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LEDs – Lighting the Way Forward

No one who has read the lighting press over recent months can have failed to be struck by the rapid in-roads LEDs (light emitting diodes) are making into the fields of lighting design and application. The developments and improvements that have taken place in recent years, in terms of efficiency, spectral coverage, reliability, cost and availability, means that their use is expanding fast. They are now found in a wide range of applications, including signs, signals and message boards on roads and railways, signalling and warning systems for air and sea transport, visual display panels, emergency exit route markers, decorative lighting and optical instrumentation. Furthermore, white LEDs have now improved to such an extent that it is only a matter of time before LED 'lamps' - intended as a direct replacement for tungsten or fluorescent lamps in general lighting applications - become available.

These new developments and applications bring with them a whole host of measurement-related problems. For example, in many cases LEDs are no longer being used as single elements, but rather in clusters and arrays. An excellent example is the LED traffic signals which have already been introduced in many places around the World. These use an array of tens, or even hundreds, of coloured LEDs to act as a direct replacement for traditional traffic signals based on tungsten lamp and filter combinations. The fact that the new signals are pixelated, self-coloured, highly directional and often operated in a pulsed mode, can all introduce significant errors if they are measured in the same way as traditional signals. Thus in order to be sure that specifications are (a) meaningful and (b) capable of being applied consistently, it is necessary to review and refine the way in which measurements are made.

Associated with these measurement-related issues are questions related to the visual perception of LEDs, and in particular the colour rendering properties of white LEDs. The spectral characteristics of white LEDs are very different from those of more traditional sources, such as fluorescent lamps, and there is growing evidence that the colour rendering index developed for these lamps does not produce the 'correct' result for white LEDs – in other words, the colour rendering index does not correlate well with the visual perception.

IN THIS ISSUE

LEDs - Lighting the way forward – CIE Supportive Member - News from the Divisions – New Publications - CIE Symposia - Future Meetings – From the Lighting Journals – For your Diary

This is not a purely academic question, but has significant commercial consequences: there will be strong resistance to the use of white LEDs in many applications if the numerical value assigned for their colour rendering performance is not as good as for other white light lamps.

A further issue is that improvements to LED technology means that the efficiency, and therefore the output, or 'brightness', of LEDs is increasing rapidly. Until recently, the optical radiation output from LEDs was so low that there was little reason to consider them as a potential eye safety hazard. This is now changing. As a result, LEDs are explicitly mentioned in IEC and CIE photobiological safety standards - specifically they appear in the IEC laser safety standard and the CIE lamp photobiological safety standard. However, not only are the requirements of these different standards not consistent with one another, leading to potential confusion, but in some cases they may lead to unnecessarily restrictive testing e.g. for LEDs for use in general purpose lighting or signalling applications.

By bringing together manufacturers, users, specifiers, measurement experts and photobiologists from around the world, the CIE is uniquely placed to address all these problems. The importance of LEDs is clearly demonstrated by the fact that Divisions 1, 2 and 6 already have a total of six Technical Committees actively involved in LED-related issues, covering topics such as: colour rendering; luminous intensity and luminous flux of single LEDs; measurements of LEDs used in clusters and arrays; characterisation of photometers and colorimeters for use with LEDs; and photobiological safety of LEDs. In addition, these 3 Divisions are organising a CIE Expert Symposium on LED Light Sources: Physical Measurement and Visual and Photobiological Assessment, to be held in Tokyo, Japan, on 7-8 June 2004 (see page 5).

As technology and instrumentation in fields such as LED lighting continue to develop, the need for best practice guidance on visual, measurement and safety related issues will also continue to grow. The role of the CIE in producing recommendations, defining best practice, and providing a lead to specification bodies such as ISO and CEN, is critical if these new developments are to be exploited to their full advantage.

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New CIE Supportive Member

Schröder Group, Liège, Belgium

(www.schreder.com) joined CIE as Supportive Member.

Supportive members benefit from the right to use the CIE Supportive member logo on their letterhead and in their publications so as to show that they are fully up to date with the latest information on world wide lighting trends, research and standards, and, depending upon membership category, the internal or external exploitation right of CIE publications. Supportive Members of the CIE also provide additional support that helps CIE to carry out its work.

Supportive Membership is open to companies and organisations working on an international or regional scale, having an interest in light and lighting and wishing to support the work of the CIE. Such organisations may include equipment manufacturing companies, commercial organisations, consultants and lighting designers, local government and government departments, educational organisations, etc.

The level of support is classified by the amount of annual membership fees and benefits received.

- Supportive Member: € 500
- Silver Supportive Member: € 3000
- Gold Supportive Member: € 8000

More information on this membership scheme can be obtained from the CIE Central Bureau (ciecb@ping.at).

