



International Commission on Illumination
Commission Internationale de l'Eclairage
Internationale Beleuchtungskommission

PROCEEDINGS OF THE CIE (INTERNATIONAL COMMISSION ON ILLUMINATION)

**PROCEEDINGS OF THE CIE 2025
MIDTERM MEETING VIENNA,
AUSTRIA, JULY 4-11, 2025:
SCIENTIFIC CONFERENCE
(JULY 7-9, 2025)**

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THE INTERNATIONAL COMMISSION ON ILLUMINATION

The International Commission on Illumination (CIE) is an organization devoted to international co-operation and exchange of information among its member countries on all matters relating to the art and science of lighting. Its membership consists of the National Committees in about 40 countries.

The objectives of the CIE are:

1. To provide an international forum for the discussion of all matters relating to the science, technology and art in the fields of light and lighting and for the interchange of information in these fields between countries.
2. To develop basic standards and procedures of metrology in the fields of light and lighting.
3. To provide guidance in the application of principles and procedures in the development of international and national standards in the fields of light and lighting.
4. To prepare and publish standards, reports and other publications concerned with all matters relating to the science, technology and art in the fields of light and lighting.
5. To maintain liaison and technical interaction with other international organizations concerned with matters related to the science, technology, standardization and art in the fields of light and lighting.

The work of the CIE is carried out by Technical Committees, organized in six Divisions. This work covers subjects ranging from fundamental matters to all types of lighting applications. The standards and technical reports developed by these international Divisions of the CIE are accepted throughout the world.

A plenary session is held every four years at which the work of the Divisions and Technical Committees is reported and reviewed, and plans are made for the future. The CIE is recognized as the authority on all aspects of light and lighting. As such it occupies an important position among international organizations.

LA COMMISSION INTERNATIONALE DE L'ECLAIRAGE

La Commission Internationale de l'Eclairage (CIE) est une organisation qui se donne pour but la coopération internationale et l'échange d'informations entre les Pays membres sur toutes les questions relatives à l'art et à la science de l'éclairage. Elle est composée de Comités Nationaux représentant environ 40 pays.

Les objectifs de la CIE sont :

1. De constituer un centre d'étude international pour toute matière relevant de la science, de la technologie et de l'art de la lumière et de l'éclairage et pour l'échange entre pays d'informations dans ces domaines.
2. D'élaborer des normes et des méthodes de base pour la métrologie dans les domaines de la lumière et de l'éclairage.
3. De donner des directives pour l'application des principes et des méthodes d'élaboration de normes internationales et nationales dans les domaines de la lumière et de l'éclairage.
4. De préparer et publier des normes, rapports et autres textes, concernant toutes matières relatives à la science, la technologie et l'art dans les domaines de la lumière et de l'éclairage.
5. De maintenir une liaison et une collaboration technique avec les autres organisations internationales concernées par des sujets relatifs à la science, la technologie, la normalisation et l'art dans les domaines de la lumière et de l'éclairage.

Les travaux de la CIE sont effectués par Comités Techniques, organisés en six Divisions. Les sujets d'études s'étendent des questions fondamentales, à tous les types d'applications de l'éclairage. Les normes et les rapports techniques élaborés par ces Divisions Internationales de la CIE sont reconnus dans le monde entier.

Tous les quatre ans, une Session plénière passe en revue le travail des Divisions et des Comités Techniques, en fait rapport et établit les projets de travaux pour l'avenir. La CIE est reconnue comme la plus haute autorité en ce qui concerne tous les aspects de la lumière et de l'éclairage. Elle occupe comme telle une position importante parmi les organisations internationales.

DIE INTERNATIONALE BELEUCHTUNGSKOMMISSION

Die Internationale Beleuchtungskommission (CIE) ist eine Organisation, die sich der internationalen Zusammenarbeit und dem Austausch von Informationen zwischen ihren Mitgliedsländern bezüglich der Kunst und Wissenschaft der Lichttechnik widmet. Die Mitgliedschaft besteht aus den Nationalen Komitees in rund 40 Ländern.

Die Ziele der CIE sind:

1. Ein internationales Forum für Diskussionen aller Fragen auf dem Gebiet der Wissenschaft, Technik und Kunst der Lichttechnik und für den Informationsaustausch auf diesen Gebieten zwischen den einzelnen Ländern zu sein.
2. Grundnormen und Verfahren der Messtechnik auf dem Gebiet der Lichttechnik zu entwickeln.
3. Richtlinien für die Anwendung von Prinzipien und Vorgängen in der Entwicklung internationaler und nationaler Normen auf dem Gebiet der Lichttechnik zu erstellen.
4. Normen, Berichte und andere Publikationen zu erstellen und zu veröffentlichen, die alle Fragen auf dem Gebiet der Wissenschaft, Technik und Kunst der Lichttechnik betreffen.
5. Liaison und technische Zusammenarbeit mit anderen internationalen Organisationen zu unterhalten, die mit Fragen der Wissenschaft, Technik, Normung und Kunst auf dem Gebiet der Lichttechnik zu tun haben.

Die Arbeit der CIE wird durch Technische Komitees geleistet, die in sechs Divisionen organisiert sind. Diese Arbeit betrifft Gebiete mit grundlegendem Inhalt bis zu allen Arten der Lichtenwendung. Die Normen und Technischen Berichte, die von diesen international zusammengesetzten Divisionen ausgearbeitet werden, sind auf der ganzen Welt anerkannt.

Alle vier Jahre findet eine Session statt, in der die Arbeiten der Divisionen berichtet und überprüft werden, sowie neue Pläne für die Zukunft ausgearbeitet werden. Die CIE wird als höchste Autorität für alle Aspekte des Lichtes und der Beleuchtung angesehen. Auf diese Weise unterhält sie eine bedeutende Stellung unter den internationalen Organisationen.

Proceedings of the CIE (International Commission on Illumination)

About this publication series

The *Proceedings of the CIE (International Commission on Illumination)* showcase the scientific contributions and discussions from CIE conferences and symposia, serving as a critical resource for advancing knowledge in the field of light and illumination. Published irregularly since 1903, with a minimum frequency of every four years, these proceedings capture the latest research and developments in light and lighting (indoor and outdoor applications, including lighting design), colour and vision, photobiology and photochemistry, and image technology. This series is published and owned by the CIE (International Commission on Illumination), an international scientific organisation with National Committees and members worldwide. As a member of the International Science Council, the CIE is globally recognised as the leading authority on these subjects and acknowledged as an international standardisation body. The *Proceedings of the CIE (International Commission on Illumination)* are governed by the publication and ethics policies and relevant procedures of the organisation.

Series edited by

International Commission on Illumination (CIE)
Managing Editor: Diana Wernisch, Secretary General of the CIE
Babenbergerstrasse 9/9A | 1010 Wien, Austria | ciecb@cie.co.at | ZVR 640982399

More information on this publication series and the volumes published therein can be found at <https://cie.co.at/publications/proceedings>.

