

SLPC2014

The First Smart Laser Processing Conference 2014

April 22–24, 2014

Pacifico Yokohama, Yokohama, Japan

<http://www.jlps.gr.jp/slpc2014/>

Advance Program

updated March 6, 2014

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Program

Oral Session

Day 1: Tuesday, April 22

Room 303

OPIC Plenary II-9

14:30 SLPC0-1 **Plenary** I000

Thrust areas of laser materials processing in the past, present and future, Reinhard Poprawe¹, Christian Hinke², Ingomar Kelbassa², ¹Fraunhofer Institute for Laser Technology ILT, Germany, ²Lasertechnology LLT at RWTH Aachen University, Germany
15:10 Break

Room 413

Opening

15:30 Opening remarks, Yasuhiro Okamoto (Okayama University, Japan)

Room 413

Session 1: Advanced Lasers and Optical Technologies for Smart Processing

Chairs: Andreas Ostendorf (Ruhr University, Germany)
Satoshi Wada (RIKEN, Japan)

15:45 SLPC1-1 **Invited** I002

Inline coherent imaging of laser materials processing: Development, diagnosis and control, Paul Webster^{1,2}, Cole Van Vlack¹, Christopher M. Galbraith², James M. Fraser², ¹Laser Depth Dynamics Inc., Canada, ²Queen's University, Canada

16:15 SLPC1-2 C003

A new 60 W 355 nm laser for precision manufacturing, Rajesh Patel¹, James Bovatsek¹, Ashwini Tamhankar¹, ¹Spectra Physics, USA

16:30 SLPC1-3 C005

Laser processing by using multi-level free-form 3D micro-fabricated DOE, Akihide Hamano¹, Atsushi Yamada¹, Takeshi Takada², Yoshiyuki Usuki¹, ¹Material Research Laboratory, R&D Division, Furukawa Co. Ltd., Japan, ²R&D Planning Department, R&D Division, Furukawa Co. Ltd., Japan

16:45 SLPC1-4 C016

The study of the phase difference of beam splitters structure in the fiber-optic Mach-Zehnder interferometer, Jun-Ting J. Huang¹, Chien-Hsing Chen², Chih-To Wang², Wei-Te Wu¹, ¹National Pingtung University of Science and Technology, Taiwan, ²National Chung Cheng University, Taiwan

17:00 SLPC1-5 C018

Development of the path generation algorithm for large-area laser pattern using the manual input control point, Kwangho Yoon¹, Kyunghan Kim¹, Jaehoon Lee¹, ¹Korea Institute of Machinery and Materials, Korea

17:15 SLPC1-6 C025

Fiber-delivery and compression of milli-Joule femtosecond pulses and micromachining, Benoit Debord¹, Madhoussoudhana Dontabactouny¹, Meshaal Alharbi¹, Coralie Fourcade-Dutin¹, Clemens Hönninger³, Eric Mottay³, Quentin Mocaer³, Luca Vincetti⁴, Frederic Gerome^{1,2}, Fetah Benabid^{1,2}, ¹GPPMM Group, Xlim Research Institute, France, ²GLOphotonics S.A.S, France, ³Amplitude Systèmes, France, ⁴University of Modena and Reggio Emilia, Italy

OPIC2014 Banquet

18:00 OPIC2014 Banquet (Room 501+502)

20:00

Day 2: Wednesday, April 23

Room 313+314

Session 2: Short Wavelength Applications

Chairs: Lin Li (The University of Manchester, UK)
Masahito Katto (Miyazaki University, Japan)

8:30 SLPC2-1 Invited I012

Update of EUV source development status for HVM lithography, Haku Mizoguchi¹, Hiroaki Nakarai¹, Tamotsu Abe¹, Takeshi Ohta¹, Krzysztof M Nowak², Yasufumi Kawasuji¹, Hiroshi Tanaka¹, Yukio Watanabe¹, Tsukasa Hori¹, Takeshi Kodama¹, Yutaka Shiraishi¹, Tatsuya Yanagida¹, Tsuyoshi Yamada¹, Taku Yamazaki¹, Shinji Okazaki¹, Takashi Saitou¹, ¹*Gigaphoton Inc., Oyama Facility, Japan*, ²*Gigaphoton Inc., Hiratsuka Facility, Japan*

