14th International Symposium on the Science and Technology of Lighting (LIGHT SOURCES 2014)

Como, Italy 22 – 26 June 2014

Editors:

Robin Devonshire Georges Zissis

ISBN: 978-1-5108-4085-0

Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2014) by Foundation for the Advancement of the Science & Technology of Light Sources (FAST-LS) All rights reserved.

Printed by Curran Associates, Inc. (2017)

For permission requests, please contact Foundation for the Advancement of the Science & Technology of Light Sources (FAST-LS) at the address below.

Foundation for the Advancement of the Science & Technology of Light Sources FAST-LS Belmayne House 99 Clarkehouse Road Sheffield, United Kingdom S10 2LN

www.fast-ls.org

Additional copies of this publication are available from:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 USA Phone: 845-758-0400 Fax: 845-758-2633 Email: curran@proceedings.com Web: www.proceedings.com

Labels and Page Numbers of Invited, Landmark and Contributed Papers

Welcome Session: Keynote Papers		
KP1	"A new blue light sensitive human photoreceptor: optimizing lighting for non-visual functions"	
	Howard M. Cooper	1
KP2	"Science and Art: Experiments on Light, from Dante Alighieri to Van Gogh"	
	Paolo Di Trapani	3
	Session One: Technology & Application Horizons for Lighting (Session Joint with EPIC)	
IP3	"Overview of Lighting Technologies and Market Evolution"	
	Pars Mukish and Milan Rosina	5
IP4	"Advances in Lighting Technologies and Applications"	
	Heinz Seyringer	7
IP5	"EU Lighting Energy Consumption and Strategies to Reduce it"	
	Paolo Bertoldi	9
IP6	"OLEDs for lighting: from research to commercialization"	
	Tobias Schwab, M. Fröbel, S. Schubert, C. Fuchs, L. Müller-Meskamp,	
	S. Hofmann, R. Scholz, M. C. Gather and K. Leo	13
IP7	"Work and perspective of IEA-4E-SSL annex on LED lighting systems"	
	Peter Bennich, Nils Borg and Michael Scholand	15
Session Two: LED Systems & LED Metrology		
IP8	"Potential Energy Savings from LED Lighting and How to Make this Happen!"	,

	Colin J. Humphreys	21
IP9	"GaN-on-GaN Full Visible Spectrum LED Technology"	
	Mike Krames	23
IP10	"Lighting quality measures for interior lighting with LEDs: A review and outlood	ok"
	Martine Knoop	25
CP11	"High Luminous Flux Module for Clear LED Bulb"	
	Kenta Watanabe, Atsushi Motoya, Naoki Tagami and Makoto Horiuchi	29
CP12	"267 nm AlGaN UVC LED using p-AlGaN superlattice transparent hole-spreading contact layer"	
	Yuuya Kanazawa, Joosun Yun, Shiro Toyoda, Noritoshi Maeda, Norihiko Kamata and Hideki Hirayama	31

CP13	"Architectural Approaches to Enhance the Color Rendering Index of Phosphor in Glass for Application in White LED"	
	Jin Gyeong Park, Won Jin Kim, In Jea Lee, Joo Yeon Won	
	and Hyungeui Lee	33
CP14	"Optimization of high-voltage thin-film GaN LEDs on ceramic substrates"	
	M. L. Tsai, J. H. Yeh, T. C. Hsu and K. Y. Lai	35
CP15	"The impact of compositional and optical properties of the colour conversion elements of phosphor converted LEDs on the thermal load upon device oper-	
	Wolfgang Nemitz, Susanne Schweitzer, Christian Sommer, Paul Hartmann,	
	Paul Fulmek and Johann Nicolics	37
CP16	"Luminescence and Quenching Properties in GaPN revealed by Below-Gap Excitation"	
	Makiko Suetsugu, A. Z. M. Touhidul Islam, T. Hanaoka, T. Fukuda, Norihiko Kamata, S. Yagi and Hiroyuki Yaguchi	41
CP17	"Nonradiative Recombination Process in AlGaN Quantum Well and Its Excitation Density Dependence"	
	M. Julkarnain, A. Z. M. Touhidul Islam, T. Takeshi, T. Fukuda,	
	Norihiko Kamata and Hideki Hirayama	43
CP18	"Effect of light emitting pattern on light extraction efficiency of white-light	LEDs"
	Chao-Chi Chung, Hong Yu Lin and Cheng-Yi Liu	45
CP19	"Optical Degradation of Single and Multiphase Liquid Cooled LED Systems	5"
	Enes TamdoĞan and Mehmet Arik	47
IP20	"Monolithic integration of multi-colors in InGaN-based LEDs with three dimensional microfacet structures for the next generation lighting"	
	Yoichi Kawakami and Mitsuru Funato	49
LP21	"The Rebound Effect and the Impact on Lighting"	
	Stuart A. Mucklejohn, Jonathon E. Porritt and Sarah Tulej	51
IP22	"ASSISTing LED metrology"	
	Nadarajah Narendran	55
	Session Three: Legacy & Novel Light Sources	
IP23	"An overview of the impact of dimming metal halide discharge lamps"	
	Stuart A. Mucklejohn	57
LP24	"Development of Advanced Gas-Cooled 'LED Filament' Lamps"	
	James D. Hooker, Walter Schaaf, Joris Achten, Wim Vinckx and Lode Derhaeg	63