About this volume

The CIE holds its scientific conferences every two years as part of its Midterm Meetings or Quadrennial Sessions, providing a regular forum for sharing new research in light and lighting and related fields. This volume brings together the scientific contributions presented at the CIE 2025 Scientific Conference (7-9 July, 2025) which was held as part of the CIE 2025 Midterm Meeting in Vienna, Austria (4-11 July, 2025).

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International Commission on Illumination (CIE), Editorial Board for the CIE 2025 Scientific Conference

Managing Editor Diana WERNISCH, Secretary General of the CIE
 Babenbergerstrasse 9/9A, 1010 Wien, Austria | ciecb@cie.co.at

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CIE Central Bureau
Babenbergerstraße 9/9A
1010 Vienna
Austria

Tel: +43 1 714 3187
E-Mail: ciecb@cie.co.at
www.cie.co.at

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Table of Contents

PART 1 – INTRODUCTION OF THE CIE 2025 SCIENTIFIC CONFERENCE AND CONFERENCE POLICIES	1
PART 2 – ABSTRACTS OF CURATED KEYNOTES AND WORKSHOPS	17
Hager, D., THE MULTIFACETED IMPACTS OF LIGHT-POLLUTION	18
Westland, S., APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN THE COLOUR INDUSTRIES	19
Brainard, G.C., LIGHT AND HUMAN HEALTH	20
Luo, R., PERSONAL COLOUR MANAGEMENT FOR DISPLAY DEVICES AND CONSUMER PRODUCTS	21
Wienold, J., et. al., HDR IMAGING FOR ASSESSMENT OF GLARE AND OF OBTRUSIVE LIGHT	22
Pellegrino, A., TAILORING INDOOR LIGHTING REQUIREMENTS TO MEET USERS' NEEDS	24
Fotios, S., RAPID REVISION OF CIE 115 - LIGHTING OF ROADS FOR MOTOR AND PEDESTRIAN TRAFFIC	25
Sliney, D., ELECTRIC LIGHT EFFECT ON INSECTS AND WILDLIFE	26
Hao, L., ACADEMIC & PROFESSIONAL LIGHTING EDUCATION	28
PART 3 – FULL-LENGTH SCIENTIFIC PAPERS	29
Abiko, E., et al., DEVELOPMENT AND VERIFICATION OF A LIGHTING CONTROL SYSTEM IN A LOW-TRAFFIC TUNNEL	30
Alwalidi, M., and Hoffmann, S., A NOVEL ANNUAL SPECTRAL MATRIX SIMULATION METHOD AND THE EFFECT OF SPECTRAL DISCRETIZATION ON ANNUAL LIGHTING ENERGY DEMAND WITH SWITCHABLE GLAZING	37
Amorim, C. N. D., et al., DAYLIGHT AND VIEW OUT: A COMPARATIVE STUDY BETWEEN BRAZILIAN AND EUROPEAN CONTEXTS	47
Aoyagi, M., et al., EXAMINATION OF THE ERROR DUE TO THE POSITION OF THE BAFFLE ON THE INTEGRATING SPHERE PHOTOMETER	58
Aoyagi, M., et al., INVESTIGATION OF THE MEASUREMENT ERROR DUE TO THE POSITION OF THE BAFFLE ON THE 2π GEOMETRY INTEGRATING SPHERE PHOTOMETER	67
Araiza, D. V., et al., ASSESSING VISUAL ATTENTIVENESS IN RETAIL ENVIRONMENTS USING A HUMAN SUBJECT-BASED TESTING PROTOCOL BASED ON JUST NOTICEABLE DIFFERENCES.	74

Table of Contents

Belgers, S., et al., IMPACT OF SHORT DARK ADAPTATION PERIODS ON POST-ILLUMINATION PUPIL RESPONSE	80
Bellia, L., et al., CLOSED-LOOP PROPORTIONAL DAYLIGHT-LINKED CONTROL SYSTEMS: HOW TO CALIBRATE THEM FOR INTEGRATIVE LIGHTING PURPOSES?	88
Bellia, L., et al., INTEGRATIVE LIGHTING IN EDUCATIONAL ENVIRONMENTS: A CRITICAL ANALYSIS OF CURRENT LITERATURE AND FOOD FOR THOUGHT FOR FUTURE RESEARCH ACTIVITIES AND DESIGN PRACTICE	95
Bellia, L., et al., STUDENTS' "LUMINOUS DIET": ARE EDUCATIONAL BUILDINGS DESIGNED TO PROVIDE THE PROPER DAILY LIGHT DOSAGE?	103
Beltrán, L. O., et al., ASSESSING MELANOPIC ILLUMINANCE IN HOMES: FROM DESIGN TO CONSTRUCTION	109
Bergen, A.S.J., and Schneider, T., A MATHEMATICAL FRAMEWORK FOR COMPARING PHOTOMETRIC OBSERVERS	118
Bhaumik, U., and Leloup, F. B., THE HELMHOLTZ–KOHLRAUSCH EFFECT ON VIRTUAL REALITY HEAD MOUNTED DISPLAYS	132
Biswas, P. R., and Jost, S., VALIDITY OF CIE COLOR MATCHING FUNCTIONS FOR OLED-LCD MIXED TECHNOLOGY MATCHES	138
Bordonaro, E., et al., LIGHTING PUBLIC SPACES FOR PEOPLE WELL-BEING: RESULTS FROM AN IN-FIELD MEASUREMENT CAMPAIGN	146
Bratschi, C., and Andersen, M., ON THE COMPARABILITY BETWEEN DAYLIT AND ELECTRICALLY LIT EXPERIMENTAL CONDITIONS FOCUSED ON NON-VISUAL RESPONSES TO LIGHT	153
Brémond, R., et al., DISABILITY GLARE FROM PHOTOVOLTAIC PANELS IN AIRPORTS	161
Castilla, N., et al., A COMPARATIVE STUDY OF SUBJECTIVE PERCEPTIONS OF LIGHTING AND PHYSIOLOGICAL RESULTS IN REAL AND VIRTUAL ENVIRONMENTS	171
Castro, A.A.S., et al., DAYLIGHT – VISUAL AND NON-VISUAL EFFECTS IN THE CONTEXT OF NEARLY ZERO ENERGY BUILDING: THE LABZERO CASE	179
Costa, J. F. W., and Amorim, C. N. D, ELECTROCHROMIC GLAZING: NON-VISUAL EFFECTS IN HIGHLY GLAZED NON-RESIDENTIAL BUILDINGS IN BRAZIL	189
Daneels, R., et al., INCREASING PERFORMANCE IN THE OFFICE WHEN WORKING WITH MONITORS: A PILOT STUDY	199
De Vries, S.W., et al., CHARACTERISING INTER-INDIVIDUAL VARIABILITY IN SIMULATED PERSONAL LIGHT EXPOSURE: IMPACT OF BODY MORPHOLOGY ON LIGHT-DOSIMETRY	207

