

LAMP2015

The 7th International Congress on Laser Advanced Materials Processing

LPM2015–The 16th International Symposium on Laser Precision Microfabrication

HPL2015–The 7th International Symposium on High Power Laser Processing

May 26 – 29, 2015

Kitakyushu, Fukuoka, Japan

<http://www.jlps.gr.jp/lamp/lamp2015/>

Final Program

updated May 20, 2015

General Chair	Koji Sugioka	<i>RIKEN, Japan</i>
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Program

Oral Session

Day 1: May 26, Tuesday

Main Hall

Opening

Chair: Koji Sugioka (RIKEN, Japan)

10:30 Opening Remark

Main Hall

Plenary Session

Chair: Takashi Ishide (Mitsubishi Heavy Industries, Inc., Japan)

10:40 TuM-PL-1 **Plenary** A276

Latest developments in high precision ultrafast laser processing,
Andreas Ostendorf¹, ¹*Ruhr-University Bochum, Germany*

11:20 TuM-PL-2 **Plenary** A249

Fundamentals and evolution of laser welding, Seiji Katayama¹,
¹*JWRI, Osaka University, Japan*

12:00 TuM-PL-3 **Plenary** A145

The state of the arts of laser manufacturing and future prospect ,
Bo Gu¹, ¹*Bos Photonics, USA*

12:40 Lunch Time

1. LPM

Room 1

L2-1: Near-field nanopatterning

Chair: Mitsuhiro Terakawa (Keio University, Japan)

14:00 Tu1-LI-1 **Invited** A243

Visualizing and controlling optical near fields: Strategies and applications, Jan Siegel¹, ¹*Laser Processing Group, Instituto de Optica, Spanish National Research Council (CSIC), Spain*

14:30 Tu1-L0-2 A138

Bessel-like photonic nanojets from engineered nanospheres for the fabrication of ultra-high-density porous membranes, David Grojo¹, G Baravaglio², Luca Boarino², Catalin Constantinescu¹, Philippe Delaporte¹, Natalia De Leo², Michael Laus³, Anthony Lioni¹, Nicolas Sandeau⁴, Katia Sparnacci³, ¹*Aix-Marseille University-CNRS, LP3 UMR 7341, F-13288, Marseille, France*, ²*INRIM, NanoFacility, Division Electromagnetism, I-10135 Torino, Italy*, ³*Department of Science and Technology, University of Eastern Piedmont Amedeo Avogadro, I-15121 Alessandria, Italy*, ⁴*Aix-Marseille University, CNRS, Centrale Marseille, Institut Fresnel, UMR 7249, 13013 Marseille, France*

14:50 Tu1-LI-3 **Invited** A195

Optical manipulation in near-field nanopatterning, Romain Fardel¹, Yu-Cheng Tsai¹, Ting-Hsuan Chen¹, Craig B. Arnold¹, ¹*Princeton University, USA*

15:20 Tu1-L0-4 A185

Optical trap assisted nanopatterning: Process parallelisation and dynamic structure generation, Johannes Strauß^{1,2}, Marcus Baum^{1,2}, Ilya Alexeev^{1,2}, Michael Schmidt^{1,2}, ¹*Institute of Photonic Technologies, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany*, ²*Erlangen Graduate School in Advanced Optical Technologies (SAOT), Friedrich-Alexander-Universität Erlangen Nürnberg, Germany*

15:40 Coffee Break

3. LPM

Room 2

Periodic Surface Structures and Applications

Chair: Juergen Reif (Brandenburgische Technische Universitaet, Cottbus-Senftenberg, Germany)

14:00 Tu2-L0-1 A113

Repetition rate dependency for high density perforation of thin Al-foils with ultra short pulse lasers, Nelli Hambach¹, Claudia Hartmann^{1,2}, Stephan Keller¹, Arnold Gillner^{1,2}, ¹*Fraunhofer Institute for Lasertechnology, Steinbachstr. 15, 52074 Aachen, Germany*, ²*Chair for Laser Technology, RWTH Aachen University, Steinbachstr. 15, 52074 Aachen, Germany*

14:20 Tu2-L0-2 **Student** A208

Control of cell spreading on Ti substrate with periodic nanostructures formed by femtosecond laser irradiation, Takuya Kawa¹, Masahiro Tsukamoto², Togo Shinonaga², Peng Chen³, Akiko Nagai³, Takao Hanawa³, ¹*Graduate School of Engineering, Osaka University, Japan*, ²*Joining and Welding Research Institute, Osaka University, Japan*, ³*Institute of Biomaterials and Bioengineering, Tokyo Medical and Dental University, Japan*