News from the Divisions

Division 1 - Vision and Colour

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

Please note the new web address of CIE Division 1:
<http://www.bio.im.hiroshima-cu.ac.jp/~cie1>

Division 1 will have its next meeting, in conjunction with the CIE Expert Symposium on LED Light Sources, on 9-11 June 2004 in Tokyo, Japan (joint meeting with Division 2).

The draft report of TC 1-52 "A review of chromatic adaptation transform" was circulated for Division and Board ballot. Deadline for vote is: 2004-05-23.

Division 2 - Physical Measurement of Light and Radiation

<http://cie2.nist.gov>

Division 2 will have its next meeting, in conjunction with the CIE Expert Symposium on LED Light Sources, on 9-11 June 2004 in Tokyo, Japan (joint meeting with Division 1).

Division 3 - Interior Environment and Lighting Design

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

Division 3 will have its next meeting on 30-31 March 2004, in Dublin, Ireland.

Division 4 - Lighting and Signalling for Transport

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

Division 4 will have its next meeting on 8-11 September 2004 in Bern, Switzerland (together with Division 5).

Division 5 – Exterior and Other Lighting Applications

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

Division 5 will have its next meeting on 8-11 September 2004 in Bern, Switzerland (together with Division 4).

Division 6 – Photobiology and Photochemistry

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

Division 6 will have its next meeting on 27-29 September 2004 in Vienna, Austria, in conjunction with the CIE Expert Symposium on Light and Health (see p. 6).



New CIE Publications

Guidelines for the Evaluation of Gamut Mapping Algorithms

CIE 156:2004

ISBN 3 901 906 26 6

This technical report provides guidelines for the evaluation of the cross-device and cross-media colour image reproduction performance of gamut mapping algorithms (GMAs). The guidelines cover numerous aspects of GMA evaluation including test

images, media, viewing conditions, measurement, gamut boundary calculation, gamut mapping algorithms, colour spaces and experimental method. Also provided are example workflows that show how the general principles are applied and a checklist for determining compliance with the guidelines. The results of GMA evaluation carried out in accordance with these guidelines will then serve as the basis for recommending either one gamut mapping algorithm, or a set of algorithms and rules for use in specific applications.

The Report consists of 30 pages with 4 figures and 2 tables.

Control of Damage to Museum Objects by Optical Radiation

CIE 157:2004

ISBN 3 901 906 27 4

The report comprises three parts. The first part reviews the scientific principles that govern the processes of radiation-induced damage to museum objects with the aim of providing fundamental information for museum conservators and research workers. The second part reviews current knowledge and recent research to provide a commentary on the efforts of researchers to better understand how these processes may be retarded or eliminated in the museum environment. The final part gives the committee's recommendations for lighting in museums in the form of a practical procedure that covers setting up a new display and monitoring the lighting during the life of the display. This procedure takes account of the research findings that have been reviewed as well as recommendations published by other organisations, and is modelled on current practice in several of the world's leading museum institutions.

The Report consists of 35 pages with 6 figures and 8 tables.

Ocular Lighting Effects on Human Physiology and Behaviour

CIE 158:2004

ISBN 3 901 906 28 2

The nonvisual biological and behavioural effects of light in animals and humans are mediated by specific neuroanatomical pathways. Controlled empirical studies have shown that light can be used to treat some clinical disorders and may have broader, nonclinical applications for problems of shift work and jet lag. Studies are testing how lighting may be incorporated into architectural designs that are optimal for vision as well as physiological and behavioural stimulation.

The Report consists of 59 pages with 9 figures.

A Colour Appearance Model for Colour Management Systems: CIECAM02

CIE 159:2004

ISBN 3 901 906 29 0

A colour appearance model provides a viewing condition specific method for transforming tristimulus values to and/or from perceptual attribute correlates. This document outlines a specific colour appearance model, CIECAM02, which may be useful for colour management applications. This model is based on CIECAM97s colour appearance model and consists of a chromatic adaptation transform and equations for computing a set of perceptual attribute correlates. The evolution and application of this colour appearance model are presented.

This report replaces CIE 131-1998, *The CIE 1997 interim colour appearance model (simple version) CIECAM97s*.

The Report consists of 22 pages with 1 figure and 7 tables.

Errata to Publication CIE 155:2003 Ultraviolet Air Disinfection

Page 60: The reference

KOWALSKI, W.J., 2001. *Design and optimization of UVGI air disinfection systems* [Ph.D. Thesis]. State College, Architectural Engineering, Pennsylvania State University, Philadelphia, 2001.

should be replaced by

KOWALSKI, W. J., BAHNFLETH, W. P., WITHAM, D. L., SEVERIN, B. F., and WHITTAM, T.S., 2000a. Mathematical modeling of UVGI for air disinfection. *Quantitative Microbiology* **2(3)**, 249-270, 2000.