9:00 SLPC2-2 Invited I017

Laser induced front side etching using Excimer laser, Klaus Zimmer¹, ¹*Leibniz Institute of Surface Modification, Germany*

9:30 SLPC2-3 C006

Straight through hole drilling in machinable ceramics, Susumu Nakamura¹, Takumi Miura², Masaya Tsuta², ¹*Department of Electrical and Electronic Systems Engineering, Nagaoka National College of Technology, Japan*, ²*Electrical & Mechanical Systems Engineering Advanced Course, Nagaoka National College of Technology, Japan*

9:45 SLPC2-4 C031

Improvement of junction properties of ZnO nanowire/GaN heterojunction using selective laser processing, Daisuke Nakamura¹, Norihiro Tetsuyama¹, Tetsuya Shimogaki¹, Mitsuhiro Higashihata¹, Tatsuo Okada¹, ¹*Kyushu University, Japan*

10:00 *Break*

Room 313+314

Session 3: Micro Nano Processing

Chairs: John Lopez (University of Bordeaux, CNRS, France)
Masayuki Fujita (Institute for Laser Technology, Japan)

10:30 SLPC3-1 Invited I006

Laser direct writing of graphene patterns on glasses under ambient condition, Yongfeng Lu¹, W. Xiong¹, W.J. Hou¹, L. J. Jiang¹, Jean-Francois Silvain^{1,2}, Lan Jiang³, ¹*University of Nebraska - Lincoln, USA*, ²*Institut de Chimie de la Matière Condensée de Bordeaux (ICMCB), CNRS, France*, ³*Beijing Institute of Technology, China*

11:00 SLPC3-2 Invited I010

Ultrashort pulsed laser processing: Laser quantum ejection from transparent thin film and their promising applications, Peter Herman¹, Kitty Kumar², Kenneth K. C. Lee¹, Jianzhao Li¹, Stephen Ho¹, Jun Nogami², ¹*Department of Materials Science and Engineering, University of Toronto, Canada*, ²*Department of Electrical and Computer Engineering, University of Toronto, Canada*

11:30 SLPC3-3 C004

Laser micromachining of bio-absorbable polymers: Impact of the laser process parameters on the machining throughput and quality, Frank Hendricks¹, Raj Patel², Victor Matylitsky¹, ¹*High Q Laser, Newport Corp., Austria*, ²*Spectra Physics, Newport Corp., USA*

11:45 *Lunch Time*

Exhibition Hall C

Session 4 : Poster

Chair: Masahito Katto (Miyazaki University, Japan)

12:30 **Poster Session**

14:15 *Break*

Room 313+314

Session 5: Ultrashort Pulsed Laser Processing I

Chairs: Yongfeng Lu (University of Nebraska-Lincoln, USA)
Mitsuhiro Terakawa (Keio University, Japan)

14:45 SLPC5-1 **Invited** I003
Parameters of influence in surface ablation and texturing of metals using high-power ultrafast laser, John Lopez¹, Marc Faucon², Raphael Devillard¹, Yoann Zaouter³, Clemens Hönninger³, Eric Mottay³, Rainer Kling², ¹University of Bordeaux, CNRS, France, ²ALPHANOV, France, ³Amplitude Systèmes, France

15:15 SLPC5-2 **Invited** I005
Double-pulsed ultrafast laser welding of glasses toward enhancement of process efficiency, Koji Sugioka¹, Sizhu Wu¹, Katsumi Midorikawa¹, ¹RIKEN, Japan

15:45 SLPC5-3 C030
Ultrafast mechanisms in semiconductor micro- and nano-processing by temporally shaped femtosecond laser pulses, Panos A Loukakos¹, Marios Barberoglou¹, David Gray¹, G. D. Tsididis¹, Emmanuel Stratakis¹, Costas Fotakis¹, ¹Foundation for Research and Technology - Hellas, Greece