Table of Contents

Dotreppe, G.M., et al., ASSESSMENT OF THE VALIDITY OF THE CURRENT MINIMAL TEST DISTANCES OF (O)LED LUMINAIRES	217
Dotreppe, G.M., et al., THE EFFECT OF RADIATION PATTERNS ON VEHICULAR VISIBLE LIGHT COMMUNICATION	227
Dotreppe, G.M., et al., USE OF STELLATED APERTURES TO MINIMISE INTERNAL FORWARD REFLECTIONS IN STRAY LIGHT BAFFLES	237
Du, F., et al., REFINING THE CMC COLOUR-DIFFERENCE FORMULA BASED ON THE COM-CORRECTED DATASET	243
Du, Y., and Yan, Y., SHARING POWER BANK—NEW NETWORK FOR BUILDING EVACUATION LIGHTING IN THE MOBILE ERA	251
Dubail, M., et al., EFFECT OF METAMERIC WHITE LIGHTS ON VISUAL PERFORMANCE	257
Durmus, D., et al., PERFORMANCE OF MELANOPsin-BASED SPATIAL BRIGHTNESS METRICS	263
Erturk, E., et al., EXPLORING THE ROLE OF THE FALL OF DARKNESS ON LONDON'S THEFT AND ROBBERY INCIDENTS BETWEEN 2013 - 2019	270
Faure, T., et al., A ROAD REFLECTANCE ANALYTICAL FUNCTION BUILT FROM BRDF MODELS	277
Feng, K., et al., OPTIMIZATION OF URBAN LIGHTING EVALUATION METHOD BASED ON MULTI-SOURCE DATA MUTUAL VERIFICATIONS	285
Fotios, S., et al., BIOMOTION LIGHTING ENHANCES CYCLIST CONSPICUITY	292
Fotios, S., et al., OPTIMAL ILLUMINANCE FOR PEDESTRIAN REASSURANCE	299
Gao, X., et al., STUDY ON PERCEIVED WHITE POINT OF WIDE COLOUR GAMUT DISPLAY	306
Geisler-Moroder, D., et al., TOWARDS AN ISO/CIE STANDARD FOR BSDF CHARACTERIZATION OF SHADING AND DAYLIGHTING SYSTEMS	312
Gevaux, L., and Obein, G., EFFECTS OF CAMERA APERTURE ON STRAY LIGHT IN HIGH DYNAMIC RANGE LUMINANCE IMAGING	320
Gevaux, L., et al., HIGH DYNAMIC RANGE IMAGING METHODS FOR TRACEABLE OPTICAL MEASUREMENTS	326
Girard, J., et al., IS THE COST 331 SOFTWARE STILL RELEVANT FOR CHARACTERISING THE VISIBILITY OF ROAD MARKINGS?	334

Table of Contents

Glanville, M.J., et al., MODELLING SOLAR DISABILITY GLARE REFLECTED FROM MODERN BUILDING FACADES	344
Gottar, L., et al., THE VISIBILITY OF TARGETS: DISCS VS GRATINGS	354
Hammes, S., and Weninger, J., THE IMPACT OF SEASONAL OCCUPANCY PATTERNS ON ENERGY-RELATED LIGHTING OBJECTIVES	363
Hansen, F., et al., NEW CONCEPT FOR ROAD LIGHTING TO IMPROVE THE VISIBILITY OF CYCLISTS IN SHARED ROAD SPACE	373
Hantos, G., et al., RESULTS OF THE JOINT LED AGING EXPERIMENT OF THREE UNIVERSITY LABORATORIES WITHIN THE AI-TWILIGHT PROJECT	380
Hao, M.Y., and Jiang, Y.C., VISUAL PREFERENCE EVALUATION FOR LUMINA NIGHT WALK APPLICATION OF LIGHTING PROJECTION IN VEGETATED ENVIRONMENT: A PLEASURE-AROUSAL-DOMINANCE (PAD) MODEL PERSPECTIVE	389
He, S., et al., DIAGNOSING HUMAN-LIGHT INTERACTIONS WITH THE AID OF 360° HDR IMAGING	399
Hegedüs, J., et al., SUPPORT AND SUPPRESSION OF ANALOGUE NIGHT VISION DEVICES USING IR LEDS	413
Hergesel, J., et al., COHERENCE OF FLICKER VISIBILITY AND PERCEPTIBILITY THRESHOLD DEFINITIONS BY CIE AND IEC	423
Hillairaud, L., et al., COLOUR-BASED GRANULOMETRIC ANALYSIS WITH PATTERN SPECTRUM	432
Igarashi, M., et al., APPLICABILITY OF THE CALCULATION MODEL FOR SPACIOUSNESS IN RESIDENTIAL SPACES WITH WINDOWS	441
Ikebuchi, M., et al., EFFECT OF FLUCTUATING EXTERIOR LIGHTING ON IMPRESSION: INFLUENCE OF THE NUMBER OF LUMINAIRES AND INSTALLATION INTERVAL	448
Inanici, M., et al., METROLOGY FOR NEUROPIC RESPONSE TO LIGHT: A CASE STUDY IN A NEONATAL INTENSIVE CARE UNIT	457
Ishihara, K., et al., MACHINE LEARNING AIDED APPROACH TO ESTIMATE IMPRESSION FOR RESIDENTIAL LIGHTING IMAGES	465
Ixtaina, P. R., et al., THE ROLE OF ROAD SURFACE IN ROAD LIGHTING QUALITY AND EFFICIENCY. A CURRENT CASE IN AN ARGENTINIAN MOTORWAY	474
Jain, S., et al., APPLICABILITY OF CIE SUPPLEMENTARY PHOTOMETRY FOR GLARE PREDICTION UNDER COLORED DAYLIT SCENES	480