New Publications in the Field of Light and Lighting

Alien Vision – Exploring the Electromagnetic Spectrum with Imaging Technology

Austin Richards

SPIE Press, Bellingham, Washington USA, 2001
ISBN 0-8194-4142-2

An interesting book that you will enjoy if you are interested in modern methods of imaging. As you look at the pictures of the book you will share the enthusiasm of the author that the World is even

more magnificent if you can look at it also in spectral bands where our eye is not sensitive.

After a short introduction, first the spectral bands most similar to the visible get explored. Some very interesting pictures show us, e.g. what subtle differences some animals (insects) see using ultraviolet radiation, where we see only a homogeneously coloured surface. Examples show also medical applications.

The second chapter deals with thermal imaging, again showing many interesting examples of its application.

Microwave and millimetre-wave imaging leads already into an area, where "imaging" is something quite different from what we are accustomed to. The microwave image of the sky brought us many new findings of our universe, but it has also interesting terrestrial applications.

X-ray and gamma-ray imaging has been known since Röntgen's times, but the modern Computer Aided Tomography (CAT) and Positron Emission Tomography (PET) brought new dimensions to this technique as well, enabling both hard and soft tissue examinations.

Although acoustic waves do not belong to the electromagnetic spectrum, a chapter deals with this technique, and also here we get a short insight into a technology that has many medical and industrial applications.

The book contains many fascinating pictures, where the same object is depicted using different parts of the electromagnetic spectrum. It can be highly recommended to anybody interested in such curious images.

Naturally from a book mainly intended to give some first overview on new techniques where the author was fascinated by the images he was able to compare – and which can really fascinate the reader as well – one cannot require scientific thoroughness. Certainly such a book cannot be comprehensive; nevertheless your reviewer would have enjoyed some mention of the Big-Bang investigations in connection with microwave and millimetre-wave imaging, or some details on holographic imaging. Despite of these, however, we can recommend the book to those who would like to get a short overview how the electromagnetic spectrum can be used to get image forming information.

J.S.

Laser Safety

Roy Henderson and Karl Schulmeister

Institute of Physics Publishing, 2004
ISBN 0 7503 0859 1

Laser safety is becoming more and more important even in the everyday life as the number of lasers used

increases exponentially. First, lasers got out of the laboratory with the spreading of the fiber optic communication systems in the late 80's early 90's, then they got into the homes with CD and nowadays with DVD players. As new technologies appear the emitted laser power increases, too, thus laser safety requires higher attention.

The authors summarized in the preface the background and aim of this book, that the reviewer cannot claim to be able to do more clearly (quoted not word by word): "The book is based on the international standard for laser safety, IEC 60825-1 (Edition 1.2), adopted in Europe as EN 60825-1 and increasingly relevant to laser safety in the United States, as well. The application of the IEC standard to LEDs is also discussed. In addition, other relevant standards are included, such as the European laser eye protection standards EN 207 and EN 208. Where requirements in the US differ, under ANSI user standards or the CDRH product standard, these differences are explained. But standards regularly do not contain the background information needed for a thorough understanding, thus the intention of the authors was to give guidance to the reader on the application of the various safety standards. This book should be seen as supplementary to those standards and not as a replacement."

The book starts with an introductory chapter that shortly describes lasers, laser light, the properties of the laser radiation, as well as the basic concepts of quantifying light, and enumerates the international (IEC) and North American (ANSI) laser standards. Chapter 2 covers the physical quantities and the biological factors influencing the laser hazards. After introducing basic radiometric terms, like power and energy, radiance and irradiance, the issues of field of view, wavelength and absorption are discussed, finally measurement instruments and metrological aspects of the quantification of radiation are reviewed. Throughout this chapter the concept of biologically effective levels of exposure is emphasized, that can be different from the actual radiometric quantities.

The next chapter treats the laser radiation hazards to human skin and eye. The maximum permissible exposure (MPE), i.e. the exposure limits are introduced after a review of the anatomical aspects of skin and eye, relevant to laser safety. Then the evaluation and representation of the MPE's are given. MPE's are discussed as a function of radiance, wavelength, time duration, angle and shape of source. Depending on the wavelength, different types of injuries can occur, either photochemical or thermal ones. Aversion responses and dosimetry are also described. Chapter 4 contains description on laser product classification. The classification has to be carried out by the manufacturer. Since the manufacturer cannot always know the intended application, instead of the MPE's the emission of the product is used for the classification. Therefore the concept of Accessible Emission Limit (AEL) is introduced that can be derived from the MPE's. The

meaning of the laser safety classes, the process of classification and requirements for the products are detailed.