Room 313+314

Session 6: Ultrashort Pulsed Laser Processing II

Chairs: Peter R. Herman (University of Toronto, Canada)
Masaki Hashida (Kyoto University, Japan)

16:30 SLPC6-1 **Invited** I011
Ultrafast laser processing: A new route to innovative manufacturing, Jiyeon Choi¹, ¹Department of Laser & Electron Beam Application, Korea Institute of Machinery and Materials, Korea

17:00 SLPC6-2 C008
Monolithic fabrication of electrofluidic glass microchips based on femtosecond laser direct-write technique, Jian Xu¹, Katsumi Midorikawa¹, Koji Sugioka¹, ¹RIKEN Center for Advanced Photonics, Japan

17:15 SLPC6-3 C024
Cutting strengthened glass using bursts of picosecond pulses from a MOPA fiber laser, David Gay¹, Louis Desbiens¹, Steeve Lavoie², Yves Taillon¹, ¹INO, Canada, ²Allied Scientific Pro, Canada

17:30 SLPC6-4 C033
Plasma expansion during laser structuring of metals with ps pulse bursts, Claudia Hartmann^{1,2}, Arnold Gillner², ¹Chair for Laser Technology, Technical University Aachen, Germany, ²Fraunhofer Institute for Laser Technology ILT, Germany

SLPC2014 Banquet

18:30 SLPC2014 Banquet (to be announced)

20:30

Day 3: Thursday, April 24

Room 313+314

Session 7: Additive Manufacturing and Advanced Surface Processing

Chairs: Reinhart Poprawe (Fraunhofer Institute for Laser Technology ILT, Germany)
Hitoshi Nakano (Kinki University, Japan)

8:30 SLPC7-1 Invited I016

Opportunities and challenges in laser 3D printing, Bo Gu¹, ¹*Bos Photonics, USA*

9:00 SLPC7-2 Invited I007

Advanced laser processing technology in BAMTRI, Shuili Gong¹, ¹*Beijing Aeronautical Manufacturing Technology Research Institute, P.R. China*

9:30 SLPC7-3 C014

Effect of defects on mechanical properties of 316 stainless steel fabricated by selective laser melting, Huaxue Li¹, Baiying Huang¹, Li Ding¹, Yudai Wang¹, Shuili Gong¹, ¹*Beijing Aeronautical Manufacturing Technology Research Institute, China*

9:45 SLPC7-4 Invited I013

Enhancement of fatigue properties of FSW joints of A6061 aluminum alloy by laser peening, Yuji Sano¹, Kiyotaka Masaki², ¹*Toshiba Corporation, Japan*, ²*Okinawa National College of Technology, Japan*

10:15 SLPC7-5 C013

Laser peening systems and the effects of laser peening on aeronautical metals sheet, Shikun Zou¹, Shuili Gong¹, ¹*Beijing Aeronautical Manufacturing Technology Research Institute, China*

10:30 *Break*

Room 313+314

Session 8: Bio-medical and Photonics Applications

Chairs: Eric Mottay (Amplitude Systemes, France)
Koji Sugioka (RIKEN, Japan)

11:00 SLPC8-1 Invited I004

Novel applications by femtosecond laser in electronics and medical device industries, Chung-Wei Cheng^{1,2}, Cen-Ying Lin², Ping-Han Wu², Kuang-Po Chang², Ji-Bin Horng², Wei-Te Wu³, Keng-Liang Ou^{4,5,6,7}, ¹*National Chiao Tung University, Taiwan*, ²*Industrial Technology Research Institute, Taiwan*, ³*National Pingtung University of Science and Technology, Taiwan*, ⁴*Taipei Medical University, Taiwan*, ⁵*Research Center for Biomedical Devices and Prototyping Production, Taipei Medical University, Taiwan*, ⁶*Research Center for Biomedical Implants and Microsurgery Devices, Taipei Medical University, Taiwan*, ⁷*Taipei Medical University-Shuang Ho Hospital, Taiwan*