14:40 Tu2-L0-3 A053

Fabrication of porous Ti parts with nanostructures from Ti powders by femtosecond laser pulses, Chung-Wei Cheng¹, Chien-Jung Huang², ¹*Department of Mechanical Engineering, National Chiao Tung University, Taiwan*, ²*ITRI Southern Region Campus, Industrial Technology Research Institute, Taiwan*

15:00 Tu2-L0-4 A209

Dynamic changes in PDMS surface morphology in femtosecond laser treatment, Sae Chae Jeoung¹, H.-Y. Moon², H.S. Lee¹, M. S. Sidhu¹, ¹*Korea Research Institute of Standards and Science, Rep. of Korea*, ²*Gachon University, Rep. of Korea*

15:20 Coffee Break

5. LPM

Room 3

Micro-Welding

Chair: Hiroaki Mori (Osaka University, Japan)

14:00 Tu3-L0-1 A193

Laser-matter interaction in Si/glass welding by ultrashort laser pulses with different pulse durations, Isamu Miyamoto^{1,2}, Kiichiro Nagata¹, Etsuji Ohmura¹, ¹Osaka University, Japan, ²Erlangen Graduate School of Advanced Optical Technologies (SAOT), Germany

14:20 Tu3-L0-2 **Student** A090

Investigation of absorptivity in micro-welding of copper by pulsed laser, Takuya Wada¹, Yasuhiro Okamoto¹, Akira Okada¹, Norio Nishi², Sin-ichi Nakashiba², Tomokazu Sakagawa², ¹Okayama University, Japan, ²Kataoka Corporation, Japan

14:40 Tu3-L0-3 A058

Recent progress on nanojoining induced by femtosecond laser, Lei Liu^{1,2}, Luchan Lin^{1,3}, Daozhi Shen¹, Hailin Bai¹, Guisheng Zou¹, Yunhong Norman Zhou^{1,3}, ¹Department of Mechanical Engineering, Tsinghua University, China, ²State Key Laboratory of Tribology, Tsinghua University, China, ³Centre for Advanced Materials Joining, University of Waterloo, Canada

15:00 Tu3-L0-4 **Student** A061

Measurement of the vapor plume velocity in laser impulse metal bonding with temporal power modulation, Simon W. Britten¹, Anthony Wang¹, Alexander Olowinsky¹, Arnold Gillner¹, ¹Fraunhofer Institute for Laser Technology ILT, Germany

15:20 Tu3-L0-5 **Student** A018

Laser droplet brazing for thermally stable contacting of piezo modules using CuSn11 braze preforms, Stefan Stein^{1,3}, Michael Suchy¹, Felix Tenner^{2,3}, Stephan Roth^{1,3}, Michael Schmidt^{1,2,3}, ¹Bayerisches Laserzentrum GmbH (blz), Konrad-Zuse-Str. 2-6, 91052 Erlangen, Germany, ²Institute of Photonic Technologies (LPT), Friedrich-Alexander-Universität Erlangen-Nürnberg, Konrad-Zuse-Str. 3-5, 91052 Erlangen, Germany, ³Erlangen Graduate School in Advanced Optical Technologies (SAOT), Friedrich-Alexander-Universität Erlangen-Nürnberg, Paul-Gordan-Str. 6, 91052 Erlangen, Germany

15:40 Coffee Break

7. HPL1

Room 4

Oscillator and Apparatus

Chair: Teruyoshi Kadoya (Precitec Japan)

14:00 Tu4-HI-1 **Invited** A232

Fiber lasers development for industrial applications, Eugene A. Shcherbakov¹, ¹IPG Laser GmbH, Germany

14:30 Tu4-H0-2 A188

Energy-efficient production with high-power disk- and diode-lasers, Matthias Koitzsch¹, Volker Rominger¹, ¹TRUMPF Laser- und Systemtechnik GmbH, Germany

14:50 Tu4-H0-3 A237

High power diode lasers and their applications at 20 kW and beyond, Markus Ruetering¹, Christoph Ullmann¹, Volker Krause¹, ¹Laserline GmbH, Germany

15:10 Tu4-H0-4 A173

One step closer to real-time control — Low coherence sensors heading for industrial applications, Markus Kogel-Hollacher², Martin Schoenleber¹, Thibault Bautze², ¹Precitec Optronik GmbH, Schleussnerstrasse 54, 63263 Neu-Isenburg, Germany, ²Precitec GmbH & Co. KG, Draisstrasse 1, 76571 Gaggenau, Germany