IP25	"Spectral Control of Thermal Radiation by Metasurface"	
	Junichi Takahara	69
LP26	"Properties of flat plane-emission panel with diode structure employing highly crystallized SWNTs as a field emitter"	
	Norihiro Shimoi, Daisuke Abe, Toshimasa Hojo, Sharon Marie Garrido, Yasumitsu Tanaka and Kazuyuki Tohji	71
LP27	"Fabrication of high performance lighting lamp with carbon nanotube based electron beams (C-beams)"	
	Kyu Chang Park, Jung Su Kang and Kyo Jun Song	75
CP28	"Preliminary study of a phosphor-conversion white light source using a blue laser diode"	
	Christophe Catalano, Gerald Ledru, Georges Zissis and Leena Tähkämö	77
CP29	"Pressure evolution in the first operation period of discharge lamps"	
	Sonja Ceulemans, Peter Heymans, Alessio Corazza, Calogero Sciascia and Stefano Giorgi	79
CP30	"Light source on the base of a (rare gas + water vapor)-discharge: up-to-date results and prospects"	
	Nikolai Timofeev, Georges Zissis, Ekaterina Artamonova, Tatyana Artamonov Antonina Beliaeva, Michail Khodorkovskii, Alekasey Melnikov, Darryl Michael, Dimitri Mikhailov, Sergey Murashov, Alexander Pastor, Lidia Rakcheeva and Pavel Serdobintsev	va, 81
CP31	"Electroded and microwave photometric properties of HgTlI metal halide lam	os"
	Mohamad Hamady, Graeme Lister and Georges Zissis	83
CP32	"Characterization of Discharge Arc Flicker in High-Intensity Discharge Lamp	s"
	Joerg Schwieger, Marcus Wolff, Bernd Baumann, Freddy Manders	
	and Jos Suijker	85
CP33	"A feasibility study on efficacy enhancement of incandescent light sources by candoluminescence"	
	Hideki Motomura, Spiros Kitsinelis, Yoshihisa Ikeda and Masafumi Jinno	89
CP34	"The influence of gas convection rate in capacitive discharge excilamps to energy and resource parameters"	
	Eduard Sosnin, Aleksei Pikulev, Victor Panarin and Victor Tarasenko	91
LP35	"Very low mercury content fluorescent lamps"	
	Alessio Corazza, Calogero Sciascia, D. Di Giampietro, G. Santella, Armin Konrad, Achim Hilscher, C. Harzig and R. Stegmueller	93
LP36	"Pulse-periodic UV radiation source with a small-size"	
	Eduard A. Sosnin, Victor F. Tarasenko, Edgenil Kh. Baksht and Michael V. Erofeev	97

