have been numerous attempts to apply databases and artificial intelligence for global optimization, here the approach is to use human tools: memory, common sense, experience and knowledge. It involves definitely the use of the (local) optimization program and then refining the more promising ideas to include greater accuracy and all of the required practical aspects.

The fourth chapter covers many of the classical photographic lenses, this is a brief review, with some insights and historical observations. The fifth chapter attempts to cover a wide range of approaches to the problem of secondary spectrum correction, which is a higher-order chromatic aberration that the practicing designer will often encounter, and which can be the most stubborn imaging defect to reduce or eliminate. The most common approach has been to use anomalous glass types, and this is briefly reviewed.

Chapter 6 illustrates the wide variety of situations that an optical designer may encounter, where in this case chromatic aberrations are unimportant, but other considerations specific to lasers need to be taken into account. Chapters 7 and 8 deal with high-numerical-aperture designs. Microscope objectives operate over a relatively small field size and broad spectral bandwidth, whereas microlithographic objectives cover a relatively large field size and narrow spectral range. Microlithographic objectives are the best illustration of the remarkably high and uniform performance across the image format that can be obtained by the combination of large size and complexity to "relax" the optical design. Essentially, this strategy simply minimizes ray incidence angles on optical surfaces, complex designs are now routinely produced with aberrations measured in a small number of milliwaves rms in the ultraviolet spectrum.

Another class of systems covered in Chapter 9, that one reasonably expects to find in a book on advanced optical design, is zoom lenses. Chapter 10 discusses some of the more basic issues involved in the design of tilted or decentered optical systems.

The final chapter is a brief discussion of some of the practical issues involved in designing a lens that has to be manufactured within specified price and performance requirements.

This second volume is also built up logically, the derivations of the merits and the refining of the designs are amply illustrated by aberration curves and spot diagrams.

J.M.

Meeting Report

1st CIE Expert Symposium on Light and Health

Vienna, Austria, September 30 – October 2, 2004

The 1st CIE Expert Symposium on Light and Health provides an outstanding example of true interdisciplinary collaboration among the worlds of medicine, biology, physiology, psychology and the world of "lighting practice".

An exciting new discovery, two years ago, of a new photoreceptor in the eye - in addition to the rods used for night-vision and the cones used for colour-vision - was described in some detail at the expert symposium organized by the International Commission of Illumination CIE. That novel receptor represents a "missing link" in describing the mechanism of biological effects as controlled by light and darkness. These effects, being studied in humans over the last 20 to 25 years, include for example the regulation of the melatonin, cortisol and growth hormones and to a certain extent also heart rate. The photoreceptor appears to be essential for maintaining and resetting the biological circadian clock. All these recent discoveries have excited the illuminating engineering and lighting design communities because of the potential to apply this knowledge to design a healthier light environment.

The *CIE Expert Symposium on Light and Health* provided an excellent opportunity for both lighting scientists and photobiologists to explore and exchange the current knowledge regarding the biological effects of light (including ultraviolet radiation). New research findings point to improved, future applications of light and daylighting for a healthier indoor environment. Research results were presented to better understand how the spatial and spectral quality of light may best be used in lighting design.

A common thread ran through many of the presentations, namely that both visible light and ultraviolet radiation have great benefits to health - both directly (short term influence) and indirectly (long term influence); however, exposures to both light and ultraviolet radiation in excess or at wrong moments can produce health risks as well, including

risks for some cancer forms. The problem was to find the golden mean and to balance benefits with risks if necessary.

Short-wavelength blue light appears to be most effective in "regulating" the biological clock. Excessive light has long been recognized as a potential hazard to the retina, particularly with regard to short-wavelength blue light which is responsible for instances of eclipse blindness or retinal blind spots produced by staring at the sun. However, the normal aversion to staring at very bright light sources normally precludes a hazard to the retina from intense lamp sources and the sun.

