



# LDC2017 PROGRAM

## LASER DISPLAY and LIGHTING CONFERENCE

Apr. 19 (Wed.) – 21 (Fri.), 2017

Pacifico Yokohama, Yokohama, Japan

### ■ Wednesday, April 19 AM

#### OPIC Plenary Session

<Room 501+502>

9:00-12:10

### ■ Wednesday, April 19 PM

#### LDC & LEDIA Joint Session

<Room 301>

[LED-LDC1] 13:30-17:20

#### LEDIA & LDC Joint Session

Chairs: Ryuji Katayama

Osaka University, Japan

Sunao Kurimura

National Institute for Materials Science, Japan

Opening Remarks : 13:30-14:00

Hiroshi Amano

Nagoya University, Japan

Kazuo Kuroda

Utsunomiya University, Japan

LED-LDC1-1 : 14:00

Invited

IQE Quantification of Nitride Semiconductors  
-Omnidirectional Photoluminescence (ODPL)  
Measurement Utilizing an Integrating Sphere-

Kazunobu Kojima<sup>1</sup>, Hirotaka Ikeda<sup>2</sup>, Kenji Fujito<sup>2</sup>,  
Shigefusa F. Chichibu<sup>1</sup>

<sup>1</sup>Tohoku University, Japan, <sup>2</sup>Mitsubishi Chemical  
Corporation, Japan

LED-LDC1-2 : 14:30

Invited

IQE Quantification of Nitride Semiconductors  
-Photocurrent and Photoluminescence Measurements  
for InGaN Based LED-

Shigeyoshi Usami, Yoshio Honda, Hiroshi Amano

Nagoya University, Japan

LED-LDC1-3

15:00

Invited

IQE Quantification of Nitride Semiconductors  
-Simultaneous Photo-acoustic and Photoluminescence  
Measurements for InGaN Quantum Wells-

Atushi A. Yamaguchi<sup>1</sup>, Takashi Nakano<sup>1</sup>, Shigeta  
Sakai<sup>1</sup>, Haruki Fukada<sup>1</sup>, Yuya Kanitani<sup>2</sup>, Shigetaka  
Tomiya<sup>2</sup>

<sup>1</sup>Kanazawa Institute of Technology, Japan, <sup>2</sup>Sony  
Corporation, Japan

----- 15:30-15:50 Break -----

LED-LDC1-4 : 15:50

Invited

Output Power Improvement of High-Power Blue Laser  
Diode with Modulated AlGaIn Cladding and n-type  
InGaIn/GaN Superlattice Waveguide Layers

C.L. Wu<sup>1</sup>, J.D. Wu<sup>2</sup>, Y.L. Lai<sup>2</sup>, K.Y. Liao<sup>2</sup>, C.L. Lin<sup>2</sup>, Y.L.  
Li<sup>2</sup>, S.H. Teng<sup>1</sup>,

<sup>1</sup>National Taiwan Univ., Taiwan, <sup>2</sup>PlayNitride Inc.,  
Taiwan

LED-LDC1-5 : 16:20

Invited

Holographic display and its computational techniques  
Tomoyoshi Shimobaba, Takashi Kakue, Tomoyoshi Ito  
Chiba Univ., Japan

LED-LDC1-6 : 16:50

Invited

Projection Mapping

Hisayo Yoshida

PICS, Japan

**OPIC Reception** 18:00-20:00

<Room 501+502>



# LDC2017 PROGRAM

■Thursday, April 20

LDC <Room 301>

## [Opening] Opening Remarks

9:00-9:10

Kazuo Kuroda

Utsunomiya University, Japan

[LDC1] 9:10-10:30

## Plenary Session

co chairs: Tetsuya Yagi

Mitsubishi Electric Corp., Japan

Shevlin Fergal

Dyoptika, Ireland

LDC1-1 : 9:10 Plenary

The initiatives of market direction and activation of the Gallium Nitride based Laser Diode for Laser Display

Shigeki Okauchi, Atsutomo Hama

Nichia Corp., Japan

LDC1-2 : 9:50 Plenary

Laser phosphor based projector

Fei Hu

Appotronics, China

[LDC2] 11:00-12:00

## Projection Technology

co chairs: Satoshi Ouuchi

Hitachi, Ltd., Japan

Jae Kwon

LG Electronics, Korea

LDC2-1 : 11:00

Performance of RGB laser based projection for Video walls

Peter Hickl

Barco, Germany

LDC2-2 : 11:15

Laser Beam Scanning Short Throw Displays and an Exploration of Laser-Based Virtual Touchscreens