IP37	"Compositions of Mercury Isotopes for More Efficient Lighting" Mark G. Raizen and James E. Lawler	101
	Session Four: Intelligent Lighting Systems, Drivers & Controls	
IP38	"Intelligent Lighting and the Industrial Internet"	
	Ryosuke Kubota, Armin Mayer and László Balázs	103
IP39	"LED drivers: a ballancing act"	
	John Schönberger, Giulio Borsoi and Istvan Bakk	105
IP40	"Challenges and technologies for connected LED lamps"	
	L.A.Marcel de Jong, B.J.W. ter Weeme and J.E. de Vries	115
CP41	"A future in Sustainable lighting using lighting controls: A study into pedestrian street lighting analyzing user comfort, perception and safety"	
	Harita S. Undurty and Effrosyni Stragali	117
CP42	"External Electrode Fluorescent Lamp Sinusoidal and Square Waveform Driv	ving"
	Walter Kaiser and R. P. Marques	121
CP43	"Influence of the pulsed power supply on sodium lamp"	
	Walid Nsibi, Abdelelil Chammam, Mohamed Nejib Nehdi, Anis Sallam, Brahim Mrabet and Georges Zissis	125
CP44	"Dynamic Behaviour of HPS Lamp supplied by a non conventional Pulsed Current"	
	Walid Nsibi, Abdelelil Chammam, Mohamed Nejib Nehdi, Anis Sallemi, Brahim Mrabet and Georges Zissis	127
CP45	"Effects of Compact Fluorescent Lamps on Power Quality of Electricity Distribution Networks"	
	Abdelelil Chamman and Brahim Mrabet	129
CP46	"Power Consumption & Luminous Performances of Energy Saving Lamps under Wide Voltage Variations"	
	Rikardo Simanjuntak, Pascal Dupuis, Ngapuli Sinisuka and Georges Zissis	131
CP47	"EMC questions during the development of LED drivers"	
	Róbert Istók	137
CP48	"Dependence of Characteristics on the LED Operating Voltage in the Operating Circuit Based on Cockcroft-Walton Circuit"	
	Koki Motosugi, Yoshio Watanabe and Kunihiko Kanetaka	141

LP49	"E+GRID: Energy-positive adaptive street lighting"	
	Roland Bátai, Laszlo Balázs, Tibor Révész, Gianfranco Pedone, Andras Kovács and Laszlo Prikler	145
IP50	"Flicker effect of lighting systems based on AC-LEDs"	
IP51	Lu Shiming, Liu Lei and Yu Anqi "Creating a Natural Feeling in Partially Daylit Spaces: Lighting Controls for Blending LED & Daylight"	149
	Helmar G. Adler	155

Session Five: Light Source Materials & Diagnostics

IP52	"Advanced packaging methods for high-power LED modules"	
	Rafael C. Jordan, Constanze Weber, Christian Ehrhardt and Martin Wilke	157
LP53	"Phosphor particle number and photon recycling"	
	Tsung-Hsun Yang, Yu-Yu Chang, and Ching-Cherng Sun	169
LP54	"High Light Extraction Phosphor Films for High Power Solid-State Lighting"	
IP55	Hisham Menkara, Arun Thamban, Mazen Minkara and Burkhard Schupeta "Narrow-band Red Emitting Phosphors: Creating High Performance LED Light Sources and Fixtures"	173
	Ashfaqul I. Chowdhury	183
CP56	"Dryer in LED encapsulants: a theoretical approach"	
	Calogero Sciascia and Alessio Corazza	187
CP57	"A bibliography of phase diagrams & thermodynamic properties of metal halide systems of interest to HID lamp development"	
	Stuart A. Mucklejohn, Hugh Davies, Alan Dinsdale and Torsten Markus	191
CP58	"Corrosion effects of metal iodides on ceramic arc tubes of metal halide lamp	s"
	Nisheng Cai, Qiuyi Han and Shanduan Zhang	205
CP59	"Effect of cavity length on the convective heat transfer through a circular heat sink for LEDs"	
	Khaoula Ben Abdelmlek, Zouhour Araoud, Kamel Abderrazak, Kamel Charrada and Georges Zissis	207
CP60	"Predictive model for homogenous large surface area lighting development"	
	Zoltan Toth, Szabolcs Beleznai, Pal Koppa, László Balázs and M. Makkai	209
CP61	"Mercury release from solid lamp amalgams: Is Zn-Hg "safer" than Sn-Hg?"	
	Tryggvi Emilsson, Steve Hansen and Duane Miller	215
CP62	"Adhesive bonding of LED substrates to heat sinks in retrofit LED lamps"	
	Wim Vinckx, Walter Schaaf and James D. Hooker	217