15:30 Tu4-H0-5 A143

Analysis of robot movements via velocity measurement for the application of laser material processing, Michael Ungers¹, Ulrich Thombansen², Wolfgang Fiedler¹, Peter Abels¹, ¹Fraunhofer-Institute for Lasertechnology ILT, Steinbachstrasse 15, 52074 Aachen, Germany, ²RWTH Aachen University, Chair for Laser Technology LLT, Steinbachstrasse 15, 52074 Aachen, Germany, Germany

15:50 Coffee Break

2. LPM

Room 1

L2-2: Near-field nanopatterning

Chair: Jan Siegel (CSIC Madrid, Spain)

16:00 Tu1-LI-5 **Invited Student** A022

Gold nanoparticle mediated laser transfection, Stefan Kalies¹, Dag Heinemann¹, Markus Schomaker¹, Georgios Antonopoulos¹, Mirko Rakoski¹, Lara Gentemann¹, Alexander Heisterkamp^{1,2}, Tammo Ripken¹, Heiko Meyer^{1,3}, ¹Laser Zentrum Hannover e.V., Department of Biomedical Optics, Hollerithallee 8, 30419 Hannover, Germany, ²Gottfried Wilhelm Leibniz Universitaet Hannover, Institut fuer Quantenoptik, Am Welfengarten 1, 30167 Hannover, Germany, ³Hannover Medical School, Department for Cardiothoracic, Transplantation and Vascular Surgery (HTTG), Carl-Neuberg-Str.1, 30625 Hannover, Germany

16:30 Tu1-L0-6 A028

Polymer microsphere-mediated cell membrane perforation using microfluidic channel, Mitsuhiro Terakawa^{1,2}, Atsuhiko Ishii¹, Tatsuki Mitsuhashi², ¹Department of Electronics and Electrical Engineering, Keio University, Japan, ²School of Integrated Design Engineering, Keio University, Japan

16:50 Tu1-L0-7 A157

Femtosecond laser nanofabrication of hybrid plasmonic structures, Hiroaki Nishiyama¹, Yukinari Ohzeki¹, ¹Yamagata University, Japan

17:10 Tu1-L0-8 A119

Study of the viscosity influence and the nanoparticles concentration in the ejection dynamics of ink, Daniel Puerto¹, Gaëlle Coustillier¹, Marc Sentis¹, A. Patricia Alloncle¹, Philippe Delaporte¹, Emeric Biver², Dimitris Karnakis², Marina Makrygianni³, Apostolos Kyritsis³, Christos Chatzimanolis Moustakas³, Ioanna Zergioti³, ¹Aix-Marseille University, CNRS, LP3 laboratory, Luminy Campus, C.917, 13288 Marseille cedex 9, France, ²Oxford Lasers Ltd., Unit 8, Moorbrook Park, Didcot, OX11 7HP, United Kingdom, ³National Technical University of Athens, 9, Heroon Polytechniou, Athens, 15780, Greece

4. LPM

Room 2

LIPPS

Chair: Jörn Bonse (BAM Federal Institute for Materials Research and Testing, Germany)

16:00 Tu2-L0-5 A201

Femtosecond laser-induced periodic surface structures on yttria-stabilized zirconia, Masayuki Kakehata¹, Hidehiko Yashiro¹, Ayako Oyane², Atsuo Ito³, Kenji Torizuka¹, ¹Electronics and Photonics Research Institute, National Institute of Advanced Industrial Science and Technology (AIST), Japan, ²Nanosystem Research Institute, National Institute of Advanced Industrial Science and Technology (AIST), Japan, ³Human Technology Research Institute, National Institute of Advanced Industrial Science and Technology (AIST), Japan

16:20 Tu2-L0-6 A004

Tailoring of nanostructure in indirect band-gap semiconductor using IR femtosecond double pulses, Yasuhiko Shimotsuma¹, Tomoaki Sei¹, Masaaki Sakakura², Kiyotaka Miura¹, Haruhiko Udono³, ¹Department of Material Chemistry, Kyoto University, Japan, ²Society-Academia Collaboration for Innovation, Kyoto University, Japan, ³College of Engineering, Ibaraki University, Japan

16:40 Tu2-L0-7 **Student** A202

Investigation on optical breakdown threshold energy of glass substrate containing multi-components during a femtosecond laser machining, Hyeonmin Lee¹, Jung Hyun Choi², Seung-Jae Moon¹, ¹Hanyang University, Korea, ²Ewha Womans University, Korea

