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New challenges in indoor lighting

At the beginning of the 21st century, we have to acknowledge that the interest for indoor lighting is growing again. One has only to count the number of fairs, professional meetings, workshops, conferences, mentioning indoor lighting. All meetings about energy efficient buildings reserve a section on lighting. Same with furniture fairs. This demonstrates that professionals of various fields are now discovering how good and efficient indoor lighting can affect their own activity. And this goes far beyond sciences: biologists, medical doctors, health professions increase their knowledge about the benefits of good lighting.

This growing interest for indoor lighting partly benefits from recent progress in lighting technology, mainly the increase in efficiency and compacity of light sources, together with new dimming capabilities. In parallel, daylight is considered as source of light deserving more attention, and new window components are now proposed which offer better glare control and increased daylight penetration.

In indoor lighting, the quality of light is a significant component in the overall aspect of the construction. It is now understood that any failure in lighting may deteriorate the image of the building, and that any good design may boost its success. There is therefore a clear added financial value of good lighting on the market. But market seems to be influenced by an evolution of the demand.

Building occupants, mainly at their work place, are also expecting more from lighting equipment. In the last 20 years, the work place has been a field of a large progress regarding comfort: for instance furniture elements have progressed, offering better adaptation to the morphology of the occupants, computer screens are brighter and less sensitive to reflections, air conditioning is more frequent. It is therefore logical that the demand for more comfortable luminous environment follows the same trend.

Today, these occupants are discovering the benefits of lighting solutions, which can adapt to their needs. And choice in the supply from manufacturers is higher than ever.

Following the same trend, improvement of thermal properties of glazing leads to a wider potential of use of large glazed areas, leading to the possibility to bring more daylight into building interiors. This trend leads to higher requirements regarding the performance of the shading device (performing also as glare control devices) and its control.

In this context the CIE, through its Division 3 "Interior Lighting", tries to bring together specialists at international level to identify the technical information which is needed, and defines various tasks of collaboration to fulfil these requirements.

In the last years it was found that the analysis of daylighting techniques needed precise daylight availability information, worldwide. Hence the launching of daylight availability assessment programmes, based on ground measurement and satellite recording, or the development of sky luminance models. Daylighting

IN THIS ISSUE

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algorithms are proposed and validated, and CIE proposes benchmarks to validate lighting software programmes.

On the design side, the Division 3 is looking more carefully at lighting performance in real buildings, where furniture and partitions may largely affect light distribution and the efficiency of lighting installation. New methods of lighting design are consequently proposed.

But most of the potential stands in the understanding of the mechanism leading to a lighting situation felt by the observer as of good quality. Lighting seems to affect our mood, our alertness, our well-being, or even our health. The Division 3 is gathering information to identify the mechanisms relating lighting parameters and perceived lighting quality. It has the objective of proposing new descriptors of lighting quality, in order to update international standards, or to propose ways to adapt them to given situations. This is probably one of the most difficult challenges that we have to face. This approach requires contributions beyond the science of lighting, through the sciences of behaviour, psychology and physiology.

This work also benefits from progress of the CIE Division 6 on Photobiology.

Marc Fontoynt, Division 3 Director
ENTPE National Engineering School

News from the Divisions

Division 1 - Vision and Colour

<http://nml.csir.co.za/~cie1/>

The Division 1 part of the International Lighting Vocabulary has been sent to CIE National Committees for comments (deadline: 2002-09-28).

Division 2 – Physical Measurement of Lighting and Radiation

<http://cie2.nist.gov>

The Division 2 part of the International Lighting Vocabulary has been circulated to Board and Division members for vote (deadline: 2002-06-11).

Division 1 and Division 2 will have their meetings 26-28 August 2002, in Veszprém (Hungary), in connection with the CIE Div.1/Div.2 Symposium on Temporal and Spatial Aspects of Light and Colour Perception and Measurement (22-23 August).