Table of Contents

Jiang, Y.C., and Hao, M.Y., INTEGRATING EMOTIONAL AND VISUAL DIMENSIONS IN URBAN LIGHTING DESIGN: A HOLISTIC APPROACH USING THE PAD MODEL AND LIGHT FIELD METRICS	487
Jin, Y., et al., WEARABLE DEVICE FOR PERSONAL LIGHT MONITORING: ASSESSING VISUAL AND NON-VISUAL RESPONSES WITH SPECTRALLY-RESOLVED SENSOR	497
Jägerbrand, A.K., ANALYSIS OF ENVIRONMENTAL LIGHTING ZONES AND THEIR EFFECTIVENESS FOR PROTECTED AREA CONSERVATION IN SWEDEN	506
Kage, H., et al., DEVELOPMENT OF AN APPROXIMATE FORMULA FOR ESTIMATING SPATIAL BRIGHTNESS FOR PLANNING AND EVALUATING THE LIGHTING ENVIRONMENT WITH WINDOWS: APPLICATIONS TO REAL SPACE AND LARGE HIGH-LUMINANCE DISPLAYS	514
Kashiwaguma, R., et al., AN INTEGRATED ASSESSMENT METHOD FOR VIEWS, DAYLIGHTING, AND GLARE IN OFFICE BUILDINGS WITH WINDOWS	522
Kato, M., INVESTIGATION OF THE BALANCE BETWEEN WORK SURFACE ILLUMINANCE AND SPATIAL AVERAGE LUMINANCE IN DESK WORKSPACES: A COMPARISON OF YOUNGER AND OLDER ADULTS	532
Kim, D.H., and Wienold, J., A VALIDATION STUDY OF THE CIE CORRECTION METHOD FOR NON-UNIFORM LIGHTING CONDITIONS	538
Kobayashi, K., and Mochizuki, E., MELANOPIE EQUIVALENT DAYLIGHT ILLUMINANCE AT HOME OF JAPANESE TELECOMMUTERS	546
Kompan, D., et al., MEASUREMENT OF OBTRUSIVE LIGHT EMISSION FROM RESIDENTIAL BUILDINGS	553
Kong, X., et al., AN EXPERIMENTAL INVESTIGATION ON DEVELOPING A VISIBILITY MEASURE FOR THE PHANTOM ARRAY EFFECT FOR GENERAL LIGHTING APPLICATIONS	562
Kozaki, M., et al., RESEARCH ON IMPRESSION-SHIFT DUE TO THE INFLUENCE OF ADJACENT LIGHTING ENVIRONMENT: IMPRESSION EVALUATION EXPERIMENT CONDUCTED AT A SHOPPING MALL	572
Kráncz, B., et al., CHROMATICITY POINTS OF REAL SPECTRA OUTSIDE THE CIE CHROMATICITY DIAGRAM	582
Kukačka, L., et al., INTERPRETATION OF THE FLICKER SEVERITY METRICS PRODUCED BY THE LIGHT FLICKERMETER	592
Lassalle, A., et al., EFFECTIVENESS OF LIGHT IN ENHANCING WORKING MEMORY THROUGH MELANOPIN STIMULATION VARIES WITH AGING	600

Table of Contents

Lee, J., et al., TLM EFFECT ON VISUAL PERCEPTION ON LANDOLT C	608
Legrand, B., and Villa, C., STATIC AND DYNAMIC ASSESSMENTS OF LIGHTING QUALITY: A FIELD EXPERIMENT	614
Li, J., and Ohno, Y., COMPARATIVE EVALUATION OF CIE SPECTRAL LUMINOUS EFFICIENCY FUNCTIONS USING LED-BASED BRIGHTNESS AND COLOUR MATCHES	623
Li, Q., et al., DEVELOPMENT OF A DATABASE FOR FABRIC VISUAL APPEARANCE	632
Liandrat, S., et al., EFFECT OF R-TABLE MEASUREMENT DISPERSION ON ROAD LIGHTING QUALITY CRITERIA	641
Liu, H., et al., UNIFORM FLAT PLANE SPECTRAL RADIANCE SOURCE BASED ON BROADBAND LED	650
Liu, T., and Zhang, X., EXPLORING THE LIGHTING ENVIRONMENT OF RESEARCH AND DEVELOPMENT LABORATORIES FOR DRIVING AND RIDING EXPERIENCE IN THE SMART TRANSPORTATION ERA	656
Manav, B., et al., A RESEARCH ON WORK PRODUCTIVITY AND VISUAL ATTENTION UNDER HUMAN CENTRIC LIGHTING SYSTEM	666
Martinsons, C., et al., SPECIFYING LUMINAIRE CUTOFF IN LIGHT POLLUTION REGULATIONS	676
Martinsons, C., et al., THE PHANTOM ARRAY EFFECT EXPLAINED USING SIMPLE FORMULAS	685
Martínez-Muñoz, I., and Mahdavi, A., FROM CALCULATION TO EVALUATION: ASSESSING UGR AS AN INDICATOR OF VISUAL DISCOMFORT	695
Maruyama, H., and Suzuki, N., STUDY ON LIGHTING CONTROL SYSTEM LINKED TO WEATHER FORECAST	701
Maruyama, K., et al., ROAD SURFACE LUMINANCE OF THE TUNNEL INTERIOR LIGHTING WITH SOOT AND SMOKE EXHAUSTED FROM VEHICLES	709
Meihami, K., et al., THE TRANSMISSION OF NEAR-INFRARED ELECTROMAGNETIC RADIATION THROUGH DIFFERENT FABRIC TYPES	719
Melero-Tur, S, et al., EXPLORING DAILY LIGHT EXPOSURE: DOCUMENTING REAL-LIFE DATA WITH PERSONAL LIGHTLOGGERS IN SPAIN	726
Miallier, M., et al., AUTOMATED LIGHT QUALITY MEASUREMENT IN CORRIDORS	734
Miyake, H., et al., FURTHER DEVELOPMENT OF THE CALCULATION MODEL FOR SPACIOUSNESS TO INCLUDE THE EFFECTS OF WINDOWS AND EXTERNAL SPACE	741

Table of Contents

Mochizuki, E., POTENTIAL OF USING LUMINOUS COLOUR IN WORKSPACES WITH DIFFERENT TYPES OF TASKS	748
Momiyama, A., et al., DEVELOPMENT OF PHOTON FLOW THROUGH PRACTITIONER DIALOGUES – DESIGNING EXHIBITION SPACES ENVELOPED IN DIFFUSE LIGHT	757
Motoyama, R., et al., RADIANCE AND BEST INTEGRATION FOR THERMAL ENVIRONMENT EVALUATION OF SPACES WITH COMPLEX EXTERNAL SHADING	763
Mrad, H., et al., MODELLING CHANGES OVER TIME IN THE REFLECTIVE PROPERTIES OF DIFFERENT TYPES OF ROAD SURFACES	769
Muzet, V., et al., ON SITE CHARACTERISATION OF ROAD SURFACES REFLECTION PROPERTIES FOR SEVERAL OBSERVATION ANGLES	779
Napitupulu, B.V.B., et al., INFLUENCE OF LEVEL OF DETAILS OF 3D OBJECTS ON REALISM IN VR ENVIRONMENTS	789
Novak, T., et al., LARGE RESIDENTIAL AREA LIGHT POLLUTION MODELLING	796
Novák, F., et al., DETERMINATION OF NATURAL REFERENCE LEVELS OF ILLUMINANCE AND EXPOSURE IN THE NIGHT ENVIRONMENT FOR THE ASSESSMENT OF LIGHT POLLUTION LEVELS	806
Németh, M., et al., LIFETIME MULTI-DOMAIN MODELING OF MID-POWER LEDS	812
Oh, S., and Gegenfurtner, K. R., COLOUR ASSIMILATION EFFECTS ON FACES IN FOVEAL AND PERIPHERAL VISION USING CURVED DISPLAY SYSTEM	822
Ohki, C., et al., DEVELOPMENT OF AN EVALUATION METHOD FOR VIEW QUALITY IN OFFICE BUILDINGS	828
Ohno, Y., et al., RESULTS OF IEA 4E SSL ANNEX INTERLABORATORY COMPARISON ON TEMPORAL LIGHT MODULATION MEASUREMENT	837
Onaygil, S., et al., MACHINE LEARNING BASED REAL-TIME PREDICTION OF LIGHTING CLASSES IN ADAPTIVE ROAD LIGHTING SYSTEMS	848
Osumi, M., SPECTROSCOPIC MEASUREMENT OF FLUORESCENT PIGMENTS FOR PENETRANT TESTING	858
Pan, J., et al., RESEARCH ON EXTREMELY HIGH-RESOLUTION WIDE-BAND ARRAY SPECTRORADIOMETER	867
Pharel, A., et al., LIMITING THE IMPACT OF LIGHTING AT NIGHT ON BIODIVERSITY: A MULTI-EXPERTISE METHODOLOGY FOR ADAPTING LIGHTING TO LOCAL CHALLENGES	875