17:00 Tu2-L0-8 **Student** A220

Initial cumulative effects in femtosecond laser-induced periodic surface structures on bulk metallic glass, Li Chen^{1,2,3}, Cheng Guang Hua^{2,3}, Colombier Philippe Jean¹, Zhang Hao¹, Razvan Stoian¹, ¹Laboratoire Hubert Curien, UMR 5516 CNRS, Université de Lyon, Université Jean Monnet, 42000 Saint Etienne, France, France, ²State Key Laboratory of Transient Optics and Photonics, Xi'an Institute of Optics and Precision Mechanics, CAS, 710119 Xi'an, Shaanxi, China, China, ³University of Chinese Academy of Science, Beijing 10049, China, China

17:20 Tu2-L0-9 **Student** A122

Minimizing the surface roughness for silicon ablation with ultrashort laser pulses, Matthias Domke¹, Giovanni Piredda¹, Johannes Zehetner¹, ¹Josef Ressel Center for material processing with ultrashort pulsed lasers, University of Applied Sciences Vorarlberg, Austria

6. LPM

Room 3

8. HPL2

Room 4

Fundamental Aspects

Simulation

Chair: Yasuhiro Okamoto (Okayama University, Japan)

16:00 Tu3-L0-6

A070

Fast and slow dynamics in femtosecond laser-induced crack propagation inside a LiF single crystal, Masaaki Sakakura¹, Takuro Okada², Naoaki Fukuda¹, Yasuhiko Shimotsuma², Kiyotaka Miura², ¹Office of Society-Academia Collaboration for Innovation, Kyoto University, Japan, ²Department of Material Chemistry, Graduate School of Engineering, Kyoto University, Japan

16:20 Tu3-L0-7

A239

Highspeed camera observation of plasma behavior induced by ultrashort pulse laser irradiation into inside of glass, Etsuji Ohmura¹, N. Komatsubara¹, Kazufumi Nomura¹, Isamu Miyamoto¹, ¹Graduate School of Engineering, Osaka University, Japan

16:40 Tu3-L0-8

Student

A146

Selective femtosecond-laser structuring of dielectric thin films with different band gaps: A time-resolved study of ablation mechanisms, Stephan Rapp¹, Gerrit Heinrich², Heinz Paul Huber¹, Michael Schmidt³, ¹Lasercenter, University of Applied Sciences Munich, Germany, ²CiS Forschungsinstitut für Mikrosensorik und Photovoltaik GmbH, Germany, ³Friedrich-Alexander-Universität Erlangen-Nürnberg, LPT, Germany

17:00 Tu3-L0-9

Student

A155

Optical emission spectroscopy of femtosecond pulsed laser-produced aluminum plasma, Jessa Jayne Cosare Miranda¹, Joseph Aban De Mesa¹, Wilson Ong Garcia¹, ¹University of the Philippines - Diliman, Philippines

17:20 Tu3-L0-10

A095

Residual heat in ultra-short pulsed laser ablation of metals, Franziska Bauer¹, Andreas Michalowski¹, Stefan Nolte², ¹Robert Bosch GmbH, Corporate Sector Research an Advance Engineering, Germany, ²Institute of Applied Physics, Abbe Center of Photonics, Friedrich-Schiller-Universität Jena, Germany

17:40 Tu3-L0-11

A244

Ultrafast lattice dynamics of femtosecond laser-driven shocked iron probed with XFEL, Tomokazu Sano¹, Tomoki Matsuda¹, Mitsuru Ohata¹, Tomoyuki Terai¹, Akio Hirose¹, Hiroyuki Uranishi², Norimasa Ozaki², Ryosuke Kodama², Toshinori Yabuuchi², Kazuo A. Tanaka², Tomonao Hosokai³, Takeshi Matsuoka³, Kazuto Arakawa⁴, Yoshinori Tange⁵, Tomoko Sato⁶, Toshimori Sekine⁶, Tsutomu Mashimo⁷, Yukio Sano⁸, Yuji Sano⁹, Yuichi Inubushi¹⁰, Takahiro Sato¹⁰, Makina Yabashi¹⁰, Tadashi Togashi¹¹, Kensuke Tono¹¹, Osami Sakata¹², ¹Division of Materials and Manufacturing Science, Osaka University, Japan, ²Division of Electrical, Electronic and Information Engineering, Osaka University, Japan, ³Photon Pioneers Center, Osaka University, Japan, ⁴Faculty of Science and Engineering, Shimane University, Japan, ⁵Geodynamics Research Center, Ehime University, Japan, ⁶Department of Earth and Planetary Systems Science, Hiroshima University, Japan, ⁷Institute of Pulsed Power Science, Kumamoto University, Japan, ⁸Faculty of Maritime Sciences, Kobe University, Japan, ⁹Power and Industrial Systems Research and Development Center, Toshiba Corporation, Japan, ¹⁰RIKEN SPring-8 Center, Japan, ¹¹Japan Synchrotron Radiation Research Institute, Japan, ¹²Synchrotron X-ray Station at SPring-8, National Institute for Materials Science, Japan