Jari O. Honkanen, P. Selvan Viswanathan

MicroVision Inc., USA

LDC2-3 : 11:30

Image Quality of Retinal Projection Laser Eyewear: How to Achieve High Resolution and Free Focus in Proper Balance

Makoto Suzuki, Kenji Yasui, Kinya Hasegawa, Nori Miyauchi and Mitsuru Sugawara

QDLaser, Inc., Japan

LDC2-4 : 11:45

Electro-Optic Bragg Diffraction Type Spatial Light Modulator Using Periodically Poled Structures for Laser Displays

Yuta Hayashi, Toshiyuki Inoue, Hiroshi Murata, Atsushi Sanada

Osaka Univ., Japan

[LDCp3] Poster Session : 13:00-15:00

<Exhibition Hall A>

LDCp3-1

Fiber coupled high-brightness blue direct-diode lasers

Shingo Uno

Shimadzu Corp., Japan

LDCp3-2

Controllable harmonic generation by couplings of horizontal- and vertical- polarized components

Yiqiang Qin, Ding Zhu, Chao Zhang

Nanjing Univ., China

LDCp3-3

The development of protective eyewear for RGB laser

Yoshihisa Ishiba, Shinya Kajiri, Kenta Noda

Yamamoto Kogaku co., Ltd., Japan

LDCp3-4

Energy-Harvesting Laser Phosphor Display

Masamichi Ohta, Shunsuke Itaya, Yuuki Hirai,

Takamasa Kohmoto, Ichiro Fujieda

Ritsumeikan Univ., Japan



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LDCp3-5

Compact Helmet Display Based on Reflection Type Holograms

Wen-Kai Lin<sup>1, 2)</sup>, Wei-Ting Liu<sup>1)</sup>, Ying-Pin Tsai<sup>1)</sup>, Tsang-Hao Hsu<sup>1)</sup>, Bor-Shyh Lin<sup>2)</sup>, Fu-Li Hsiao<sup>1)</sup>, Wei-Chia Su<sup>1)</sup>

1) National Changhua Univ. of Education, Taiwan, 2) National Chiao Tung Univ., Taiwan

LDCp3-6

3D Display using Optimized Binary Phase Distribution from Computer Graphics(CG) Data

Takahiro Uemae, Koichi Nitta, Osamu Matoba  
Kobe Univ., Japan

LDCp3-7

Comparison between Reconstructed Full-color Images by Binary and Grayscale Phase Distributions

Syo Harada, Kouichi Nitta, Osamu Matoba  
Kobe Univ., Japan

LDCp3-8

Comparative Study of Blue Laser Diode driven Ce:YAG, Ce:LuAG, Ce:GAGG, and Ce:GdYAG Single Crystal Phosphors in Application of High-Power Lighting and Display Technologies

Mustafa H. Balci<sup>1)</sup>, Fan Chen<sup>1)</sup>, A. Burak Cunbul<sup>1)</sup>, Øyvind Svensen<sup>2)</sup>, M. Nadeem Akram<sup>1)</sup>, Xuyuan Chen<sup>1)</sup>  
1) Univ. College of Southeast Norway, Norway, 2) Barco Fredrikstad AS, Norway

LDCp3-PDP1

Laser Driven Phosphor Light Engine for High Lumen DMD Projector

A. Burak Cunbul<sup>1)</sup>, Mustafa H. Balci<sup>1)</sup>, Xuyuan Chen<sup>1)</sup>, Øyvind Svensen<sup>2)</sup>, M. Nadeem Akram<sup>1)</sup>

1) Univ. College of Southeast Norway, Norway, 2) Barco Fredrikstad AS, Norway

LDCp3-PDP2

An Instrument to Measure the Photometric Quantity and Color of RGB Laser Displays

K. Hieda, T. Maruyama, T. Takesako, F. Narusawa

HIOKI E. E. CORP., Japan

LDCp3-PDP3

Spectroradiometric Measurements of Laser Projector and Tablet Display Chromaticity Coordinates