11:30 SLPC8-2 Invited I009

Femtosecond laser generated optically generated sub-100 nm structures for biomedical and technical applications, Karsten Koening¹, Andreas Ostendorf², ¹*Saarland University, Germany*, ²*Ruhr University, Germany*

12:00 SLPC8-3 C001

Femtosecond laser integration of high-performance microoptical devices into 3D microchannel for optofluidic application, Dong Wu¹, Jian Xu², Sizhu Wu¹, Katsumi Midorikawa¹, Koji Sugioka^{1,2}, ¹*Laser Technology Laboratory, RIKEN, Japan*, ²*RIKEN-SIOM Joint Research Unit, RIKEN, Japan*

12:15 *Lunch Time*

Room 313+314

Session 9: Processing of CFRP

Chairs: Rajesh Patel (Spectra Physics, USA)
Kunihiko Washio (Paradigm Laser Research Ltd., Japan)

13:15 SLPC9-1 **Invited** I008

Laser machining of CFRP composite—A comparison of fibre, Nd:YAG, CO₂, DPSS and picosecond laser processing, Lin Li¹, ¹The University of Manchester, UK

13:45 SLPC9-2 C002

Investigations in wavelength adapted Laser Remote Treatment of fiber reinforced polymers, Annett Klotzbach¹, Andreas Fürst^{1,2}, Jan Hauptmann¹, Eckhard Beyer^{1,2}, ¹Fraunhofer Institute Material and Beam Technology, Germany, ²Technische Universität Dresden, Germany

14:00 SLPC9-3 C029

Micromachining of thin CFRP with UV-ps laser pulses, Masayuki Fujita¹, Hiroshi Ohkawa², Masataka Otsuka², Toshihiro Somekawa¹, Yoshinobu Maeda², Yosuke Orii³, Koji Inaba³, George Okada³, Noriaki Miyanaga⁴, ¹Institute for Laser Technology, Japan, ²Kinki University, Japan, ³Spectronix Corporation, Japan, ⁴Institute of Laser Engineering, Osaka University, Japan

14:15 SLPC9-4 CP035

Laser cutting of CFRP by Q-CW fiber laser, Hiroki Yoshida¹, Sho Yamazaki¹, Hitoshi Fukagawa¹, Tomoyuki Tanaka², Tomihiko Imai², Hiroshige Ogawa², ¹Gifu University, Japan, ²Technological Innovation Center GIFU, Japan

14:30 SLPC9-5 CP039

Influences of laser scanning conditions for CFRP processing with fiber laser, Kenjiro Takahashi¹, Masahiro Tsukamoto¹, Shinichiro Masuno¹, Yuji Sato¹, Masafumi Matsushita², Hidetsugu Yoshida³, Koji Tubakimoto³, Hisanori Fujita³, Noriaki Miyanaga³, Akira Fujisaki⁴, Shunichi Matsushita⁴, Takeshi Yamamura⁵, Masahiro Ishikawa⁵, Tomokazu Sakagawa⁵, Masayuki Fujita⁶, Hiroyuki Niino⁷, Yoshihisa Harada⁷, Mayu Muramatsu⁷, Michiteru Nishino⁸, Tamotsu Kamiya⁹, ¹Joining and Welding Research Institute, Osaka University, Japan, ²Shin Nippon Koki Co., Ltd., Japan, ³Institute of Laser Engineering, Osaka University, Japan, ⁴Furukawa Electric Co. Ltd., Japan, ⁵Advanced Laser Research Laboratory, Kataoka Corporation, Japan, ⁶Institute of Laser Technology, Japan, ⁷Advanced Industrial Science and Technology, Japan, ⁸Mitsubishi Chemical Co., Ltd., Japan, ⁹Advanced Laser and Process Technology Research Association, Japan

14:45 Break

Room 313+314

Session 10: Industrial Applications

Chairs: Bo Gu (Bos Photonics, USA)
Kohji Hirano (Nippon Steel & Sumitomo Metal Corporation, Japan)