Table of Contents

Pic, E. C., et al., REAL-LIFE CHARACTERIZATION OF EYE EXPOSURE TO LIGHT USING A NEW INSTRUMENTED EYEWEAR: A PROOF-OF-CONCEPT STUDY	884
Pinheiro, A. M., et al., DAYLIGHT REQUIREMENTS AND METRICS IN PRACTICE: A CLIMATIC ANALYSIS OF CURRENT CRITERIA	893
Pizág, B., et al., HYPERSPECTRAL IMAGING IN AGRICULTURE – EVALUATING THE SPECTRAL DEPENDENCY OF VEGETATION INDICES	903
Preston, B., and Mucklejohn, S.A., THE RELIABILITY OF LED DRIVERS - ESTIMATING FAILURE RATES AND TRENDS	911
Ranaer Harputluoğlu, E., et al., DAYLIGHT PERFORMANCE OF PERFORATED SOLAR SCREEN FACADES IN OFFICES: A CASE STUDY	921
Rastgou, M, et al., ENHANCING MEASUREMENT ACCURACY IN MICROSCOPE-BASED REFLECTOMETRY FOR THIN FILM OPTICAL CHARACTERIZATION	931
Richard, N., and Chatoux, H., PROPOSITION FOR A NEW TEXTURE DEFINITION AND ASSOCIATED METROLOGY	937
Richard, N., et al., BIDIMENSIONAL SPECTRAL DIFFERENCE MEASUREMENT FOR SCENE COMPLEXITY ASSESSMENT	943
Rodriguez, F., and Garcia-Hansen, V., INTEGRATING VIRTUAL REALITY AND EYE-TRACKING TO ASSESS THE RESTORATIVE POTENTIAL OF DYNAMIC VISUAL CONDITIONS	949
Rybczyński, A., IMPROVED UNCERTAINTY ESTIMATION PROCEDURE FOR SPECTRAL MEASUREMENTS USING THE COMBINED MONTE CARLO METHOD AND BOOTSTRAP	958
Saint-Jacques, E., et al., MEASURING THE REFLECTION PROPERTIES OF WET ROAD SURFACES	965
Sato, S., et al., STUDY ON SPATIAL IMPRESSION AND OBJECT VISIBILITY BY AGE OF MELANOPIE EQUIVALENT DAYLIGHT ILLUMINANCE CONTROL LIGHTING	975
Schramm, S., et al., INTRA-LENS-SPECTROMETER FOR A NEAR-EYE DISPLAY MEASUREMENT APPLICATION	983
Schulze, C., et al., INVESTIGATING THE ACCURACY OF ROAD SURFACE REFLECTION CHARACTERISATION BASED ON ROUND-ROBIN MEASUREMENTS	989
Schwarcz, P., WILL INCREASING EFFICACY IN LIGHTING TECHNOLOGY DELIVER LOWER ELECTRICITY CONSUMPTION?	998
Scorpio, M., et al., OPTIMISING BUILDING DESIGN THROUGH WINDOW VIEW ANALYSIS: A CASE STUDY IN GDANSK	1004

Table of Contents

Scums, D.V., and Valodchenka, A.D, THE INFLUENCE OF THE CORRELATED COLOUR TEMPERATURE CALCULATION METHOD ON THE ACCURACY OF COLOUR RENDERING INDEX MEASUREMENT	1013
Shinohara, N., and Taguchi, T., EFFECTS OF DUV ON THE RELATIONSHIP BETWEEN PREFERRED ILLUMINANCE AND CORRELATED COLOUR TEMPERATURE	1020
Slembrouck, N., et al., PSYCHOPHYSICAL EXPERIMENT TOWARDS A MEASUREMENT SCALE OF SPARKLE	1027
Szabó, M., and Samu, K., HETEROCHROMATIC BRIGHTNESS MATCHING AND RED-GREEN COLOUR VISION DEFICIENCY RECOGNIZING WITH A SOFTWARE BASED ON APPARENT MOVEMENT	1035
Takahashi, H., et al., EFFECT OF IPRGC STIMULATION ON CONTRAST SENSITIVITY IN CENTRAL VISION	1042
Talon, D., et al., TOWARDS MORE ENERGY-EFFICIENT ROAD TUNNEL LIGHTING - A COMPARISON OF LIGHTING INSTALLATION DESIGN METHODS	1049
Tanaka, M., et al., EXPERIMENTAL INVESTIGATION OF IMAGE REPRODUCTION WITH PERCEPTUAL GLOSS EQUIVALENT TO REAL GLASS, METAL, AND STONE	1058
Tayama, S., et al., ESTIMATION MODEL OF VISIBILITY BASED ON THE CHROMATIC MECHANISM IN NEUROPHYSIOLOGY	1066
Teji, J.U., et al., THE INFLUENCE OF SPECTRAL POWER DISTRIBUTIONS ON THE GROWTH OF RED SPINACH (AMARANTHUS DUBIUS)	1075
Thorseth, A., et al., VARIABILITY OF SPECTRAL DISTRIBUTIONS OF LED	1084
Tokuşlu, M.F., and Erdem Atılğan, L., ENERGY-EFFICIENT LIGHTING DESIGN FOR HAGIA EIRENE: TAILORED SOLUTIONS FOR WORSHIP, CONCERT AND MUSEUM SETTINGS	1090
Tsukagoshi, K., et al., LUMINANCE CONTRAST THRESHOLD UNDER ROAD LIGHTINGS IN REVERSED SILHOUETTE VISION AND SILHOUETTE VISION	1100
Tsushima, S., et al., THE EFFECTS OF THE INTERIOR SURFACE REFLECTANCE AND COLOUR ON THE RELATIONSHIP BETWEEN MEAN ROOM SURFACE EXITANCE AND SPATIAL BRIGHTNESS	1110
Turley, K., et al., A DEMENTIA PERSPECTIVE: INTERACTIVE WORKSHOPS HIGHLIGHTING INTEGRATIVE LIGHTING PREFERENCES FROM A DEMENTIA COHORT	1117
Ueno, S., et al., EFFECT OF TARGET AND AMBIENT LIGHTING ON SPATIAL IMPRESSION AND SUBJECTIVE VISUAL PERFORMANCE	1128
Uttley, J., et al., DARKNESS INCREASES RISK OF SPECIFIC CRIMES	1134