Chair: Claus Thomy (Bremer Institut für angewandte Strahltechnik GmbH, Germany)

16:10 Tu4-HI-6

Invited

A062

Examination of laser cutting phenomena by comprehensive steady-state simulations, Dirk Petring¹, Frank Schneider¹, Stoyan Stoyanov¹, ¹Fraunhofer-Institute for Laser Technology ILT, Germany

16:40 Tu4-H0-7

A027

Numerical simulation of laser beam brazing — Model validation and process analysis, Michael Dobler^{1,2}, Philipp Wiethop³, Michael Schmidt^{1,2}, ¹Institute of Photonic Technologies, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany, ²Erlangen Graduate School in Advanced Optical Technologies (SAOT), Germany, ³Audi AG, Germany

17:00 Tu4-H0-8

Student

A066

Heat conduction modelling to optimize the laser beam profile for pulsed conduction mode welding, Jesper Sundqvist¹, Alexander F.H. Kaplan¹, Choon-Yen Kong², Jon Blackburn², Eurico Assuncao^{3,4}, Luisa Quintino^{3,4}, ¹Dept. of Engineering Sciences and Mathematics, Luleå University of Technology, Sweden, ²TWI Ltd, Granta Park, Great Abington, Cambridge CB21 6AL, United Kingdom, ³LAETA, IDMEC, Instituto Superior Técnico, Universidade de Lisboa, Lisboa, Portugal, ⁴EWTF, Porto Salvo, 2740-120, Portugal

17:20 Tu4-H0-9

A010

Role of vapor recondensation on bead shape in high power laser welding, Sohail Muhammad¹, Na Suck-Joo¹, Gumenyuk Andrey², Rethmeier Michael², ¹(KAIST) Korea Advanced Institute of Science and Technology, Republic of Korea, ²(BAM) Federal Institute for Materials Research and Testing, Germany

Day 2: May 27, Wednesday

9. LPM

Room 1

L1-1: Hybrid Femtosecond Laser Manufacturing
—3D glass microstructuring—

Chair: Rebeca Martinez Vazquez (Istituto di Fotonica Nanotecnologie, IFN-CNR, Italy)

8:40 We1-LI-1 **Invited** A255

Subtractive femtosecond-laser-micromachining: Writingpath dependence and its effects on stress generation in glass substrates, Yves Bellouard¹, ¹*École Polytechnique Fédérale de Lausanne, Switzerland*

9:10 We1-L0-2 A123

Fabrication of high-Q lithium niobate microresonators by femtosecond laser micromachining, Lingling Qiao¹, Jintian Lin¹, Min Wang¹, Zhiwei Fang¹, Ya Cheng¹, ¹*Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, China*

9:30 We1-L0-3 **Student** A225

3D electrostatic actuator fabricated by non-ablative femtosecond laser exposure and chemical etching, Tao Yang¹, Yves Bellouard¹, ¹*École Polytechnique Fédérale de Lausanne (EPFL), Switzerland*

9:50 We1-L0-4 A293

Multi-scale microstereolithography using optical fibers, Shoji Maruo¹, Genki Ishibashi¹, Eisuke Komada¹, ¹*Yokohama National University, Japan*

10:10 *Coffee Break*

12. LPM

Room 2

Pulsed Laser Deposition

Chair: Aiko Narazaki (AIST, Japan)

8:50 We2-L0-1 A144

Time-resolved imaging of ZnO nanoparticles produced in high-pressure phase, Daisuke Nakamura¹, Shuhei Takao¹, Tetsuya Shimogaki¹, Mitsuhiro Higashihata¹, Hiroshi Ikenoue¹, Tatsuo Okada¹, ¹*Kyushu University, Japan*