Chapter 5 discusses beam propagation concentrating on beam profiles, propagation through apertures, reflections and the use of optical viewing instruments. The next chapter deals with additional laser hazards. These hazards are usually not unique for lasers, they include fire, explosion, fume and non beam hazards, like electrical ones. Chapter 7 discusses the laser risk assessment, how to determine the risk. Based on the identified risks the adequate control measures can be selected. A list of the more common techniques are given, referring usually to standards. These protective measures and safety controls are discussed then in the following chapter. First, the different types of control measures are introduced, then the control measures as the function of the laser class are analyzed. Subsections are dedicated to laser controlled area, engineering control measures, administrative control measures and personal protection. Since eye is the most vulnerable to laser radiation, eye protection, its specification and the relevant standards are thoroughly detailed. The last chapter deals with the management of laser safety, the human factor and the role of the laser safety officer.

This comprehensive handbook explains in detail both the background to laser safety and its practical implementation. The discussions extend from detailed theoretical considerations to practical issues or workplace safety, therefore this book can be used advantageously both by scientists and practitioners.

J.M.

Diffraction Optics Design, Fabrication and Test

**Donald C. O'Shea, Thomas J. Suleski,
Alan D. Kathman, Dennis W. Prather**

SPiE Press, 2004
ISBN 0-8194-5171-1

Diffraction optics is a modern subfield of physical optics, it describes the control and generation of wavefronts by segmenting initial wavefronts and redirecting the segments through the use of interference and phase control. They can be used together with classical optical elements or they can produce their effects on their own. One of the subclasses is the classical diffraction grating, but it includes among others binary optics, computer generated holograms, etc. This text book is not a cookbook, it provides the basic theoretical background of the field, then describes some of the applicable technologies and finally shows examples.

The first chapter is a brief introduction to the field, discussing mostly the topics of physical optics among

others diffraction, apertures, Fresnel plates, Fresnel zones, etc. that will be used in the later sections. In chapter two the Maxwell's equations as the basis of any electromagnetic propagation and therefore the basis of the design of any diffractive optical elements are discussed. If the wavelength is essentially greater than the features of the diffractive optical element, with some assumptions, the Rayleigh–Sommerfeld analysis can reduce the very general propagation theory to a practical method for calculating far field diffraction patterns. The use of the scalar form of these equations and the way for their solutions applying the Fast Fourier Transform are detailed. The next chapter starts with the limitations of the scalar theory, as some of the assumptions are not valid in all applications, for example the wavelength is comparable or even greater than the features of the diffractive optical elements. Consequently, a more rigorous handling of the propagation, the vector description has to be used. Two techniques, the modal and the finite-difference time-domain techniques are introduced. Results from these techniques are given, along with a discussion on effective medium theory, a simplified approach to subwavelength features.

The next chapter describes the application of diffractive optics in lens design, either as a single diffractive optics element or in combination with a classical lens. This application is a 1 to 1 mapping, the entering wavefront has a corresponding single output wavefront. The ways of correcting lens aberrations in a hybrid design are also demonstrated. Chapter 5 discusses 1 to n mapping, i.e. wavefront splitting. Both one and two dimensional gratings can be produced, in each case the far field pattern as an aim is the starting point and either by a direct inversion or usually by iterative methods the structure of the diffractive optical elements can be calculated. Different methods for the calculation are given.

The next three chapters concentrate on technological questions, how to manufacture these elements. Lithographic techniques used in semiconductor industry, micromachining and replication techniques are discussed. The next chapter shortly describes the test methods, ranging from microscopy, including optical, electron and atomic force microscopes, to interferometry. Chapter 10 is dedicated to lens design; lens aberrations and correction possibilities are discussed both in single lens design and in lens systems. Finally, a short survey of a number of applications, among others beam shaping, beam deflection, anti reflection coating, beam splitting for optical communication, etc. is provided in which these devices are making an impact on today's technology.

This book does not provide long derivations or detailed methods for specific engineering calculations. Instead of this, concepts are emphasized to understand the field and later application examples are given, making the book easily readable for those having a solid background in calculus and Fourier theory. Theoretical calculations on the effects of higher orders, shadowing and manufacturing tolerances are provided but,

unfortunately, the effects of these phenomena are not given for the manufactured elements.

J.M.

CIE Symposia

CIE Expert Symposium on LED Light Sources Physical Measurement and Visual and Photobiological Assessment June 7-8, 2004, Tokyo Japan

Tentative Programme:

Monday, June 7: Visual and Photobiological Assessment

Keynote Lecture:

J. Schanda, University of Veszprém, Hungary:
"Physical and visual requirements for LEDs to be used for future system"

Session I: Colour Rendering

Invited Speaker:

P. Bodrogi, University of Veszprém, Hungary:
"Colour Rendering: past, present (2004), and future"

Session II : Vision

Session III : Photobiological Safety

Invited Speaker:

W. Horak, Siemens AG, Germany:
"Photobiological safety issues concerning LEDs - problems and requirements"

Dinner Cruise (Japanese Style)

Tuesday, June 8 : Physical Measurement

Keynote Lecture

G. O. Mueller, Lumileds Lighting, U.S.A.: "White light from LEDs"

Session IV : Measurement (1)