15:15 SLPC10-1 **Invited** I014

Laser-based micro-processing for electronics industries, Haibin Zhang¹, ¹Electro Scientific Industries, Inc., USA

15:45 SLPC10-2 **Invited** I015

Laser processing for display glass, Seiji Shimizu¹, ¹Mitsuboshi Diamond Industrial Co., LTD., Japan

16:15 SLPC10-3 C012

Laser drilling with ps laser and ms laser in thermal barrier coated single-crystal alloy, Xiaobing Zhang¹, Ruifeng Sun¹, Wei Zhang¹, Shuili Gong¹, ¹Beijing Aeronautical Manufacturing Technology Research Institute, China

16:30 SLPC10-4 C019

Smart laser tracking, welding and monitoring, Jean-Paul Boillot¹, Raynald Simoneau¹, Jean Claude Fontaine¹, Jacques-Andre Gaboury¹, Nobumasa Torii², ¹Servo-Robot Inc., Canada, ²Servo-Robot Japan, Japan

16:45 SLPC10-5 C034

Freeform beam shaping for industrial technologies based on fiber or fiber-coupled lasers, Alexander V. Laskin¹, Vadim Laskin¹, ¹AdlOptica GmbH, Germany

Room 313+314

Closing

17:00 Closing remarks, Masahiro Tsukamoto (Osaka University, Japan)

17:15 end

Poster Session

SLPC2014 Poster Session

12:30–14:15, Wednesday, April 23 at Exhibition Hall C

Chair: Masahito Katto (Miyazaki University, Japan)

Advanced Lasers and Optical Technologies for Smart Processing

SLPC4p-1 C009

All-fiber microfluidic Mach-Zehnder interferometer for detection of calcium hydroxide, Jian-Neng Wang¹, Wei-Te Wu², Chien-Hsing Chen³, Ping-Li Shen¹, ¹National Yunlin University of Science and Technology, Taiwan, ²National Pingtung University of Science and Technology, Taiwan, ³National Chung Cheng University, Taiwan

SLPC4p-2 C017

A study of the reflective cladding-off cylindrical fiber sensor, Yu-Tse Y. Kao¹, Wei-Te Wu¹, ¹National Pingtung University of Science and Technology, Taiwan

SLPC4p-3 C023

Method for measuring of the contrast of Multi-Beam-Interference with a gaussian beam-shape, Michael Steger^{1,2}, Simon Boes², Sven Thilker², Arnold Gillner², ¹Chair for Laser Technology, Technical University Aachen, Germany, ²Fraunhofer Institute for Laser Technology, Germany

SLPC4p-4 C011

Holographic vector wave femtosecond laser processing, Satoshi Hasegawa¹, Yoshio Hayasaki¹, ¹Center for Optical Research and Education (CORE), Utsunomiya University, Japan

SLPC4p-5 C020

Solid-state-like fiber lasers: Ultrahigh repetition rate femtosecond fiber laser and applications, Zhigang Zhang¹, Aimin Wang¹, Chen Li¹, Xiang Gao¹, Guizhong Wang¹, Jian Zang¹, ¹Peking University, China

SLPC4p-6 C021

Multifunctional laser system for micromachining of various materials, Michael Milenky¹, Eugene Raevsky¹, Dmitry Saprykin¹, ¹Electronic Special Technological Equipment, Research & Development Institute, Russia

SLPC4p-7 CP036

Demonstration of heat resistant Bragg grating by femtosecond laser processing for vibration monitoring, Akihiko Nishimura¹, Yusuke Takenaka², Takehiro Furuyama², Takuya Shimomura³, Takaya Terada³, Hiroyuki Daido³, ¹Japan Atomic Energy Agency, Kizugawa, Japan, ²A-Tech, Japan, ³Japan Atomic Energy Agency, Tsuruga, Japan