Division 3 – Interior Environment and Lighting Design

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

The Draft Standard CIE DS 011.2 "Spatial distribution of daylight - CIE standard general sky" (elaborated by

TC 3-15) was circulated to CIE National Committees for comments (deadline: 2002-08-10).

Division 4 – Lighting and Signalling for Transport

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

The Minutes of the Division 4 meeting in Istanbul 2001 is now available on the Division 4 website (<http://www.tut.fi/cie4/>).

Division 5 – Exterior and Other Lighting Applications

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

The Minutes of the Division 5 meeting in Istanbul 2001 is now available on the Division 5 website (<http://www.cie.co.at/cie/div5/>).

New CIE Publications

CIE Collection on Glare 2002

CIE 146:2002

ISBN 3 901 906 15 0

CIE 147:2002

This volume contains two Technical Reports prepared by Technical Committees within Division 1 and Division 3.

CIE 146:2002 CIE Equations for Disability Glare

Three disability glare equations have been defined to extend the classic Stiles-Holladay equation to take account of the effect of age, the effect of ocular pigmentation and to extend the angular domain over which the equations are valid. They all describe the veiling luminance L_{veil} (in cd/m^2) due to a point glare source at an angle θ (in degrees) to the line of sight that gives rise to an illuminance E_{glare} (in lx) in the plane of the observer's eye, and they do so with adequate accuracy within their respective validity domains.

The CIE Age-adjusted Stiles-Holladay Disability Glare equation has a restricted validity domain of $1^\circ < \theta < 30^\circ$ that is extended in the low angular region by the CIE Small Angle Disability Glare equation to the domain of $0,1^\circ < \theta < 30^\circ$. The CIE General Disability Glare equation further increases the validity domain to the range of $0,1^\circ < \theta < 100^\circ$ and also includes an eye pigmentation factor p which plays a role at glare angles greater than 30° . They all include age A (in years) as a factor.

The technical report consists of 14 pages with 8 figures.

CIE 147:2002 – Glare from Small, Large and Complex Sources

The UGR , while valid for "normal" sources between $0,005 m^2$ and $1,5 m^2$ assesses "small" sources ($<0,005 m^2$) too severely and is too tolerant for "large"

sources ($>1,5 \text{ m}^2$). This Technical Report gives formulations and recommendations for small and large sources, which agree with research results and practical experience. For "complex" sources, such as specular luminaires, it gives a more realistic glare assessment than that based on average luminance over the full luminaire area.

The technical report consists of 13 pages with 3 figures and 2 tables.

CIE Standard CIE S 009/E:2002 Photobiological Safety of Lamps and Lamp Systems

Lamps were developed and produced in large quantities and became commonplace in an era when industry-wide safety standards were not the norm. The evaluation and control of optical radiation hazards from lamps and lamp systems is a far more complicated subject than similar tasks for a single-wavelength laser system. The required radiometric measurements are quite involved, for they do not deal with the simple optics of a point source, but rather with an extended source that may or may not be altered by diffusers or projection optics. Also the wavelength distribution of the lamp may be altered by ancillary optical elements, diffusers, lenses, and the like, as well as variations in operating conditions.

To evaluate a broad-band optical source, such as an arc lamp, an incandescent lamp, a fluorescent lamp, an array of lamps or a lamp system, it is first necessary to determine the spectral distribution of optical radiation emitted from the source at the point or points of nearest human access. This accessible emission spectral distribution of interest for a lighting system may differ from that actually being emitted by the lamp alone due to the filtration by any optical elements (e.g., projection optics) in the light path. Secondly, the size, or projected size, of the source must be characterized in the retinal hazard spectral region. Thirdly, it may be necessary to determine the variation of irradiance and effective radiance with distance. The performance of the necessary measurements is normally not an easy task without sophisticated instruments. Thus it was decided to include reference measurement techniques for lamps and lamp systems in this standard. The measurement techniques along with the described risk group classification scheme will provide common ground for both lamp manufacturers and users to define the specific photobiological hazards of any given lamp and/or lamp system. Finally, there are well known optical radiation hazards associated with some lamps and lamp systems. The purpose of this standard is to provide a standardized technique for evaluation of potential radiation hazards that may be associated with various lamps and lamp systems.