Ultraviolet radiation is essential for health with the production of vitamin D, which is required for calcium metabolism, sound bones and other positive benefits. Ultraviolet seems also of value for other photo-immunological benefits (probably reducing risks for some forms of cancer). Excessive ultraviolet radiation exposure however poses a distinct risk of acute effects such as sunburn as well as delayed effects ranging from accelerated skin aging to severe skin cancer.

Of course some of these detailed biological aspects require further research. The symposium has given some input as to in which areas more knowledge is especially required. Most participants generally agreed that some approaches are already possible and the lighting community needs to know what is currently accepted as scientific fact as opposed to scientific speculations. It was therefore proposed and accepted to organize in 2005/2006 a follow up CIE expert symposium. Here the aim would be to lay the ground work for starting formulating how today's knowledge can be put already carefully into lighting practice. For this the balance of participants with a medical/biological respectively lighting practice background should be more equal in such follow up symposium. The 1st, very successful, symposium saw slightly more than 100 participants from 19 different countries with about 65 % medical/biological and 35 % lighting background.

The Proceedings will be ready by early 2005, and can then be obtained from the CIE Central Bureau.

CIE Symposia

CIE Expert Symposium on Vision and Lighting in Mesopic Conditions '05

21 May 2005, León, Spain

The one day Symposium will be a satellite meeting of the Lighting in the 21st Century León 05 Conference. It will feature Invited Papers and Contributed Papers, together with a round-table

discussion meeting to formulate recommendations for the CIE.

Much new information has been gained in the field of vision during the past few years that has a direct influence on lighting practice. In particular new results have increased our understanding of visual mechanisms at mesopic light levels. On both sides of the Atlantic and in Japan new mesopic models have been set up. A European consortium, MOVE, has adopted a task performance based approach for night-time driving.

The CIE has established Technical Committees to investigate the possibility of applying mesopic models of visual performance and of brightness estimates to produce unified photometric systems. This Symposium is hosted by TC1-58 'Visual performance in the mesopic range'.

The task of this symposium is to foster the exchange of ideas and to inform illuminating engineers of the new methods of evaluating mesopic light levels.

Goals are:

- to discuss open questions of mesopic visual models, find the common ground shared by the different models and their range of applicability,
- to foster discussion between vision scientists and lighting engineers to find ways of utilizing the new findings for more energy efficient and safer lighting,
- to formulate recommendations for CIE Division 1 and 2, as well as 4 and 5 for further action.

Call for Papers:

Papers should deal with one of the following subjects:

- Visual performance measures in the mesopic range of vision.
- Brightness measures in the mesopic range of vision.
- Establishment of mesopic scales for different types of applications.
- Photometric measurement methods and measurement devices for the mesopic visual range.
- Implications of the new results on street and outdoor lighting.

Authors are invited to submit two page extended abstracts of their proposed contributions in English no later than 15 March 2005 using the on-line Submission Paper Form to be found at the WEB site of the Symposium:

<http://vision.vein.hu/CIESYMP05>

or per e-mail to: kntsj@almos.vein.hu

or per mail to the Co-Chair of the Symposium:

Dr. J. Schanda
Nádor u. 25
H-1029 Budapest

(please do not fax, as the extended abstracts, if accepted, will be used to print the Abstract Booklet).

Authors will be notified of acceptance of their abstract by 15 April 2005. Instructions for preparing camera-ready copy of papers will be forwarded to accepted authors. Final camera-ready copy is due at the Symposium. The Proceedings of the Symposium will be made available after the meeting. Accepted Symposium contributions will be pre-published for Symposium participants at the WEB site of the meeting.

This meeting is open to all participants. To ensure adequate space and support, and to allow distribution of relevant documents, prior registration is required. The Symposium is free for all who are registered for the Lighting in the 21st Century León 05 Conference. Information on Registration for this Conference can be obtained at

<http://www.ceisp.com/simposium/ceileon/ingles/>

or from

Viajes Presstour España
C/ Guzmán el Bueno, 100
28003 Madrid
Tel.: +34 91 553 2606
Fax: +34 91 554 9123
e-mail: leon05@presstour-viajes.com

Deadline for discount registration is 12 March 2005.