9:10 We2-L0-2 **Student** A087

Structural and optical properties of ZnO nano/microcrystals grown on laser patterned ZnO buffer layer, Tetsuya Shimogaki¹, Hirotaka Kawahara¹, Shihomi Nakao¹, Kosuke Harada¹, Kota Yamasaki¹, Mitsuhiro Higashihata¹, Hiroshi Ikenoue¹, Daisuke Nakamura¹, Yoshiki Nakata², Tatsuo Okada¹, ¹*Department of Information Science and Electrical Engineering, Kyushu University, Japan*, ²*Institute of Laser Engineering, Osaka University, Japan*

9:30 We2-L0-3 **Student** A136

SiC thin film growth on different substrates using pulsed Nd³⁺:YAG laser deposition technique, Emmanuel Pannir selvam¹, Nilesh J Vasa¹, Ramachandra Rao M.S², ¹*Department of Engineering Design, Indian Institute of Technology Madras, Chennai, Tamil Nadu, 600036., India*, ²*Department of physics, Indian Institute of Technology Madras, Chennai, Tamil Nadu, 600036, India*

9:50 We2-L0-4 **Student** A178

Formation of nanoporous SiO₂ films by pulsed-laser deposition using F₂ laser, Daichi Taniyama¹, Hiroshi Ikenoue¹, Tomoyuki Ohkubo¹, Daisuke Nakamura¹, Tatsuo Okada¹, ¹*Graduate School of Information Science and Electrical Engineering, Kyushu University, Japan*

10:10 *Coffee Break*

Poster I and II

10:30 Short Presentation for Poster Session I and II (Room 1)

Poster I

12:10 Poster Session I and Exhibition (Event Hall)

⌘ Lunch Time (up to 14:00)

Day 2: May 27, Wednesday

15. LPM

Room 3

Advanced Laser Applications

Chair: Masaaki Sakakura (Kyoto University, Japan)

8:40 We3-L0-1 **Student** A180

Laser writing for selective copper plating on plastics for electronics applications, Karolis Ratautas¹, Mindaugas Gedvilas¹, Ina Stankevičienė¹, Aldona Jagminienė¹, Eugenijus Norkus¹, Nello Li Pira², Stefano Sinopoli³, Gediminas Račiukaitis¹, ¹Center for physical sciences and technology, Lithuania, ²Centro Ricerche Fiat, Italy, ³BioAge srl, Italy

9:00 We3-L0-2 **Student** A219

Three dimensional laser micro-fabrication in diamond, Bangshan Sun¹, Patrick S. Salter¹, Martin J. Booth^{1,2}, ¹Department of Engineering Science, University of Oxford, UK, ²Centre for Neural Circuits and Behaviour, University of Oxford, UK

9:20 We3-L0-3 A176

Present status and trend of femtosecond laser processing in AMOLED display manufacturing industry of korea, Sung-Hak Cho¹, ¹KIMM (Korea Institute of Machinery and Material), Korea, Republic of

9:40 We3-LI-4 **Invited** A273

Superresolution direct laser writing, Min Gu¹, ¹Swinburne University of Technology, Australia

10:10 Coffee Break

18. HPL3

Room 4

Welding 1 (Hybrid Welding of Thick Plates)

Chair: Martin Dahmen (Fraunhofer Institute for Laser Technology, Germany)

8:30 We4-H0-1 **Student** A211

Numerical study on effect of laser position and joint gap on full penetration Laser-GMAW-P hybrid welding, Sohail Muhammad¹, Na Suck-Joo¹, Karhu Miikka², Kujanpaa Veli², ¹(KAIST) Korea Advanced Institute of Science and Technology, Rep. of Korea, ²VTT Technical Research Centre of Finland, Finland

8:50 We4-H0-2 A199

Development of hybrid laser-arc welding with CO₂ shielding gas, Mohamed Wahba¹, Masami Mizutani², Seiji Katayama², ¹Central Metallurgical Research and Development Institute, Egypt, ²Joining and Welding Research Institute, Japan

9:10 We4-H0-3 **Student** A247

Laser-arc hybrid weldability of high-tensile strength steel and welding phenomena, Pan QingLong¹, Masami Mizutani¹, Yousuke Kawahito¹, Seiji Katayama¹, ¹JWRI, Osaka University, Japan

9:30 We4-H0-4 A082

Development of narrow gap multi-layer welding process using oscillation laser beam, Yosuke Yamazaki¹, Yohei Abe², Yukio Hioki², Mitsuyoshi Nakatani¹, Akikazu Kitagawa², Kazuhiro Nakata³, ¹Joining and Welding Research Institute, Osaka University (Hitachi Zosen Corporation), Japan, ²Hitachi Zosen Corporation, Japan, ³Joining and Welding Research Institute, Osaka University, Japan