A French (CIE S 009/F:2002) and a German (CIE S 009/G:2002) version is also available.

New Publications in the Field of Light and Lighting

Luminous Flux and Illumination

Harald Schröer

Wissenschaft & Technik, Berlin 2001
ISBN 3-89685-521-2

This slim volume (less than 100 A5 pages) shows with some hand-drawn figures (without references to the figures in the text) the fundamentals of radiometry and photometry. It describes the calculation of such quantities for different geometric arrangements.

The book sometimes uses unusual quantities, as e.g. "square degree" as a measure of solid angle; in other places photometric principles are touched only in a tangential form, as e.g. K_m is simply stated to be $6.8 \cdot 10^2 \text{ lm watt}^{-1}$. (We wrote this in the form as the book provides it, the author seems to be uninterested in the fact that one either spells out the name of a quantity, or uses its international symbol, but one should never put it in a mixed form.)

The main interest of the author seems to be in geometric descriptors, thus sentences like "The light source in this book must not be Lambert-radiators, neither approximately" (p. 39) just stand without any explanation. Most chapters start with references of equations from other books, without which the essence of the writing is hard to follow. Interesting enough no book on radiometry or photometry is among the 15 works the author enumerates as bibliography.

J.S.

Visual Color and Color Mixture, The Fundamental Color Space

J.B. Cohen

Univ. of Illinois Press, Urbana and Chicago, 2001
ISBN 0-252-02549-0

Due to the untimely death of the author, the publication of this book has been made possible by the work of Hugh Fairman, Rolf Kuehni and Michael H Brill. Colour scientists couple the name of Prof. Cohen to Matrix R formulation. This book is also devoted to a large extent to this subject and the metamerism formulation.

The first chapters of the book justify the first part of the title: visual colour. Well readable chapters demonstrate to the reader the evolution of the presently used colour stimulus description, and show clearly the difference between colour stimulus and colour perception. One gets an introduction to the Newtonian Doctrine, Young's hypothesis up to the works of Herschel and Maxwell, ending with Wyszecki's hypothesis of metamerism colours, the fundamental and the residual.

From Chapter 6 on we get into the more fundamental and mathematical part of colour matching and matrix descriptions. From here on we lose connection to visual colour, and get a thorough introduction to Professor Cohen's description of colour. One can state that this book is much more readable than the author's many earlier articles have been.

The style changes again for the last chapters, where questions of the CIE colour spaces are discussed. Here one finds a detailed description of the brightness/luminance discrepancy; it is only a pity that the author has not kept the perceptual and stimulus descriptions more apart, although at the beginning of the book he called the attention on this difference.

In summary the book can be highly recommended to those who would like to get a better understanding of colorimetric principles. To be able to follow the reasoning of the author one has to have some basic knowledge of matrix algebra, but this goes certainly not beyond undergraduate matrix algebra studies.

J.S.

Introduction to Semiconductor Integrated Optics

Hans P. Zappe

Artech House, Inc. 1995
ISBN 0-89006-789-9

This book intends to cover the overlap between semiconductor technology and integrated optics mainly for the engineering society. The text is designed, on the one hand, for the semiconductor engineer who might know little about optics but would like to begin applying his or her expertise to integrated optical structures but it may also, on the other hand, be employed by the engineer experienced in bulk or integrated optics who would like to probe into the world of semiconductors for new possibilities.

The book starts with a very short overview of electromagnetic basics, the propagation of waves in material i.e. the Maxwell equations as the basis for the further discussions. Then basic semiconductors and specific semiconductor optical material systems are reviewed, primarily the III-V and silicon, plus a close look at their optical properties is given. Energy bands and transition types are discussed in terms of the Brillouin zones and crystal indices. In forthcoming sections semiconductor processing and manufacturing techniques are reviewed.