CP63	"Evaluation System for Uniformity of Lighting Fixture using Display Images"	,
	Kyohei Nakamura, Tadashi Murakami and Naohiro Toda	221
CP64	"Nonradiative and Trap Centers in Ba3Si6O12N2:Eu2+ Phosphors Observed by Thermal and Below-Gap Excitation"	
	Tingting Li, Norihiko Kamata, Takeshi Fukuda and Tomoyuki Kurushima	223
CP65	"Study of the temperature distribution within the phosphor regions of WLEDs	"
	Te-Yuan Chung, Shih-Chen Chiou, Ching-Cherng Sun, Tsung-Hsun Yang and Szu-Yu Chen	227
CP66	"Temperature Effects on Dibromomethane Gas Mixtures"	
	Tom Gallagher, Mark Yang, Ken G.Unfried, Dave Trempel and Walker Burnette	231
LP67	"Camera as a Sensor for Mixed Color Solid-Sate Luminaires"	
	Danijel Maricic, Ramanujam Ramabhadran and David Smith	233
LP68	"Study of acoustic resonance and its suppression for HPS lamps"	
	Feng Tian, Weibin Cheng, Georges Zissis and Fang Lei	239
LP69	"Evaluation of visual perception enhancement effect by pulsed operation of L	EDs"
	Hideki Motomura, Yoshihisa Ikeda and Masafumi Jinno	243
LP70	"Development of temperature measurement system for LED junction using pulsed-laser Raman scattering"	
	Yukihiko Yamagata, Makoto Horiuchi, Kentaro Tomita and Yoshio Manabe	245
IP71	"An accelerated test method for estimating LED system life"	
	Nadarajah Narendran and Yi Wei Liu	249
	Session Six: Lighting Applications & Metrics	
IP72	"High CRI LED Lighting for Art Illumination"	
	Stephan Malkmus and Tobias Schmidt	251
IP73	"Lighting the Mona Lisa painting"	
	Marc Fontoynont & Multiple Collaborators	253
LP74	"Light-emitting diodes: a tool for growth and metabolism handle"	
	G. Samuolienė, A. Brazaitytė, P. Duchovskis, A. Viršilė, R. Sirtautas, J. Jankauskienė, S. Sakalauskienė, A. Čeidaitė, V. Vaštakaitė, A. Sasnauskas	259
CP75	"Smart lighting engine for artwork-specific illumination with controlled photochemical safety"	
	Arūnas Tuzikas, Artūras Žukauskas, Rimantas Vaicekauskas, Andrius Petrulis, Michael Shur and P. Vitta	263

CP76	"High power density LED modules for UV curing"	
	Qiuyi Han, Zhong Jing and Shanduan Zhang	265
CP77	"High Pressure Discharge Lamp for Collagen Regeneration in the Skin"	
	Lode Derhaeg and James D. Hooker	267
CP78	"The importance of vertical illuminance and of the vector component of the illumination light in obstacle visibility of the road"	
	Masayoshi Kimura, Hirohito Uchino, Yoshihisa Ikeda, Hideki Motomura and Masafumi Jinno	271
CP79	"Verification of the importance of vertical illuminance and of the vector component of road illumination light"	
	Masayoshi Kimura, Hirohito Uchino, Yoshihisa Ikeda, Hideki Motomura and Masafumi Jinno	273
CP80	"Exciplex lamps for determination of antibiotic susceptibility of Pseudomonas aeruginosa strains"	
	Eduard Sosnin, Oksana Zdanova, El'Vira Kashapova, Alexandra Gritsuta and Victor Artyukhov	275
CP81	"Conversion and Application between photosynthetic photon flux and Illuminance in Plant Lighting"	
	Dan Gao, Qiuyi Han, Yali Zhang and Shanduan Zhang	279
CP82	"Implementing mesopic photometry in outdoor lighting - CIE Technical Committee JCT-01"	
	Teresa Goodman, Stuart A. Mucklejohn, Liisa Halonen and Marjukka Puolakka	281
CP83	"Creating tunable white light with high CRI using six LED units"	
	Yuzhang Jin, Qiuyi Han and Shanduan Zhang	287
CP84	"A study on the appearance of Japanese paintings under White LEDs"	
	Kazuki Sawaki, Nozomu Yoshizawa, Takumi Fujiwara and Takeshi Miyashita	289
CP85	"High-performance LED luminaire with accurate projection for large-area field illumination in sports ground"	
	Ching-Cherng Sun, Xuan-Hao Lee, Jhih-You Cai, Yi-Chien Lo, Ming-Shiou Tsai and Zheng-Yu Tsai	295
CP86	"Comparisons of Different Proportions of Green to White Light LEDs on Energy Saving and Visual Acceptability under Mesopic Vision"	
	Han Chen, Yu-Yu Chang, Ching-Cherng Sun and Yi-Chun Chen	299
CP87	"Proposal for voluntary label to indicate the equivalence of luminous intensity distribution on the basis of measurements of LED lamps for households"	
	Leena Tähkämö, Niko Rolamo and Liisa Halonen	301