Alexandre Y. Fong and Austin Dowd  
Gooch and Housego, USA

[LDC4]15:30-17:30 <Room 301>

**Laser Diode & LED**

co chairs: Tomoyuki Miyamoto

Tokyo Inst. Tech., Japan

Charles Li

PlayNitride Inc., Taiwan

LDC4-1 : 15:30 Invited

GaN-based VCSELs towards high efficiency

T. Takeuchi<sup>1)</sup>, S. Kamiyama<sup>1)</sup>, M. Iwaya<sup>1)</sup>, I. Akasaki<sup>1), 2)</sup>

1) Meijo Univ., Japan, 2) Nagoya Univ., Japan

LDC4-2 : 16:00

High-power and highly-reliable 638 nm band BA-LD for CW operation

T. Nishida, K. Kuramoto, S. Abe, M. Kusunoki, M. Miyashita, T. Yagi

Mitsubishi Electric Corp., Japan

LDC4-3 : 16:15

Master Oscillator Power Amplifier Concepts with Nearly Diffraction-Limited Watt-Level Continuous Wave Emission at 635 nm for Laser Projection

N. Werner, G. Blume, D. Feise, J. Pohl, P. Ressel, D. Prasai, K. Paschke, G. Tränkle

Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik, Germany

LDC4-4 : 16:30

Improvement of WPE of Laser Diode by Conversion of Spontaneous Surface-emission to Edge-emission via Radiation Mode

Junichi Kinoshita

Osaka Univ., Japan



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LDC4-5 : 16:45

Study on AlGa<sub>N</sub>-Based High-Voltage Ultraviolet Light-Emitting Diodes for White Light Applications  
Ray-Hua Horng, Chen-Hao Kuo, Ching-Ho Tien, Dong-Sing Wu  
National Chiao Tung Univ., Taiwan

LDC5-4 : 10:00

A New Measurement Method Suitable for Color and Photometric Quantity of Laser Displays  
K.Hieda, T.Maruyama  
HIOKI E.E. CORP., Japan

LDC4-6 : 17:00 Invited

Building the ECO-System for the Digital Electro-optics Platform (X-on Silicon)  
Kenneth Tai  
Jasper Display Corp., Taiwan

LDC5-5 : 10:15

Efforts to realize wide color gamut, high brightness projector  
Masaya Masuda, Daisuke Hayashi, Shunji Kamijima  
Seiko Epson Corp., Japan

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----- 10:30-10:45 Break -----

## Friday, April 21

[LDC5] 9:00-10:30 <Room 301>

### Color Speckle & Management

co chairs: Shigeo Kubota  
Oxide Corp., Japan  
Young-Joo Kim  
Yonsei Univ., Korea

[LDC6] 10:45-11:45

### Speckle Reduction

co chairs: Hiroshi Murata  
Osaka Univ., Japan  
Lung-Han Peng  
National Taiwan Univ., Taiwan

LDC5-1 : 9:00 Invited

Direct Measurement of Color Speckle II Modification of 2D Colorimeter  
Kazuo Kuroda<sup>1)</sup>, Junichi Kinoshita<sup>2)</sup>, Hiroyuki Tanaka<sup>3)</sup>, Ryushi Fujimura<sup>1)</sup>, Kazuhisa Yamamoto<sup>2)</sup>  
1) Utsunomiya Univ., Japan, 2) Osaka Univ., Japan, 3) Topcon Technohouse, Japan

LDC6-1 : 10:45 Invited

Simulation and Fabrication to the Speckle Reduction in Compact Optical Engine for Laser Projection Displays  
Young-Joo Kim, Jae-Yong Lee, Se-Hwan Jang, Sungbin Jeon, No-Cheol Park  
Yonsei Univ., Korea

LDC5-2 : 9:30

Color Speckle Measurement Errors for Uncorrelated XYZ Filter-Sensor System  
Junichi Kinoshita<sup>1)</sup>, Kazuhisa Yamamoto<sup>1)</sup>, Kazuo Kuroda<sup>2)</sup>  
1) Osaka Univ., Japan, 2) Utsunomiya Univ., Japan

LDC6-2 : 11:15

Speckle Contrast Measurement Rigorously in Human Eye Response Time  
Koji Suzuki, Shigeo Kubota  
Oxide Corp., Japan