The most detailed part of the book is the one dealing with waveguides, fundamental to a wide variety of integrated optical devices, among others sensors. First the propagation in a waveguide is shown using boundary conditions, then slab and channel waveguides are presented. Waveguide modes, monomode waveguides and the different coupling techniques are given in the next section.

Once these two areas have been presented, the text turns its attention to lasers, modulators and detectors, the active devices that are essential for an integrated optical system. The structure of the different types of lasers, their physical backgrounds and manufacturing techniques as well as optical characteristics are detailed. The section on the detectors is somewhat schematic for a radiometrist, only the very basics of detector physics and only photovoltaic and avalanche types are shown. The modulator section provides examples of phase and amplitude modulation. Finally, the questions of integration and hybridization are surveyed.

The book is intended to be an engineering text, to provide an adequate balance between theoretical development and concrete application. In most subject areas, derivations of the basic concepts are undertaken to provide a basic understanding of the physics involved. These concepts are then developed in a way that will allow to solve real-world problems. To facilitate understanding, a numerical example is occasionally stuck into the development, when suitable and not utterly trivial.

The reader should have a thorough knowledge of physics, particularly electromagnetics, fields and waves, plus a familiarity with the mathematical tools that are commonly used. A rudimentary knowledge of basic semiconductor physics and the associated electrical devices would help, as this text does not even approach the completeness of standard works in the field.

J.M.

Introduction to Semiconductor Physics

Holger T. Grahn

World Scientific, Ltd. 1999
ISBN 981-02-3302-7

The reviewer started to read this book because of the shortcomings of the previous reviewed book on integrated optics in the field of semiconductor physics. This book is a good summary of this topic, it even contains many material parameters of the most commonly used and investigated semiconductors. Some of them are not the latest, but even this way a general trend can be conceptualised.

After an introduction the book begins with a review of the crystal structure of semiconductors followed by a section on the formation of energy bands and energy gaps in the frame of periodic potentials. Both the Bloch theorem and the Kronig-Penney model are introduced. The band structures together with the concept of effective mass are presented in the next chapter. Selected semiconductors either with direct or indirect band structure are shown, first the ones from group IV, then III-V compound semiconductors, finally II-VI ones. After introducing the density of states for bulks

and for low dimensional semiconductors the statistics of carriers and the temperature dependence of the carrier density are reviewed. Intrinsic and extrinsic as well as compensated semiconductors are discussed. The next chapter deals with the basic models of carrier transport and the Hall effect. Before discussing the important scattering processes, which determine the carrier mobility, the phonon dispersion of semiconductors are presented followed by the phonon statistics. Both acoustic and optic phonons are treated in this section. After reviewing the scattering processes (phonon scattering, impurity scattering carrier-carrier scattering and intervalley scattering), the concept of excitons is introduced, which forms the basis for the next part of the book focusing on optical properties. In the last three chapters, the optical absorption of free carriers and excitons as well as emission processes are presented including the effects of an external electric and magnetic field.

The reader is not required to have a deep knowledge of condensed matter physics, but a basic knowledge of classical physics and quantum mechanics is required in order to follow the material presented. The book is suggested to be read within CIE circles by radiometrists, dealing with detectors and semiconductor sources, like lasers and LEDs.

J.M

Meeting Reports

Symposium on the Visual Environment, its Descriptors and Consequences for Human Endeavour

The symposium was organized under the co-sponsorship of ARUP and the CIE and held on the premises of the Royal Society, London on 24 and 25 April 2002.

The meeting started with two short introductions by Gy. Sebestyén, the former President and Secretary General of CIB, and John K. Page, Professor Emeritus of the University of Sheffield. Professor Page drew attention to the legacy future generation have gained from three big lighting scientists of the 20th century, Ralph Hopkinson, Gunnar Pleijel and Jürgen Krochmann.