Invited Speaker:

K. Muray, INPHORA Inc., U.S.A.: "LED measurements: Current work within CIE"

Session V : Measurement (2)

Call for Papers

CIE Expert Symposium on

Light and Health: The non-visual effects

30 September - 2 October 2004, Vienna, Austria

Background:

The impact of light upon human health has been of greatly increased interest over the past three years

with new discoveries relating to the impact of light upon the daily biological rhythms and mood. Medical research related to the neuroendocrine cycle point to particular effectiveness of blue light and totally new light sensory – but non-visual – pathways in the retina. A keynote presentation by Prof. George Brainard, Philadelphia, will set the stage for presentations by a roster of internationally-known medical researchers and technical experts. They will address new medical applications of light, using light to treat mental disorders, therapeutic lighting, human circadian rhythms, light and the aging eye, and the benefits and hazards of ultraviolet radiation. The last day of the symposium will consider the potential impact upon lighting products, recommendations, and standards. This symposium will create a unique opportunity for both the biomedical and lighting communities to exchange information and consider the impact upon lighting of the recent research.

Goals:

Discuss open questions relating to light and health, recent discoveries related to non-visual effects of light and appropriate photobiological dosimetry of:

- Neuroendocrine effects, jet-lag, circadian,
- Ultraviolet and Vitamin D, health hazards,
- Impact of interior lighting on health

and formulate recommendations for CIE Divisions.

Who should attend ?

This meeting is open to all participants. To insure adequate space and support, and to allow distribution and adequate review of relevant documents, prior registration is required.

Call for Papers:

The first two days of the Symposium (Thursday, Friday) will feature Invited Papers. Contributed Papers are also sought. Ample time will be secured for round-table discussions and demonstrations.

Papers should deal with one of the following subjects:

- Basic research into neuroendocrine effects of light to include action spectra, ganglion-cell photoreception, light phototherapy, jet-lag, the importance of spectral, spatial and temporal characteristics of ocular illumination.
- Ultraviolet radiation - benefits and risks.
- Photobiologically relevant measurements of sunlight and artificial light sources relative to health effects.
- Implications of health effects from daylighting and from artificial lighting.

Authors are invited to submit two-page extended abstracts of their proposed contributions in English no later than 31 May 2004 to:

CIE Central Bureau,
Kegelgasse 27, A-1030 Vienna, Austria
per mail or e-mail: ciecb@ping.at

(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 1 July 2004. 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.

Registration:

Deadline for registration is 15 August 2004.

Registration Fee of the Symposium will be:

With Proceedings:	€ 350,-.
Without Proceedings:	€ 300,-.
Tutorial:	€ 100,-.

to be sent to the CIE Central Bureau Bank Account:
04610-665-450 at BAWAG Landstrasser
Hauptstrasse 60, A-1030 Vienna, Austria. VISA,
Master Card, American Express credit cards also
honoured.

Early registration is strongly recommended because of limited seating.

Further information:

A one-day tutorial on optical radiation measurements for photobiology will be offered on 29 September (Additional Fee: 100 €).

This circular can also be downloaded from the CIE website (<http://www.cie.co.at/symp/sympD6.pdf>).

A meeting of CIE Division 6, along with TC meetings will be organized on 27-29 September in conjunction with the symposium. Details will be provided in a Division 6 Newsletter.

Future Meetings

XII National Conference on Lighting

Light'2004

15-17 June 2004, Varna, Bulgaria

Topics:

- Energy efficiency in lighting and ecology,
- Indoor lighting,
- Outdoor lighting,
- Ergonomics and physiology of vision,
- Photometry and colorimetry,
- Daylighting,
- Architectural, decorative and advertising lighting,
- General aspects of lighting, terminology, standardization.

During the Conference, an exhibition of lighting products will be held. Companies interested in exhibition space are requested to send the reply Form B not later than 2004-05-10.

Registration:

The registration fee is € 100,--.

For the participants from Balkans Region and Eastern European countries the fee is € 50.

For the accompanying persons the fee is € 50.

The registration fee includes free access to the Conference activities (plenary and poster sessions, discussions, exhibition, competitions, welcome party, cocktail and coffee breaks) and the Conference materials (program, book of abstracts, the volume of the proceedings and list of participants).

The registration fees should be paid at the Bank account of BNCI given in the web page of the conference or at the Registration desk before the opening of the Conference, but with 10 % pay-increase.

For further information and registration, please contact:

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http://light2004.tugab.bg



5th National Lighting Congress and Interlight Istanbul Fair

7-8 October 2004, Istanbul, Turkey

Aims

The aims of the Congress are to enable the meeting of people working on various subjects of lighting such as research, design, application and production, to ensure the exchange of knowledge and experience, to contact with people and companies concerned in lighting, and to observe the developments.