9:50 We4-H0-5 **Student** A075

Development of vertical welding process on thick steel plate using hot-wire laser welding method, Eakkachai Warinsiriruk¹, Koei Hashida¹, Motomichi Yamamoto¹, Kenji Shinozaki¹, Kota Kadoi¹, Tadakazu Tanino², Hiroshi Yajima², Tsutomu Fukui³, Shin Nakayama⁴, Tetsuro Nose⁵, Syoko Tsuchiya⁶, Hiroshi Watanabe⁷, Tatsunori Kanazawa⁷, ¹Graduate School of Engineering, Hiroshima University, Japan, ²Department of Engineering, Nagasaki Institute of Applied Science, Japan, ³Nippon Kaiji Kyokai, Japan, ⁴Mitsubishi Heavy Industries, Ltd., Japan, ⁵Nippon Steel & Sumitomo Metal Corporation. (Present: Nippon Steel & Sumikin Welding Co., Ltd.), Japan, ⁶Nippon Steel & Sumitomo Metal Corporation., Japan, ⁷Mitsubishi Hitachi Power Systems Engineering Co., Ltd., Japan

10:10 Coffee Break

Poster I and II

10:30 Short Presentation for Poster Session I and II (Room 1)

Poster I

12:10 Poster Session I and Exhibition (Event Hall)

⌘ Lunch Time (up to 14:00)

10. LPM

Room 1

**L1-2: Hybrid Femtosecond Laser
Manufacturing
—Two-photon polymerization—**

Chair: Ya Cheng (Shanghai Institute of Optics and Fine Mechanics, CAS, China)

14:00 We1-LI-5 **Invited** A256

Three-dimensional laser microfabrication for the production of functional microdevices, Shoji Maruo¹, ¹*Yokohama National University, Japan*

14:30 We1-L0-6 A156

Functionalization of two-photon polymerized microtools for biological applications, Lóránd Kelemen¹, Badri Lakshmanrao Aekbote¹, Gaszton Vizsnyiczai¹, Pál Ormos¹, ¹*Institute of Biophysics, Biological Research Centre, Temesvári krt. 62, Szeged 6726, Hungary*

14:50 We1-L0-7 A169

Light driven photopolymerised microstructures to model biological motion, András Búzás¹, Roberto Di Leonardo², Péter Galajda¹, Lóránd Kelemen¹, Anna Mathesz¹, László Oroszi¹, Tamás Vicsek³, Gaszton Vizsnyiczai¹, Pál Ormos¹, ¹*Institute of Biophysics, Biological Research Centre, Hungarian Academy of Sciences, Szeged, Hungary*, ²*IPCF-CNR UOS Roma, Dipartimento di Fisica, Università Sapienza, I-00185 Rome, Italy*, ³*Department of Biological Physics, Eötvös University, Statistical and Biological Physics Research Group of the Hungarian Academy of Sciences, H-1117 Budapest, Hungary*

15:10 We1-L0-8 **Student** A216

Selectively magnetized microstructures produced by two-photon microfabrication and electroless plating, Shuhei Taniguchi¹, Shoji Maruo², ¹*Yokohama National University, Japan*, ²*Yokohama National University, Japan*

15:30 Coffee Break

13. LPM

Room 2

Micro/Nano Patterning

Chair: Min Gu (Swinburne University of Technology, Australia)

14:00 We2-L0-5 **Student** A179

A novel direct patterning method of graphene on SiC(0001) by KrF excimer laser irradiation, Masakazu Hattori¹, Hiroshi Ikenoue¹, Daisuke Nakamura¹, Tatsuo Okada¹, Kazuaki Furukawa², Makoto Takamura², Hiroki Hibino², ¹*Kyushu Univ., Japan*, ²*NTT Basic Res. Labs., Japan*

14:20 We2-L0-6 A109

Fabrication and application of phase only holograms for high power laser beam shaping, Ilya Alexeev^{1,2}, Eric Brehm¹, Johannes Strauß^{1,2}, Marcus Baum^{1,2}, Michael Schmidt^{1,2}, ¹*Institute of Photonic Technologies, Friedrich-Alexander-University of Erlangen-Nuremberg, Germany*, ²*Erlangen Graduate School in Advanced Optical Technologies (SAOT), Germany*

14:40 We2-L0-7 A140

Four-dimensional femtosecond laser processing, Satoshi Hasegawa¹, Yoshio Hayasaki¹, ¹*Center for Optical Research and Education (CORE), Utsunomiya University, Japan*