The following three papers by H.A. Löfberg (President of the CIE), Professor Schmidt-Clausen (University of Darmstadt) and Richard Kittler (Slovak Academy of Sciences) were devoted to the work of the above mentioned three distinguished scientists.

The next block of papers dealt with the photometric, radiometric and colorimetric descriptors of the visual climate: J. Schanda discussed the necessity of developing new photometric and colorimetric descriptors that will better correlate to

human visual climate perception, and tried to draw up the characteristics of instruments needed for such measurements. J. Page described the SoDa project, developing an Internet based system, which will enable users to order up processed radiation data in a number of forms for any global site selected. S. Darula discussed the dynamics of radiation and daylight climate linked with standard skies.

The next session was devoted to health and perception of the indoor visual environment. M. Fontoynt dealt with lighting preferences, the role of season, air temperature, daylight quantity, colour of daylight, activity, and architectural constraints. P. Nelson discussed the interaction that the quality of light has on the elderly and visually impaired population. The paper by A. R. Hill and P. A. Aspinall emphasized the importance of the question even further, discussing lighting design and visual impairment.

The session on ergonomic, ecologic and economic implications of perception commenced with a paper by E. J. Jackson, and was followed by a paper by Y. Suttter on a study of day-lighting of VDU work-places using Venetian blinds. A. Rosemann and H. Kaase discussed the question of day-lighting building interiors using daylight guides, and showed a measurement system for the characterization of such hollow light guides. P. Nelson showed some data on discomfort glare measurement and evaluation.

The next session dealt with the descriptors of the built visual environment. Nakamura and Oki re-visited the question of comfort – illumination level and colour temperature of the lighting. D. Loe discussed the question of lighting appearance and its effect on people. B. Matusiak showed how a simple modelling sensor can be used in the lighting practice in cases where it is essential to compare the modelling ability of light in an important point in a room for different lighting alternatives. K. Cuttle discussed a similar subject showing the importance of the "light field" concept and the three-dimensional reality of lighting. The paper by P. Tregenza and B. Lawson aimed at establishing criteria for lighting in relation to cognitive theory, particularly the notion of the behavioural setting. G. Schmidt introduced the visual dome of the ETH Zurich, where a large scale virtual reality system has been built up for the study of total immersion, and discussed also the new-informatics concept of the ETH Zurich teaching model and infrastructure. The last paper by M. Fontoynt gave an overview of how they try to enliven in the winter season the dull and dark mid-European environment.

The last session of the symposium tried to draw the balance between the visual environmental research and practical lighting design. J. Eberhard called the attention to evaluating the psychological mood of the occupants of an interior space by using neuropsychological methods.

The Proceedings of the Symposium will be made available by the CIE, as one of its Symposium Proceedings.

J. Schanda

Future Meetings

Balkan Light '02 "Energy Saving and New Trends in Lighting"

**3-4 October 2002,
Istanbul, Turkey**

Balkan-Light '02 will give the possibility to all specialists in lighting from the Balkan countries as well as from other countries to exchange knowledge and experience in the field of lighting.

The main theme is energy saving and new trends in lighting. Other topics are as follows:

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

The official language is English. Simultaneous translation from English to Turkish will be available.

A fair of lighting products will also take place along with the conference and the following weekend.

For further information please contact:

Turkish National Committee on Illumination
Aydınlatma Türk Milli Komitesi
İTÜ Elektrik-Elektronik Fakültesi
Ayazağa Kampüsü, Maslak
80626 Istanbul, Turkey
tel.: +90 212 285 6050
fax: +90 212 285 6051
e-mail: atm@elk.itu.edu.tr
<http://www.atmk.org.tr>

Light Emitting Diodes 2002

**21-23 October, 2002
San Diego, California, USA**

This conference will bring together the key users, component suppliers and manufacturers of high-brightness LEDs. It will be dedicated to the market, technology and business outlook for LED applications, and will focus on the latest technical advancements, including white LEDs and optical components of LED systems, as well as the market drivers and industry penetration. Participants will get a thorough assessment of LED markets, while having ample opportunity to discuss industry issues and network with the experts, key LED executives and end-users in a three-day open-forum format.