	Session Seven: OLED systems	
	Mark S. Rea	345
IP96	"Luminous Intensity: Trouble with the curve"	
	Yuki Minoda and Kent Larson	339
LP95	"An experimental report of a novel subjective lighting evaluation scheme using an online computer graphic system and crowd-sourcing"	
	David Lu and Weijun Li	335
LP94	"Test and Criteria for Fast LED Luminaire Lumen Maintenance Life Qualification"	
	Kevin Vick and Gary Allen	329
LP93	"Quantifying Consumer Lighting Preference"	
	Yukio Akashi and Kyota Morimoto	327
IP92	"LED street lighting improving visual performance and scene brightness through mesopic photometry"	
	Harpreet Singh Grover, Francis P. Dawson, Markus Lieberer, Dave M. Camm and Yann Cressault	321
CP91	"Modelling of a Vortex Water-Wall Argon Arc Lamp for Rapid Thermal Annealing Applications"	
	Harpreet Singh Grover, Francis P.Dawson, Markus Lieberer, Dave M.Camm and Yann Cressault	315
CP90	"Control of Wafer Temperature Using a Vortex Water-Wall Argon Arc"	
	Anatoly Sh.Chernyak, Alexey A.Bartsev and Alexey A.Korobko	311
CP89	"Outdoor lighting measurements by digital mobile laboratory"	
	Jianjun Liu, Haibing Li, Hairong Liang and Wenzheng Lin	307
CP88	"A new spectral measurement scheme for intense pulsed light"	

IP97	"How to improve light emission in OLEDs"	
	Kristiaan Neyts, M. Callens and P. De Visschere	353
LP98	"The ODALINE project: OLED luminaires for indoor environmental applicat	ions"
	Valerio R.M. Lo Verso, Anna Pellegrino, Chiara Aghemo, Sabrina Fiorina and Gabriele Piccablotto	357
LP99	"Intelligent light Management for OLED on foil Applications: Automotive realight Demonstrator Implementation"	ar
	Marco Mos, FrancoMarcori and Sara Padovani	363
LP100	"Transmissive One-Side-Emission OLED Lighting Panel with Stripe Electrod	es"
	K. Sugi, A. Amano, D. Kato, T. Sawabe, T. Sugizaki, H. Kakizoe, T. Ono, S. Enomoto, Y. Shinjo and Y. Nakai	367

LP101	"Approaches for stabilized deep blue emission in polyfluorene-based solution processed OLEDs"		
	Umberto Giovanella, Mariacecillia Pasini, Wojciech Mróz, Barbara Vercelli, Francesco Galeotti, Silvia Destri and Chiara Botta	369	
CP102	CP102: "Improved light extraction from OLEDs employing microlens arrays prepared by breath figure templates"		
	Wojciech Mróz, Guido Scavia, Chiara Botta, Umberto Giovanella and Francesco Galeotti	373	
CP103	CP103: "Study of electric and photometric behavior of the organic light emitti diodes for lighting which has undergone an accelerated ageing"	ng	
	Alaa Alchaddoud, Laurent Canale, Pascal Dupuis and Georges Zissis	375	
IP104	"Electroluminescent Materials for White Organic Light Emitting Diodes"		
	Gianluca Maria Farinola and Roberta Ragni	379	
IP105	"OLED encapsulation: critical aspects and solutions"		
	Jabril Gigli, Stefano Tominetti, Marco Mudu, Alesssandra Colombo and Paolo Vacca	389	
Session Eight: UV-VIS-IR Lighting Applications			
IP106	"Photobiological Safety in Lighting Applications"		

	Leslie Lyons	391
IP107	"Application of LED in protected horticulture"	
	Yang Qichang, Xu Zhigang, Liu Wenke, Fang Wei, Wei Lingling, Tong Yuxin and Li Kun	399
IP108	"OLEDs for lab-on-chip applications"	
	Patrizia Melpignano, Alessandro Marcello, M. Manzano and N. Vidergar	407
LP109	"Residential lighting preference and perception study for Chinese population"	,
	Gu Chunshi, Norbert Linder, H. Luoxi and C. Yaodong	409
	Session Nine: Colours and Human Factors (Joint Session with Italian Colour Group)	
IP110	"Experiencing the past by virtual luminous environment"	
	Fabio Bisegna	417
IP111	"Perceived and measured hues under different sources"	
	Laura Bellia, Alessia Pedace and Emanuela Stefanizzi	423
IP112	"Color rendering: The forest and the trees"	
	Mark S. Rea and Jean Paul Freyssinier	429