Topics

The congress will include papers on the following general topics and is open to papers in Turkish or English:

- Vision and colour,
- Physical measurement of light and radiation,
- Interior environment and lighting design,
- Lighting and signalling for transport,
- Exterior and other lighting applications,
- Photobiology and photochemistry,
- Image technology,
- General aspects of lighting (terminology, education, economics of lighting, development of light sources, luminaires etc.).

Fair (7-10 October 2004)

Interlight 2004 Istanbul International Lighting Installation and Building Automation Fair will take place at CNR Fair Centre along with the congress and the following weekend.

Registration

The registration fee for all participants covers the proceedings, refreshments and the opening cocktail.

Until 28th May 2004 € 50,--

After 28th May 2004 € 75,--

Participants are requested to pay the fee to the bank account of ATMK given below and fax the receipt to the Congress Secretariat.

Bank Account No: Türkiye İş Bankası Yıldız Teknik Üniversitesi Şubesi, İstanbul, Turkey. 1199-30103 3438

For further information contact:

Congress Secretariat
Assoc.Prof.Dr. Leyla Dokuzer Öztürk
Yıldız Teknik Üniversitesi, Mimarlık Fakültesi
Yapı Fiziği Bilim Dalı, 34349 Beşiktaş, İstanbul
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Tel: + 90 212 259 70 70 / 2303
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International Conference on Cancer and Rhythm - A new challenge in occupational medicine

14-16 October 2004, Graz, Austria

Recently evidence has been mounting that the disturbances of rhythms, in particular, circadian disruption, e.g. shift work or chronic jet lag, contribute significantly to the development of cancer. Circadian rhythms are part of the rhythmic activities of the human body and obviously exert a protective influence on our health and well-being. These and other implications for occupational health will be discussed in an international scientific conference under the auspices of the Austrian Worker's Compensation Board (Allgemeine Unfallversicherungsanstalt) in autumn 2004 in Graz.

This conference will bring together important researchers and experts in the field of chronobiology and chronomedicine, sensory physiology and epidemiology as well as researchers investigating the genome with respect to the effects of chronobiological disturbances, occupational physicians and psychologists as well as social security experts to exchange state of the art research results and address open issues. It will facilitate both formal and informal discussion.

The various sessions will deal with the following topics:

- the oncological relevance of the recently discovered circadian photo-sensors in the eye as well as the implications of increased illumination pollution in our cities,
- the cancer-protective effects of clock genes in mice,
- the effect of the pineal gland and melatonin on jet lag and health,
- health risks of night and shift work,
- the possible role of new shift schedules or rhythm therapies in the prevention of work-related cancer.

"Cancer and Rhythm" will feature plenary lectures as well as workshops, poster sessions and an exhibition.

The registration fee is € 300.

For further information, please contact the Congress Secretariat:

Allgemeine Unfallversicherungsanstalt
Kongressbüro
Mag. Doris Scherling
Adalbert-Stifter-Strasse 65
1200 Vienna, Austria
Phone: +43 1 33111 - 261
Fax: +43 1 33111 - 469
E-Mail: doris.scherling@auva.sozvers.at

AIC Colour 05 10th Congress of the International Colour Association

8-13 May 2005, Granada, Spain

Scientists, technologists, engineers, architects, artists, designers and educators, who all study the subject of colour from many points of view, will have the chance to exchange opinions and the results of their research within a wide selection of specialist and multidisciplinary forums.

The subjects to be dealt with are many and wide-ranging, including such varied topics as colour-appearance models, colour management, colour

imaging, the multispectral processing of chromatic information, the colorimetry of foodstuffs and materials such as textiles and ceramics, colour-representation systems and colour-difference formulas, colour in education, colour vision, colour in interior design, colour within the urban environment, colour in object design, colour restoration, the use of colour as an element of artist expression and colour in different popular cultures.

Deadline for submission of abstracts: September 2004.

An exhibition featuring the latest developments in colour technology will be held during the congress.

For further information, contact:

Eurocongres
Avda. Constitución 18, bq. 4, bajo
18012 Granada, Spain
tel.: +34 958 208650, +34 958 209361
fax: +34 958 209400
e-mail: eurocongres@eurocongres.es
<http://www.ugr.es/local/aic05>

CIE Midterm Meeting 2005 and International Lighting Congress

12-21 May 2005, León, Spain

The main theme of the congress is "Lighting in the XXI Century". The congress will be organized by the Comité Español de Iluminación.

Subjects to be covered:

- Image technology,
- Photobiology and photochemistry,
- LEDs and applications,
- Lighting and signalling for transport,
- Economics of lighting,
- New light applications,
- General aspects of lighting.

Information on the submission of abstracts will be published in the 2nd Circular.