Future Meetings

2nd Joint International Conference of The Forum of Experts on Measurements and Modelling of Solar Radiation & the Hellenic Illumination Committee on the Solar Light Advancements and Applications in the Dawn of the 21st Century (SOLARIS 2005)

26 - 27 May 2005, Athens, Greece

The following issues on solar radiation and daylight applications will be addressed during the conference:

Solar radiation:

- Solar radiation measurements
- Solar radiation data bases
- Solar radiation modelling
- Solar radiation and satellites
- Advanced technology in solar radiation applications
- Solar radiation applications in everyday life

Daylight:

- Daylight measurements
- Daylight data bases
- Daylight modelling

- Daylight and satellites
- Advanced technology in daylight applications
- Daylight applications in everyday life

Working language: English.

Presentations: Oral and posters.

Registration: On-line.

Registration fee: € 150 until 31 December 2004 and € 200 from 1 January 2005. The fee includes conference Proceedings, coffee breaks, official dinner and accompanying material.

For further information, consult the website of the Conference:

www.efe.gr/news-eng/symposium-2005.htm

5th Lux Pacifica

24 - 26 July 2005, Cairns, Australia

Papers will be presented from all member and many non-member countries. The theme is "Towards a sustainable lighting future" and this has scope within it to present your story on lighting, whether it be in scientific research, lighting energy policy, use of new design techniques, new products and services, environmental issues or development issues.

Scientific topics could include:

- Fundamental of lighting and daylighting
- Lighting design and application
- Vision and colour
- Radiometric or optical properties of materials
- Actinic effects of optical radiation and application
- Light sources
- Luminaires and lighting electronics
- Optical device, sensor and display
- Lighting energy efficiency

An interesting social and accompanying person's program complements the scientific and design sessions.

For further information, consult the Lux Pacifica website:

<http://www.arch.usyd.edu.au/~luxpacific/index.html>

Urban Nightscape 2006

21 - 24 September 2006, Delphi, Greece

The Hellenic Illumination Committee (HIC) is organizing an international conference on the topic "Urban Nightscape" in Delphi/Greece. The scientific committee of the conference will include scientists representing Divisions 4 & 5, which are expected to hold their annual meetings at the same venue, namely the European Cultural Center of Delphi.

The topics are

- Light pollution
- Lighting master plan strategies & policy

- Light and colour in the city
- Illumination of public spaces & objects
- Illumination of private spaces & objects in urban context
- Luminous advertisements
- Photodynamic effects
- Night vision
- Others

Abstracts (Word documents in Arial 10 of 1 page max.) accompanied with a remark for the respective topic, can be sent until 30th November 2005 for selection to the Headquarters of HIC:

Hellenic Illumination Committee
National Observatory of Athens
Lofos Nymphon, PO Box 20048
GR-11810 Thission, Greece
Phone: +30 210 3490119
Fax: +30 210 3490113
e-mail: info@efe.gr

Authors will be notified on acceptance or rejection of the submitted abstracts until 31st January 2006. Selected Papers can be presented orally or as a poster according to the respective decision of the scientific committee and will be included in the proceedings of the conference. All authors of papers will be invited to provide a complete article for the proceedings following a specific template given later.