CP113	"Optimization of a polychromatic solid-state source of light for the dynamical control of circadian rhythms"	
	Andrius Petrulis, Rimantas Vaicekauskas and Artūras Zukauskas	433
CP114	"The effects of purple peak-wavelength of White LEDs on the appearance of colour charts and oil paintings"	
	Jumpei Mitsuhashi, Nozomu Yoshizawa, Takumi Fujiwara and Takeshi Miyashita	435
CP115	"Measurement and Theoretical Calculation of the Blue Light Hazard of Light-Emitting Diodes"	
	Jie Liu, Qiuyi Han and Shanduan Zhang	441
CP116	"Mixed-Color LED Lighting with Circadian Benefits"	
	You Jin Tam, Vineetha Kalavally and Jussi Parkkinen	443
CP117	"Validation of the Kruithof rule in an outdoor environment using a smart solid-state lighting engine"	
	Andrius Petrulis, Arunas Tuzikas, Pranciškus Vitta, Rimantas Vaicekauskas and Artūras Zukauskas	449
CP118	"Nonlinear additivity of visual perception on pulsed red and green light"	
	Shenglong Fan, Xin Gu, Muqing Liu and Xiaolin Zhang	451
CP119	"The influence of pulse light on visual comfort and visual performance"	
	Xin Gu, Shenglong Fan and Muqing Liu	453
CP120	"Investigation of Visual Comfort with Dynamic Colourful LED Billboards"	
	Meng-Wei Lin, Ming-Wei Lee, Erik C. Chang and Yi-Chun Chen	455
IP121	"Evaluation of colour shifts under different light sources following Hering's natural colour system"	
	Osvaldo da Pos and Pietro Fiorentin	459
IP122	"Color-rendition analysis of light sources by a chromatic adaptation model based on the OSA-UCS system"	
	Claudio Oleari and Manuel Melgosa	461
IP123	"Solid-state lighting: colour rendition metrics and beyond"	
	Arturas Žukauskas	475
	Session Ten: Lighting Design	
IP124	"Design practice facing new technologies for Lighting"	
	Maurizio Rossi	477
IP125	"SSL in lighting systems: the point of view of lighting producers"	
	Fabio Zanola	483

IP126	"User Experience Design in Solid State Lighting"	
	Helmar Adler	485
IP127	"Light and Health: What we know, what we don't know, and what we need to know"	
	Mariana G. Figueiro	489
CP128	"New Light Vision: Lighting for elderly users in domestic environments"	
	Federico Casotto, E. Angelini, Carlo D'Alesio and P. Santoro	495
CP129	"Energy balances for lighting systems - Quantifying the impact of maintenance factors"	
	Stuart A. Mucklejohn, Julie Gore and Anna L. Whittaker	499
CP130	"Optical design of LED tunnel lighting with low glare effect"	
	Xuan-Hao Lee, Ming-Shiou Tsai, Yi-Chien Lo and Ching-Cherng Sun	505
CP131	"LEDs based lighting Design, receipts for enhancing the colours of urban materials: a preliminary exploration"	
	Maurizio Rossi, Fulvio Musante and Daria Casciani	507
CP132	"Effect of Spectral Characteristics of Metameric Illuminant on Glare Perception	on"
	Toshihiro Toyota, Taka-Aki Suzuki, Wataru Shichi, Takashi Funai and Tsuyoshi Mano	513
IP133	"Lighting design for the industrial sector focused on comfort and human aspe	cts"
	Christian Mazzola	517
IP134	"Light first. LED is more"	
	Laura Cinquarla	521
IP135	"Redefining the Purpose of General Lighting Practice"	
	Christopher Cuttle	525
	Post-Deadline Paners	

Post-Deadline Papers

CP136	"Modeling of the dynamic interaction "Power System - HPS Lamps" by the	
	methodology of design of experiments (MPE)"	
	M. Ziane, K. Medles, A. Tilmatine, Laurent Canale and Georges Zissis	533