For further information and registration, contact:

Presstour
tel.: +34 91 553 2606
fax: +34 91 554 9123
e-mail: leon05@ceisp.com

Call for Papers
Lux Europa 2005
Lighting for humans

19-21 September 2005, Berlin, Germany

Subjects:

- Generation of light,
- Interior lighting,
- Exterior lighting,
- Intelligent, energy efficient and economical illumination systems,
- Dynamic lighting,
- Daylighting,
- Light and health,
- Photobiology and photochemistry,
- Light and environment.

Conference languages: German, English, French
(with simultaneous translation).

Deadline for abstracts: 30 September 2004

Conference Chairman:

Prof.Dr.rer.nat. Heinrich Kaase
Technische Universität Berlin
Fakultät für Elektrotechnik und Informatik
FG Lichttechnik, Sekr. E6
Einsteinufer 19
D-10587 Berlin
tel.: +49 (0) 30 314 22401
fax: +49 (0) 30 314 22161
e-mail: lichttechnik@ee.tu-berlin.de
<http://www.luxeuropa2005.de>

 **From the Lighting Journals**

Ingineria Iluminatului (Lighting Engineering)

(<http://bavaria.utcluj.ro/~lec>)

Vol. 4, Number 10, December 2002 (printed in February 2003)

Efficiency in public lighting

F. Deco

Calculation sheets for photometric characteristics of luminaires (Romanian)

P. Dinculescu, G. G. Bratu

Photovoltaic lighting systems for rural isolated area

S. Fara, D. Finta

Public lighting design: economic optimisations, an example

L. Di Fraia

Using interreflection theory for the reflection measurements (Romanian)

C. D. Galatanu

Energy efficiency in lighting - between regulations and reality

F. Pop

European utilisation factor method

A. Stockmar

Lighting Engineering Center - LEC - UTC-N (Romanian)
F. Pop

A quick and easy web-based assessment tool for day/electric lighting (translated to Romanian)

K. Papamichael

Lighting in the new world - Current and upcoming research topics

C. Suvagau

Vol. 5, Number 11, June 2003

Lighting & Energy savings. Some research fields at Fisica Tecnica Department "La Sapienza"

F. Gugliermetti, F. Bisegna

Study of transient regime of the fluorescent lamp mountings using magnetic starter

D. Ioachim, M. V. Nemescu, D. D. Lucache

Mesopic lighting conditions and pedestrian visibility

J. Ketomäki, M. Eloholma, P. Orreveläinen, L. Halonen

Control of the lost light energy at houses

B. Manav

Innovative office building - lighting, productivity and energy (Romanian)

J. Lehtovaara, V. L. Gligor, L. Halonen

LED technology in Romania, LED - energy efficient lighting of the future (Romanian)

S. Matei

Lighting Engineering Center - LEC - UTC-N (Romanian)

F. Pop

Lighting in the New World. New directions in lighting energy efficiency

C. Suvagau

Journal of Light & Visual Environment

(<http://www.ieij.or.jp/english/> and

<http://jlve.jstage.jst.go.jp/en/>)

Vol. 27, Number 3, 2003

Special issue "LED Lighting Technologies"

Present status of white LED lighting technologies in Japan

T. Taguchi

High output power near-ultraviolet and violet light-emitting diodes fabricated on patterned sapphire substrates using metalorganic vapor phase epitaxy

K. Tadatomo, H. Okagawa, Y. Ohuchi, T. Tsunekawa, H. Kudo, Y. Sudo, M. Kato, T. Taguchi

Short wavelength LED based on III-V nitride and its applications

N. Shibata, T. Uemura, H. Yamaguchi, T. Yasukawa

On deviations between observed and theoretically estimated values on additivity-law failures

Y. Nayatani, H. Sobagaki

Causes of individual differences on brightness/luminance (B/L) ratios

Y. Nayatani, H. Sobagaki

Equivalent luminance contrast representing the relationship between color difference and readability of chromatic documents

N. Hara, I. Namba, T. Noguchi

A healthy future for office lighting?

A. D. Tenner

Light & Engineering (Svetotekhnika)

(www.lta.ru)

Volume 11, Number 4, 2003

Microwave discharge in high pressure mercury vapors

S.P. Reshenov

Spectral efficiency of visual perception of low-sized objects

A.A. Vaskovsky

Biological aspects of hygienic assessment of natural and artificial light

Z.A. Skobareva, L.M. Teksheva

An investigation into the properties of light pipes and windows as daylight providers

D. Jenkins, T. Muneer

Red LED railway traffic lights visual perception research

D. Agaphonov, M. Murashova, S. Nikiphorov, O. Pinchuk, R. Stolyarevskaya

Why can't we use the world standard for indoor lighting practice?