LDC5-3 : 9:45

Measurement of Angular Characteristics of Speckle Contrast  
Shogo Kubota, Makio Kurashige, Kazutoshi Ishida  
Dai Nippon Printing Co., Ltd., Japan

LDC6-3 : 11:30

Laser Speckle Reduction by Using Motionless Image Conduits  
Zhaomin Tong<sup>1)</sup>, Wenzhi Cheng<sup>1)</sup>, Shaohua Song<sup>1)</sup>, Zhuo Cai<sup>1)</sup>, Yifei Ma<sup>1)</sup>, Xuyuan Chen<sup>1),2)</sup>, Weiguang Ma<sup>1)</sup>, Liantuan Xiao<sup>1)</sup>, Suotang Jia<sup>1)</sup>  
1) Shanxi Univ., China, 2) Univ. College of Southeast Norway, Norway



# LDC2017 PROGRAM

[LDC7]13:15-15:15

## Advanced Laser & Lighting

co chairs: Tetsuya Yagi

Mitsubishi Electric Corp., Japan

Masafumi Ide

Magic Leap, Japan

LDC7-1 : 13:15 Invited

Compact RGB laser sources

K. Paschke, G. Blume, N. Werner, J. Hofmann, R. Bege,

D. Feise, A. Sahm

Ferdinand-Braun-Institut, Leibniz-Institut für  
Höchstfrequenztechnik, Germany

LDC7-2

13:45

30 W CW Red fiber Laser for RGB laser system

Surin A.A., Borisenko T.E., Stirmanov Y.S.

“IRE-Polus” Ltd (IPG Photonics Russian department),  
Russia

LDC7-3 : 14:00

Speckle Reduction Using Fiber-laser Pumped $\chi^{(2)}$

Nonlinear Photonic Crystals with Double-slit Structures

Seong-Jin Son<sup>1)</sup>, Hsin-Jung Lee<sup>2)</sup>, Ya-Ching Huang<sup>2)</sup>, Do-

Kyeong Ko<sup>1)</sup>, Lung-Han Peng<sup>2)</sup>, Nan Ei Yu<sup>1)</sup>

1) Gwangju Institute of Science and Technology, South

Korea, 2) National Taiwan Univ., Taiwan

LDC7-4 : 14:15

Compact Microchip-seeded Multistage MOPA System  
for Laser Induced Breakdown Applications

V. Yahia, T. Taira

Institute for Molecular Science, Japan

LDC7-5 : 14:30 Invited

Liquid Crystal Display with RGB Laser Backlight

Y. Fujii, E. Niikura, N. Okimoto, S. Maeda, H. Yasui, A.

Heishi

Mitsubishi Electric Corp., Japan

LDC7-6 : 15:00

Simple and Small Holographic RGB Illumination Unit  
~ Egarim ~

Toshihiro Kasezawa<sup>1)</sup>, Hideyoshi Horimai<sup>1)</sup>, Hiroshi  
Tabuchi<sup>2)</sup>, Toshitaka Nara<sup>2)</sup>, Tsutomu Shimura<sup>3)</sup>

1) Egarim Co., Ltd, Japan, 2) Okamoto Glass Co., Ltd.,  
Japan, 3) The Univ.of Tokyo, Japan

----- 15:15-15:30 Break -----

[LDC8] **Postdeadline session** 15:30-15:50

Chair: Sunao Kurimura

National Inst. for Materials Science, Japan

LDC8-1 : 15:30

Fibrance® Enables Laser For Everyday Light and  
Decoration

Qing Tan<sup>1)</sup>, Mario Pannicia<sup>1)</sup>, Kevin Sullivan<sup>1)</sup> Kevin  
Sullivan<sup>1)</sup>, Gerald Schmidt<sup>2)</sup>, Carl Crossland<sup>2)</sup>, Peter

Wigley<sup>2)</sup>, and Yasuyuki Kagawa<sup>3)</sup>

1) Versalume LLC, USA, 2) Corning Incorporated, USA,

3) Corning International K.K, Japan

LDC8-2 : 15:40

A high efficiency laser spotlight illuminator

T. Miwa<sup>1)</sup>, A.Takamori<sup>2)</sup>

1) IDEC Corp., Japan, 2) Osaka Univ., Japan

[Award & Closing] 15:50-16:10

**Award Ceremony** 15:50

**Closing Remarks** 16:00

Sunao Kurimura

NIMS, Japan