Table of Contents

Uttley, J., et al., THE PRESENCE OF ROAD LIGHTING LEADS TO MORE CYCLING	1140
Vali, K., et al., LIGHT EXPOSURE OF OLDER ADULTS LIVING ALONE: A PILOT STUDY	1146
Vandahl, C., and Schierz, C., EFFECT OF ILLUMINANCE ON PERCEPTION OF THE STROBOSCOPIC EFFECT	1156
Veitch, J.A., et al., LIGHTING CONDITIONS IN THE HOMES OF OLDER ADULTS: ARE THEY SUITABLE FOR HEALTHY AGING IN PLACE?	1166
Villa, C., et al., INVESTIGATING FACIAL EMOTION RECOGNITION: TWO FIELD EXPERIMENTS	1174
Vissenberg, M.C.J.M., et al., COMFORT VIEW ZONE: MEASURING DISCOMFORT GLARE	1182
Wang, Y., et al., IMPACT OF ANTARCTIC OVERWINTERING ON RHYTHMS, SLEEP, AND MOOD OF CHINESE EXPEDITION MEMBERS AT ZHONGSHAN STATION	1191
Weninger, J., and Obleitner, M., DESIGN CRITERIA FOR USER-CENTRED SHADING SYSTEMS: A VR-BASED STUDY ON USER PREFERENCES	1198
Wienold, J., et al., DO CIE-RECOMMENDATIONS FOR PROPER LIGHT AT THE PROPER TIME CONFLICT WITH GLARE?	1208
Yabe, C., and Ohki, C., STUDY ON CALCULATING LUMINANCE DISTRIBUTIONS BY INCORPORATING THE ESTIMATED MODELS OF DIRECTIONAL REFLECTANCE CHARACTERISTICS FROM SIMPLIFIED MEASUREMENTS INTO RADIANCE	1217
Yan, J., et al., CAMERA SPECTRAL SENSITIVITY MEASUREMENT AND UNCERTAINTY EVALUATION	1226
Yebara, A., et al., TOWARD AN UNIFIED PROPOSAL FOR THE COLOURS OF THE FLAGS OF THE TWENTY-SEVEN MEMBER STATES OF THE EUROPEAN UNION	1232
Yin, R., et al., ASSESSING ATYPICAL COLOUR PERCEPTIONS IN NEURODIVERGENT INDIVIDUALS	1242
Yuen, B.C.L., et al., ABILITY OF COMMON GLARE INDICES TO EVALUATE DISCOMFORT GLARE IN THE PRESENCE OF MULTIPLE ELECTRIC LIGHT SOURCES	1252
Zeng, Y., et al., HOW LIGHT VARIES ACROSS DIFFERENT LEVELS: INSPECTING CONVERGENCE AND DISCREPANCIES IN MEASUREMENTS FROM FIXED OUTDOOR AND INDOOR MONITORING AND PERSON-WORN SENSORS	1262
Zhang, Z.J., and Andersen, M., SPATIO-TEMPORAL DYNAMICS OF KOMOREBI LIGHT PATTERNS	1272

Table of Contents

Zhao, W., et al., LED PHOTOMETRIC MEASUREMENT BASED ON LED STANDARD LAMPS	1282
Škoda, J., et al., THE OBTRUSIVE LIGHT MEASUREMENT WITH UNMANNED AERIAL VEHICLE	1293
Žagar, K., et al., CIRCADIAN RHYTHMS AND LIGHT EXPOSURE: INSIGHTS FROM WEARABLE SENSORS	1299
PART 4 – SHORT PAPER CONTRIBUTIONS	1309
Arranz, I, et al., DRIVING DISABILITY GLARE IN MIDDLE AGE: EFFECT OF CORRELATED COLOR TEMPERATURE (CCT)	1310
Aslanoğlu, R., et al., PERCEPTIONS OF LIGHTING, SAFETY, AND BIODIVERSITY: A MIXED-METHODS STUDY OF PARK USAGE IN URBAN SETTINGS	1314
Bae, I.-H., et al., TOWARDS ESTABLISHING A PRIMARY STANDARD FOR SPECTRAL RESPONSIVITY	1318
Bae, J., COMPACT TYPE OF ILLUMINOMETER CALIBRATION SYSTEM USING INTEGRATING SPHERE	1322
Bergen, A.S.J., and Whitehead, L., LOW-COST OPTION FOR ADAPTING CURRENT PHOTOMETERS TO A NEW SPECTRAL LUMINOUS EFFICIENCY FUNCTION	1327
Bouroussis, C. A., and Rinderer, F., METROLOGY OF OUTDOOR LIGHT EMISSIONS AT NIGHT USING UNMANNED AERIAL PLATFORMS	1331
Bouroussis, C. A., et al., OUTDOOR INTERCOMPARISON OF HDR IMAGING LUMINANCE MEASUREMENT SYSTEMS USING A HIGH CONTRAST LUMINANCE SCENE	1335
Broszio, K., et al., OPTIMIZATION OF PERSONAL LIGHT DOSIMETRY: CONSIDERATION OF THE BINOCULAR FIELD OF VIEW	1339
Chatoux, H., et al., HOW WELL DO HUMAN PERCEIVE NON-UNIFORM SURFACE NOISE VARIATION?	1344
Dunstan, O. B. O., et al., A PRELIMINARY FIELD-TEST OF LIGHTING WITHIN A GERIATRIC AND REHABILITATION UNIT: INFORMING A LARGER STUDY ON SLEEP QUALITY	1349
Favero, F., CLAPP – A NEW FRAMEWORK FOR LIGHTING DESIGN EDUCATION AND PRACTICE	1353
Ferrero, A., et al., CHARACTERIZATION OF HIGH-DYNAMIC-RANGE IMAGING MEASUREMENT SYSTEMS BY USING A HIGH CONTRAST LUMINANCE REFERENCE SOURCE	1357