For more information, please contact:

Intertech Corporation
Patricia Kinzer
tel.: +1 207 781 9800
fax: +1 207 781 2150
e-mail: info@intertechusa.com
<http://www.intertechusa.com>

AIDI International Congress Light as Innovation

**3-5 December 2002
Perugia, Italy**

AIDI (Italian Association for Illumination) will hold, in collaboration with the University of Padua, this international conference. Invitations are being extended to all the countries belonging to Lux Europa, but also to prestigious professional studios and to the most important European and extra-European universities.

Several subjects will be developed in dedicated technical sessions around the central theme *Light as Innovation*, some of those already identified are:

- Light sources and illuminating bodies;
- Illumination systems: requirements and performance;
- New design tools;
- Luminosity control;
- Light as an art form.

The Congress will also organize a round table entitled "Light and Research: the state of the art".

A further novelty of the 2002 edition will be the presentation of the winners of two competitions, which are being promoted by AIDI.

- "*Innovation in design, realization and management*" is to give professionals, local authorities and managers an opportunity to present their programmed/realized experiences in the area of technological innovation or an in depth study in the area of illumination technology;
- "*Light-symbol*" is only open to European architects, engineers or designers (under 40) and requires the design and installation of a system of illumination, which interprets the theme of the Congress: *Light as Innovation*.

There will be exhibition stands in the beautiful Palazzo dei Priori, for the period of the Congress.

Light Premiere 2002

**9-11 December 2002
Paris, France**

The first "Light Premiere International Conference" aims to put knowledge into action by providing an updated report on the question of light which has

progressively been calling upon a number of extremely varied disciplinary fields including: towns and urban life, landscape, architecture, health, sustainable development, ecology, images and communication.

The following sessions will be held:

- Lighting culture - East and West;
- Nocturnal plurals;
- New technologies, quality of life and sustainable development;
- Light, communication and architecture.

An exhibition on technical, architectural, decorative lighting and luminaires will be organized in parallel with the conference.

For further information, please contact:

Light Premiere 2002
c/o SEE
17, rue Hamelin
F-75783 Paris, Cedex 16, France
e-mail: congres@see.asso.fr

CIE Session 2003

25 June - 2 July 2003
San Diego, California, USA

Invitation brochures with provisional registration forms have been mailed to all CIE National Committees; this information is also available on the USNC website (<http://www.cie-usnc.org>).

The Board of Administration will meet in June to fix the scientific programme.

From the Lighting Journals

Light & Engineering

Volume 10, Number 1, 2002

High-performance ALGaInP/GaP light-emitting diodes

L. M. Kogan

Assessment of photometric unit and scales realization and keeping reliability in the light of long-standing international comparison results

Y. M. Zolotarevsky, V. S. Ivanov, A. F. Kotyuk, V. I. Sapritsky, R.I. Stolyarevskaya

Energy management in lighting systems

T. D. Baenziger

An innovative system for daylight collecting and transport for long distances and mixing with artificial light coming from hollow light guides

A. Mingozzi, S. Bottiglioni, R. Casalone

Urban lighting evaluation by a benefit/cost analysis

E. Manzano, R. San Martin

Visual comfort and industry buildings

R. Ünver

Methods of optimization of operating regimes of compact fluorescent lamps

A.V. Vudovin, S. A. Mikaeva, A. S. Fedorenko

Method of calculation of the discharge ignition voltage in high pressure sodium lamps

S. V. Zhivoderov, L. A. Chumak

Theoretical investigation of the discharge breakdown voltage in low wattage high pressure sodium lamps

S. V. Zhivoderov, L. A. Chumak

Lighting Research & Technology

Volume 34, Number 1, 2002

Daylight linked dimming: effect on fluorescent lamp performance

E. Tetri

Summertime performance of an automated lighting and blinds control system

L. Roche

Experimental conditions to examine the relationship between lamp colour properties and apparent brightness

S.A. Fotios

The measured and predicted performance of passive solar light pipe systems

D.J. Carter

The luminance differences index: a new indicator of user preferences in daylight spaces

K. Parpairi, N.V. Baker, K.A. Steemers, R. Compagnon

Does lighting need more photopic luminous efficiency functions ?