Short Wavelength Applications

SLPC4p-8 CP038

A simplified fabrication technique for TFBG for the simultaneous measurement of refractive index and temperature of liquids, Akihiro Kameyama¹, Atsushi Yokotani¹, Masahito Katto², ¹Faculty of Engineering, University of Miyazaki, Japan, ²Center of Collaborative Research and Community Cooperation, University of Miyazaki, Japan

Micro Nano Processing

SLPC4p-9 C010

The absorption property change of quartz in micromachining by ns pulsed CO₂ laser, Kota Yamasaki¹, Hiroshi Ikenoue¹, Yousuke Watanabe¹, Daisuke Nakamura¹, Tatsuo Okada¹, ¹Kyushu University, Japan

Localized CO₂ laser smoothing of defects on EUV Ti-doped silica substrates, Alain Cournoyer¹, Martin Briand¹, Yanbin Duval¹, ¹*INO, Canada*

Ultrashort Pulsed Laser Processing

SLPC4p-11

C007

Formation of periodic nanowire array by femtosecond laser irradiation, Yasutaka Nakajima¹, Hisashi Shimizu², Takuya Shinohara², Mitsuhiro Terakawa², ¹*Department of Electronics and Electrical Engineering, Keio University, Japan*, ²*School of Integrated Design Engineering, Keio University, Japan*

SLPC4p-12

CP037

Periodic grating structures on metal self-organized by double pulse irradiations, Laura Gemini¹, Masaki Hashida¹, Takaya Nishii¹, Yasuhiro Miyasaka¹, Hitoshi Sakagami², Shunsuke Inoue¹, Shuji Sakabe¹, ¹*Kyoto University, Japan*, ²*National Institute for Fusion Science, Japan*

SLPC4p-13

C027

Investigation of micro-welding characteristics of Si and glass by picosecond pulsed laser, Imaduddin Helmi Wan Nordin¹, Yasuhiro Okamoto¹, Isamu Miyamoto², Akira Okada¹, ¹*Okayama University, Japan*, ²*Osaka University, Japan*

Industrial Applications

SLPC4p-14

C026

Thin film CIGS cell scribing using a high energy femtosecond fiber amplifier, Franck Morin¹, Yoann Zaouter¹, Clemens Hönninger¹, Eric Mottay¹, Quentin Mocaer¹, Brendan Dunne², Rui De Almeida³, Jean Pierre Aguerre³, ¹*Amplitude Systèmes, France*, ²*NEXCIS Photovoltaic Technology, France*, ³*Mondragon Assembly, France*

SLPC4p-15

C015

Double-sided laser-arc hybrid welding of high strength steel thick plate, Liqun Li¹, Jiecai Feng¹, Yanbin Chen¹, ¹*Harbin Institute of Technology, China*

Additive Manufacturing and Advanced Surface Processing

SLPC4p-16

C032

Research progress on the high power laser processing technique, Liping Feng¹, Aiping Wu¹, ¹*Beijing Institute of Opto-Electronic Technology, China*

SLPC4p-17

C028

Effects of laser peening parameters on plastic deformation of metallic materials, Miho Tsuyama¹, Yasuteru Kodama², Yukio Miyamoto², Ippei Kitawaki², Toshiya Shibayanagi³, Masahiro Tsukamoto⁴, Hitoshi Nakano¹, ¹*Faculty of Science and Engineering, Kinki University, Japan*, ²*Program in Electronic Engineering, Interdisciplinary Graduate School of Science and Engineering, Kinki University, Japan*, ³*Faculty of Engineering, Toyama University, Japan*, ⁴*Joining and Welding Research Institute, Osaka University, Japan*

Processing of CFRP

SLPC4p-18

CP040

Experimental study on CFRP cutting with nanosecond laser in air and Ar gas ambience, Yuji Sato¹, Masahiro Tsukamoto¹, Fumihiro Matsuoka², Kenjiro Takahashi¹, Shinichiro Masuno¹, Tomomasa Ohkubo³, Hitoshi Nakano², ¹*Joining and Welding Research Institute, Osaka University, Japan*, ²*Kinki University, Japan*, ³*Tokyo Institute of Technology, Japan*

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