Table of Contents

Fryc, I., et al., RECIPE FOR TYPICAL MINIMUM AND MAXIMUM SPECTRAL MISMATCH CORRECTION FACTOR USING BROADBAND PHOTOMETER MEASUREMENTS AND CATALOG PARAMETERS FOR TESTED WHITE LED SOURCES	1361
Godó, K., et al., POTENTIAL OF LED-BASED STANDARD SOURCE PROVIDING CIE STANDARD ILLUMINANT A	1365
Greffier, F., et al., A SIMPLE METHODOLOGY FOR ASSESSING LIGHT POLLUTION ISSUES USING FREE SATELLITE DATA AND AN INVENTORY OF ROAD LIGHTING INSTALLATIONS	1369
Grigoryev, A. A., and Rybina, V.A., PHYSIOLOGICALLY-RELEVANT COLORIMETRIC SYSTEM (LMS) PHYS AND COLOUR DIFFERENCE	1374
Hara, N., et al., SUBJECT EXPERIMENTS CONTRIBUTING TO THE DEVELOPMENT OF DISCOMFORT GLARE EVALUATION METHOD FROM LARGE-AREA HIGH LUMINANCE SURFACE BASED ON VISUAL CHARACTERISTICS	1378
Henriques da Silva, N., et al., A CRITICAL ASSESSMENT OF ROAD LIGHTING PRACTICES IN RELATION TO OBTRUSIVE LIGHT	1382
Higo, K., et al., POTENTIAL IMPACT OF DAYLIGHTING ON VISUAL ENVIRONMENTAL SATISFACTION IN SMALL HOUSES WITH RESTRICTED VIEW	1386
Ikonen, E., RELATION OF CONE FUNDAMENTALS TO UNITS, QUANTITIES AND SYMBOLS	1390
Ikonen, E., et al., ACCOUNTING FOR SPECTRAL CORRELATIONS IN UNCERTAINTY ANALYSIS OF SPECTRAL INTEGRALS	1393
Iodice, M., et al., LIGHTING LEVELS ON A TRAM PLATFORM: AN EXPLORATORY STUDY	1397
Iodice, M., et al., REVIEW OF LIGHTING STRATEGIES TO REDUCE LIGHT POLLUTION	1401
Jost, S., et al., COMPARING PSYCHOPHYSICAL RESEARCH METHODS FOR DISCOMFORT FROM GLARE	1405
Jägerbrand, A.K., COMPARATIVE ANALYSIS OF INTERNATIONAL LIGHT POLLUTION GUIDELINES IN ECOLOGY: TOWARDS EVIDENCE-BASED MITIGATION STRATEGIES AND ECOLOGICAL THRESHOLDS	1409
Kliment, P., et al., DEVELOPMENT OF A HIGH CONTRAST LUMINANCE REFERENCE SOURCE FOR CHARACTERIZATION OF HIGH-DYNAMIC-RANGE IMAGING MEASUREMENT SYSTEMS	1412
Knoop, M., COLOUR OF THE SKY - A PILOT STUDY TO EXPLORE GEOGRAPHICAL DIFFERENCES IN THE SPECTRAL PROPERTIES OF TWILIGHT	1416

Table of Contents

Knoop, M., et al., A ROUND ROBIN FOR A WORLDWIDE DAYLIGHT MEASUREMENT CAMPAIGN: INSIGHTS, CHALLENGES, AND LESSONS LEARNED	1420
Källberg, S., et al., SPILL LIGHT IN A SENSITIVE COASTAL AREA: COMPARING TWO DIFFERENT LIGHTING INSTALLATIONS	1424
Ledig, J., et al., LUMINOUS AND SPECTRAL RESPONSIVITY OF PHOTOMETERS FOR MEASUREMENTS OF HIGH ILLUMINANCE LEVELS	1428
Li, M., and Luo, M.R., INVESTIGATION OF DIFFERENT HELMHOLTZ–KÖHLRAUSCH (H-K) FORMULAE	1432
Li, Y. F., and Liu, X. X., A WORKFLOW FOR CONVERTING 2D IMAGES TO REALISTIC NAKED-EYE 3D VISUALIZATIONS USING COMFYUI	1437
Li, Z., et al., EFFECTS OF NIGHTTIME DISPLAY COLOR TEMPERATURE AND CIRCADIAN STIMULUS ON CIRCADIAN RHYTHMS AND VISUAL FATIGUE	1442
Linders, I.K., et al., LIGHT EXPOSURE AND SLEEP QUALITY IN ICU PATIENTS: PRELIMINARY PILOT FINDINGS	1446
Listowski, M., RETHINKING PHOTOMETER CALIBRATION STANDARDS: ALTERNATIVE SPECTRAL DISTRIBUTIONS SHAPED BY LED TECHNOLOGY	1449
Lu, Y., et al., SKIN COLOUR PERCEPTION IN HUMAN FACES AND TEXTURED PATCHES	1453
López, S., et al., CHARACTERIZATION OF THE NONLINEARITY OF ARRAY SPECTRORADIOMETERS FOR IRRADIANCE MEASUREMENTS	1457
Malovrh Rebec, K., et al., INTERDISCIPLINARY INSIGHTS: OPTIMIZING LIGHTING FOR HORMONAL HEALTH IN INDOOR ENVIRONMENTS	1461
Matesanz, B. M., et al., EXPLORING THE IMPACT OF CORRELATED COLOUR TEMPERATURE OF LED GLARE ON PUPILLARY DYNAMICS	1465
Matusiak, B., et al., EVALUATING WINDOW VIEWS: INSIGHTS INTO PERCEPTUAL DIFFERENCES BETWEEN OWNERS AND OBSERVERS	1469
Muramatsu, N., et al., PREDICTING VEILING REFLECTIONS IN THE VIEWING OF MUSEUM EXHIBITS BY OLDER ADULTS	1473
Nakazawa, Y., and Godo, K., WAVELENGTH CALIBRATION WITH A TUNABLE MONOCHROMATIC SOURCE BASED ON A SUPERCONTINUUM SOURCE	1477
Nilsson Tengelin, M., et al., ESTIMATING GLARE IN DYNAMIC TRAFFIC SITUATIONS	1481
Ninomiya, H., AN EXAMINATION OF PRACTICAL METHODS FOR PERFORMING CONE-FUNDAMENTAL-BASED PHOTOMETRY	1485