J. Schanda, L. Morren, M. Rea, L. Ronchi, P. Walraven

The Lighting Journal

Volume 67, Number 2, March/April 2002

Lighting Design Awards - the winners

C. Gardner

New light on Skyline

J. Hunt

Decorative festive lighting

C. Roberts

Volume 67, Number 3, May/June 2002

The blue lamp: oil or electricity ?

R. Childs

"Ambient streetlight" debate - Mooncell replies

M. Crampton, D. Coatham

Lighting with high power LED sources

K. Scott

Lighting and the disability discrimination act

M. Simpson

How to do it No.10: The lighting of traffic routes

D. Simpson



For your Diary

Date	Title of Meeting	Organizer	Place of Meeting
2002			
Aug. 22-23	CIE Symposium: Temporal and spatial aspects of light and colour perception and measurement	CIE	Veszprém, Hungary
Aug. 26-28	CIE Division 1 Meeting	CIE Division 1	Veszprém, Hungary
Aug. 26-28	CIE Division 2 Meeting	CIE Division 2	Veszprém, Hungary
Aug.29-31	AIC Color 2001	AIC Secretariat, Smetanova 17 SI-2000 Maribor vanja.kokol@uni-mb.si	Maribor, Slovenia
Sep. 9-11	Lighting 2002/Verligting 2002	South African NC on Illumination, SANCI,drcronje@mweb.co.za	Durban, South Africa
Sep. 9-11	Lux Pacifica 2002	ISLE, fax 4656 739 e-mail: isledel@vsnl.com	New Delhi, India
Sep. 22-25	Licht 2002	NSVV, a.rommers@kema.nl, www.nsvv.nl	Maastricht, The Netherlands
Sep 27- Oct.2	CIE Division 4 Meeting	CIE Division 4	Turin, Italy
Oct. 1	CIE Division 5 Meeting	CIE Division 5	Turin, Italy
Oct. 2	Daylighting Buildings of the XX1st Century	CIE Division 3 and IEA Task 31	Ottawa, Canada
Oct. 3-4	Balkan Light'02	Turkish NC of CIE, Aydinlatma Türk Milli Komitesi, atmk@elk.itu.edu.tr	Istanbul, Turkey
Oct. 4	CIE Division 3 Meeting	CIE Division 3	Ottawa, Canada
Oct. 21-23	Lighting Emitting Diodes	P. Kinzer, Intertech info@intertechusa.com	San Diego, CA, USA
Nov.3-5	Light & Human Health	EPRI/LRO, www.lightingresearchoffice.org	Orlando, Florida, USA
Nov. 12-15	10 th Color Imaging Conference	IS&T, info@imaging.org	Scottsdale, AZ, USA
Nov. 28-30	Light & Lighting 2002 "Comfort and Efficiency"	CNRI, fax: +40 12104962 cnri@xnet.ro	Bucharest, Romania
Dec. 2-5	Interlight 2002	OWP, fax: +29 961/32035 OWP-Weiden@t-online.de	Moscow, Russia
Dec. 3-5	AIDI International Congress	AIDI, fax: +39 0221 597231 segreteria@aidiluce.it	Perugia, Italy
Dec. 9-11	Light Premiere 2002	SEE, congress@see.asso.fr www.elec.fr	Paris, France
2003			
June 25-July 2	25th Session of the CIE	CIE	San Diego, CA, USA

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