From the Lighting Journals

Journal of Light & Visual Environment

(www.soc.nii.ac.jp/iej/) *Volume 28, Number 2, 2004*

Volume 28, Number 2, 2004

Ca(Eu_{1-x}La_x)₄Si₃O₁₃ red phosphor and its application to tri-chromatic white LEDs

K. Yamada, M. Ohta, T. Taguchi

Comparison of perceived colour differences with colorimetric colour differences in uniform colour spaces and colour appearance model

M. Nakayama, K. Ikeda

Prophylactic UV radiation and CIE Standard on photobiological safety of lamps and lamp systems

G. Sarychev, G. Gavrilkina

Measurement of vacuum ultraviolet radiation with diamond photo sensors

K. Uchida, H. Ishihara, K. Nippashi, M. Matsuoka, K. Hayashi

Evaluation of the artificial neural network for color discrimination - discrimination of non-learned colors

Y. Tayagaki, S. Sekiya, S. Sekine, M. Ohkawa

Developments in digital addressable lighting control

M. Moeck

Lighting Design + Application

(www.iesna.com)

September 2004: *Daylighting & Energy Management*

October 2004: *Retail Lighting*

November 2004: *2004 Progress Report*

The Lighting Journal

(www.ile.co.uk)

Volume 69, Number 5, September/October 2004

Getting "best value" out of lighting and PFI

H. Crossman

Talking LEDs

C. Gardner

Daylight by night

Volume 69, Number 6, November/December 2004

Street lighting and PFI: a risky business

H. Crossman

The use and misuse of coloured light in the urban environment

C. Gardner

Light pollution - lessons from the past, lessons for the future?

S. Ellis

Reducing road congestion with dynamic road marking

K. Henry

For your Diary

| Date | Title of Meeting | Organizer | Place of Meeting |
|-------------|--|--|------------------|
| 2005 | | | |
| April 10-14 | Lightfair 2005 | www.lightfair.com | New York, USA |
| May 8-13 | AIC Colour '05 10 th Congress of the Internat. Colour Association | AIC, http://www.ugr.es/local/aic05 | Granada, Spain |

| | | | |
|-------------|---|--|----------------------|
| May 9-11 | 6 th Int. Conf. of Energy-Efficient Lighting (Right Light 6) | http://www.rightlight6.org | Shanghai, China |
| May 12-21 | CIE Midterm Meeting & International Lighting Congress | CIE, ciecb@ping.at , leon05@prestour-viajes.com | León, Spain |
| May 16-17 | Meetings of the CIE Divisions 1, 2, 4, 5, 6 | CIE Divisions 1, 2, 4, 5, 6 | León, Spain |
| May 16-20 | NMIJ-BIPM Workshop on the Impact of IT in Metrology | NMIJ-BIPM, Dr. Rainer Köhler fax: +33 1 4534 20 21 rkohler@bipm.org | Tsukuba, Japan |
| May 18-20 | 4 th Intern. Euroskin Conference: The Burden of Skin Cancer | European Soc. of Skin Cancer Prevention dermatologie@hospit.std.shuttle.de | Lyon, France |
| May 21 | CIE Expert Symposium on Vision & Lighting in Mesopic Conditions '05 | CIE, ciecb@ping.at | León, Spain |
| May 26-27 | Measurement and Modelling of Solar Radiation | Hellenic Illumination Committee www.efe.gr | Athens, Greece |
| June 2-3 | ILUMINAT 2005 + BalkanLight 2005 | dorin_beu@cluj.astral.ro , marilena.maierean@energobit.com | Cluj-Napoca, Romania |
| Sep. 19-21 | Lux Europa 2005 | lichttechnik@ee.tu-berlin.de | Berlin, Germany |
| Sep. 22-23 | CIE Division 3 Meeting | CIE Division 3 | Berlin, Germany |
| 2006 | | | |
| March 27-30 | XII International Winter Road Congress | PIARC. Org.Secr.: aipcr2006@mafservizi.it | Torino, Italy |
| May | CIE Division 1 Meeting | CIE Division 1 | Ottawa, Canada |
| Sep. 21-24 | Urban Nightscape 2006 | Hellenic Illumination Committee info@efe.gr , www.efe.gr | Delphi, Greece |

The staff of the CIE Central Bureau is sending you

**SEASON'S GREETINGS
MEILLEURS VOEUX**

und wünscht

FROHE FESTTAGE



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