Table of Contents

Osaki, N., et al., LIGHTING COLOUR CONDITIONS THAT MAKE DISH LOOK DELICIOUS	1490
Pond, J., et al., ALGEBRAIC & ELECTROMAGNETIC MODELLING OF L, M, S CORNEAL SPECTRAL SENSITIVITIES USING A SINGLE PHOTOPIGMENT TEMPLATE	1494
Price, L., THE PERFORMANCE OF COLOUR FIDELITY METRICS UNDER SPECTRAL PERTURBATIONS	1498
Raza, A., et al., COLOURED SUNGLASS SIMULATION USING HYPERSPECTRAL IMAGING AND ICAM06	1501
Royer, M.P., and Miller, N.J., A MULTI-METRIC SYSTEM FOR LIMITING TEMPORAL LIGHT MODULATION	1505
Saito, M., et al., A SIMPLIFIED METHOD FOR CALCULATING DAYLIGHT ILLUMINANCE CONSIDERING EXTERNAL SHADING AND INTERIOR BLINDS	1509
Seah, M-Y., et al., PRELIMINARY ANALYSIS: UTILIZATION OF LIGHT QUANTIFICATION METRICS IN CLASSIFYING SLEEP-WAKE TIMINGS	1513
Supronowicz, R., AGE-INCLUSIVE LIGHTING DESIGN	1517
Supronowicz, R., NOVEL APPROACH TO INTEGRATIVE LIGHTING DESIGN FOR DIFFERENT AGE GROUPS: A COMPREHENSIVE METHOD FOR PARAMETERIZING LIGHTING SITUATIONS	1521
Sáez, A. M., and Ferrero, A., CHARACTERIZATION OF PHOTORESPONSE NON-UNIFORMITY AND NON-LINEARITY OF MULTISPECTRAL CAMERAS FOR RADIANCE AND LUMINANCE MEASUREMENTS	1525
Takase, K., et al., STUDY ON SPATIAL BRIGHTNESS EVALUATION USING OLED LIGHTING	1528
Tanabe, M., and Godo, K, CHANGE IN SPECTRORADIOMETER CHARACTERISTICS ON CHROMATICITY FOR TRICOLOUR LASER LIGHT SOURCES	1532
Urbin, Á, et al., A SHIFT TOWARDS WHITE – OBSERVING CHROMATIC ADAPTATION VIA ACHROMATIC SETTINGS	1536
Vasquez, N.G., et al., A COLLABORATIVE APPROACH TO INTEGRATING SUBJECTIVE ASSESSMENTS AND SIMULATION IN DAYLIGHTING LEARNING	1540
Wang, Z., and Hou, D., UNSUPERVISED END-TO-END FEED-FORWARD NEURAL NETWORK FOR COLOUR DISCREPANCY ADJUSTMENT IN DISPLAY CAMERA COMMUNICATION SYSTEMS	1544
Wu, Z., et al., LINEARITY CALIBRATION OF ARRAY SPECTRORADIOMETER FOR MEASURING SPECTRAL RADIANCE	1549

Table of Contents

Wuchterl, G., SIXTEEN YEARS OF ALPINE LIGHT - TRENDS, SOURCES, STABILITY, ACCURACY	1553
Yoo, J.K., et al., ESTABLISHMENT AND APPLICATION STRATEGIES OF THE QUANTUM COMMUNICATION AND SENSOR EVALUATION TECHNOLOGY CENTER	1557
Zong, Y., and Miller, C.C., CHARACTERIZATION AND CALIBRATION OF TRANSFER-STANDARD SPECTRORADIOMETERS USING A TUNABLE LASER	1559
PART 5 – ABSTRACTS OF PAPERS WITH PUBLICATION OPT-OUT	1563
Baeza, D., et al., CIRCADIAN RHYTHMS OF THE RETINA AND THE SKIN	1564
Baeza, D., et al., SUNGLASSES STANDARD ISO 12312-1. A NEW PROPOSAL BASED ON NON-IMAGE EFFECTS OF LIGHT	1565
Besenecker, U. C., et al., PEDESTRIAN LIGHTING IN URBAN FORESTS – A MULTIDISCIPLINARY PERSPECTIVE	1566
Bonavia, S., et al., THE EFFECT OF LIGHT DIRECTION ON PUPILLARY LIGHT REFLEX: A PILOT STUDY	1567
Dai, S.J., et al., A CONTROLLED EXPERIMENT ON THE EFFECTS OF ARTIFICIAL LIGHTING ON PUERPERAE SLEEP, FATIGUE AND MOOD	1568
Hou, D., et al., INDIVIDUAL DIFFERENCES IN PHOTOBIOLOGICAL EFFECTS: A COHORT STUDY APPROACH	1569
Huang, Y., and Dai, Q., QUANTIFYING THE IMPACT OF DYNAMIC NIGHT-SHIFT DISPLAY LIGHT ON MELATONIN SECRETION	1570
Ikeda, Y., et al., LUMINANCE CONTRAST DISCRIMINATION THRESHOLDS FOR OBJECT AND BACKGROUND SURFACES IN SILHOUETTE AND REVERSE SILHOUETTE VIEWS	1571
Jinno, M., et al., EVALUATION OF THE VISIBILITY OF A FALLEN OBJECT IN A FULL-SCALE TUNNEL WHEN A SUBJECT IS A PASSENGER IN A MOVING VEHICLE AND VERIFICATION OF THE EFFECTIVENESS OF INDIRECT EVALUATION BY USING AN HMD	1572
Kilpeläinen, A., et al., STABILITY OF INDUCED JUNCTION PHOTODIODES UNDER UV IRRADIATION	1573
Kobav, M. B., et al., ESTABLISHING A FRAMEWORK FOR COLLECTION OF COLORIMETRIC CHARACTERISTICS OF DAYLIGHT WITH AFORDABLE FISH-EYE ACTION CAMS	1574
Kuittinen, O., et al., BROADBAND LIGHT SOURCE BASED ON LIGHT-EMITTING DIODES FOR RADIOMETRIC CALIBRATIONS IN THE ULTRAVIOLET REGION	1575

Table of Contents

Li, N. Y., et al., INTEGRATED LIGHTING FOR ENCLOSED SPACES FOCUSING ON VISUAL AND NON-VISUAL EFFECTS TO IMPROVE WORKERS' WELL-BEING	1576
Oe, Y., et al., TOWARDS RESILIENT LIGHTING DESIGN FOR DISASTER REFUGES PART 1: SUBJECTIVE EXPERIMENTS IN A JAPANESE CLASSROOM	1577
Rezazadeh, Y, et al., UNCERTAINTY EVALUATION OF COLOUR MEASUREMENTS	1578
Song, S., et al., A PROPOSAL OF STANDARD DEVIATE OBSERVERS BASED ON 100 OBSERVERS	1579
Wei, L.Z., et al., QUANTITATIVE STUDY ON SKIN WHITENESS PREFERENCE OF CHINESE YOUNG WOMEN	1580
Yi, X. W., et al., CAR BODY LIGHTING: MASTERING THE BALANCE BETWEEN RECOGNITION AND DISTRACTION	1581
Yoshida, Y., et al., TOWARDS RESILIENT LIGHTING DESIGN FOR DISASTER REFUGES PART 2: LIGHTING CONDITIONS OF JAPANESE GYMNASIUMS USED DURING ACTUAL DISASTERS	1582