L. Bedocs

Assessment of lighting conditions under metal-halide lamps

L.V. Abramova, S.A. Amelkina, O.E. Zheleznikova

Bilateral international comparison in spectrophotometry

O.B. Tarasova, C. Okhanovich-Adamska, I. Gembitska, J. Pietrzykowski

Features in the construction of lamp projectors with IR filters

Y. G. Basov, A.G. Rackviashvili, V.V. Sysun

Fluxes of light. The Light Festival in Lyon

R. Narboni

Architectural lighting of film production corporation "Mosfilm"

N.S. Perova, B.M. Pyatigorsky, N.N. Timofeeva

Lighting Design + Application

(www.iesna.com)

December 2003: Entertainment

January 2004: Office and Commercial Lighting

February 2004: Transportation and roadway lighting

The Lighting Journal

(www.ile.co.uk)

Volume 68, Number 6, November/December 2003

Selfridge's, Birmingham: Did they get it right ?

C. Gardner

Can "over lighting" increase the fear of crime ?

S. Postlethwaite

Wolfson Medical School, Glasgow: a lighting design case study

G. Fraser

Digital photography: What to do after you've taken the picture

T. Webster

Volume 69, Number 1, January/February 2004

Atrium buildings: Subjective reactions to the daylighting performance of new glazing materials

M. Wiess

A white LED low-mounted luminaire, using the all-positive contrast concept based on car headlights

A. Walking

The structural stability of lighting columns

P. Withers

Competition in connections: where do we stand ?

T. Stephens

Lighting maintenance contracts: time for a change ?

M. Thompson

Light pollution and astronomy - are we still relevant ?

T. Webster

For your Diary

Date	Title of Meeting	Organizer	Place of Meeting
2004			
March 30-31	CIE Division 3 meeting	CIE Division 3	Dublin, Ireland
May 20-22	ICNIRP/WHO International NIR Workshop & URSI Symposium	ICNIRP, fax +49 1888 333 2155, www.icnirp.org	Sevilla, Spain
June 7-8	CIE Expert Symposium on LED Light Sources	CIE, ciecb@ping.at	Tokyo, Japan
June 9-11	CIE Division 1 meeting	CIE Division 1	Tokyo, Japan

June 9-11	CIE Division 2 meeting	CIE Division 2	Tokyo, Japan
June 15-17	XII National Conference on Lighting: Light'2004	Bulgarian NC of CIE light2004@tugab.bg, http://light2004.tugab.bg	Varna, Bulgaria
June 29-July 2	7th Intern.Conf.on Work with Computing Systems, WWCS 2004	Alvin Yeo, tel/fax: +65 6790 7761 contact@wwcs2004.org	Kuala Lumpur, Malaysia
July 18-22	10th Intern. Symposium on the Science & Technology of Light Sources	G. Zissis, fax: +3 35 61556332 is10@cpat.ups-tlse.fr www.ls-symposium.org	Toulouse, France
Aug. 7-8	1st Symposium on the Science and Technology of Light Sources	http://www.graphics.umn.edu.apgv04 /	Los Angeles, USA
Aug. 22-26	ECVP 2004, 27th European Conf. on Visual Perception	http://www.ecvp.hu, http://www.ecvp.com	Budapest, Hungary
Sep. 8-11	CIE Division 4 meeting	CIE Division 4	Bern, Switzerland
Sep. 8-11	CIE Division 5 meeting	CIE Division 5	Bern, Switzerland
Sep. 15-17	Image Acquisition and Display - CIE Expert Symposium	CIE, ciecb@ping.at	Budapest, Hungary
Sep. 19-22	Licht 2004	LTGR, marita.steinhoff@dew.de	Dortmund, Germany
Sep. 23-24	European Symposium for Protection of the Night Sky	Alan.Legue@wanadoo.fr	Paris, France
Sep. 30 - Oct. 2	CIE Expert Symposium on Light and Health	CIE, ciecb@ping.at	Vienna, Austria
Oct. 7-8	5th National Lighting Congress	Dr. Leyla Dokuzer Öztürk fax: +90 212 261 05 49 dokuzer@yildiz.edu.tr	Istanbul, Turkey
Oct. 14-16	International Conference on Cancer and Rhythm	doris.scherling@auva.sozvers.at	Graz, Austria
Nov. 11	Het nationale lichtcongres 2004	NSVV, a.rommers@kema.nl	Ede, The Netherlands
2005			
May 6-7	5th European Symposium for Protection of the Night Sky	International Dark-Sky Association www.darksky.org	Belgium
May 8-13	10th Congress of the International Colour Association	AIC www.ugr.es/local/aic05	Granada, Spain
May 12-21	CIE Midterm Meeting	CIE, ciecb@ping.at	León, Spain
June 2-3	Iluminat 2005, Balkan Light 2005	dorin_beu@cluj.astral.ro	Cluj-Napoca, Romania
Sep. 19-21	Lux Europa 2005	lichttechnik@ee.tu-berlin.de	Berlin, Germany

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