15:00 We2-L0-8 **Student** A135

Analysis and evaluation of boundary conditions for direct surface structuring by multi-beam interference, Michael Steger^{1,2}, Arnold Gillner¹, ¹*Fraunhofer Institute for Lasertechnology, Steinbachstraße 18, Germany*, ²*Chair for Laser Technology, Technical University of Aachen, Germany*

15:20 We2-L0-9 A171

Interfering ultraviolet femtosecond laser processing, Yoshiki Nakata¹, Yoshiki Matsuba¹, Noriaki Miyanaga¹, ¹*ILE, Osaka University, Japan*

15:40 Coffee Break

16. LPM

Room 3

Peening and Annealing

Chair: Daisuke Nakamura (Kyushu University, Japan)

14:00 We3-L0-5

A245

Femtosecond laser peening without sacrificial overlay under atmospheric conditions, Tomokazu Sano¹, Takayuki Eimura¹, Syouhei Iwata¹, Norihiro Matsuyama¹, Ryota Kashiwabara¹, Tomoki Matsuda¹, Yutaro Isshiki¹, Akio Hirose¹, Kazuto Arakawa², Tadafumi Hashimoto³, Seiichiro Tsutsumi⁴, Kiyotaka Masaki⁵, Yuji Sano⁶, ¹*Division of Materials and Manufacturing Science, Osaka University, Japan*, ²*Interdisciplinary Faculty of Science and Engineering, Shimane University, Japan*, ³*Hashimoto Iron Works Co., Ltd., Japan*, ⁴*Joining and Welding Research Institute, Osaka University, Japan*, ⁵*Okinawa National College of Technology, Japan*, ⁶*Power and Industrial Systems Research and Development Center, Toshiba Corporation, Japan*

14:20 We3-L0-6

A074

Effects of laser peening parameters on plastic deformation in several metals, Miho Tsuyama¹, Yasuteru Kodama², Yukio Miyamoto², Ipppei Kitawaki², Masahiro Tsukamoto³, 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*Joining and Welding Research Institute, Osaka University, Japan*

14:40 We3-L0-7

A207

Effects of pulse duration on crystallization of poly-Si thin films by XeF excimer laser annealing, Tomoyuki Ohkubo^{1,2}, Hiroshi Ikenoue¹, Yasuhiro Kamba², Yosuke Watanabe^{1,2}, Daisuke Nakamura¹, Hiroaki Oizumi², Kouji Kakizaki², Tatsuo Okada¹, ¹*Kyushu Univ., Japan*, ²*GIGAPHOTON Inc., Japan*

15:00 We3-L0-8

A116

Lasers with line focus geometries as universal tool for a wide range of surface processing applications, Dirk Hauschild¹, Jens Meinschien¹, Mikhail Ivanenko¹, Manuel Bracker¹, ¹*LIMO Lissotschenko Mikrooptik GmbH, Germany*

15:20 Coffee Break

19. HPL4

Room 4

Welding 2

Chair: Kenji Shinozaki (Hiroshima University, Japan)

14:00 We4-HI-6

Invited

A236

Present state and future of laser materials processing for light weight applications, Eckhard Beyer^{1,2}, Jens Standfuss¹, Axel Jahn¹, Steffen Bonss¹, Annett Klotzbach¹, ¹*Fraunhofer Institute for Material and Beam Technology IWS Dresden, Germany*, ²*Technische Universitaet Dresden, Germany*

14:30 We4-H0-7

Student

A118

Influence of pulse shape on crack and spatter formation in laser beam welding of aluminum alloy with high content of zinc, Matthias Holzer¹, Oliver Straub¹, Konstantin Hofmann¹, Florian Hugger¹, Stephan Roth^{1,3}, Michael Schmidt^{1,2,3}, ¹*Bayerisches Laserzentrum GmbH (blz), Konrad-Zuse-Str. 2-6, 91052 Erlangen, Germany*, ²*Institute of Photonic Technologies (LPT), Friedrich-Alexander-Universität Erlangen-Nürnberg, Konrad-Zuse-Str. 3-5, 91052 Erlangen, Germany*, ³*Erlangen Graduate School in Advanced Optical Technologies (SAOT), Friedrich-Alexander-Universität Erlangen-Nürnberg, Paul-Gordan-Str. 6, 91052 Erlangen, Germany*

14:50 We4-H0-8

Student

A083

Investigation of evaluation method for hot cracking susceptibility of 310S stainless steel during laser welding using trans-varestraint test, Dan Wang¹, Shuntaro Sakoda¹, Kota Kadoi¹, Kenji Shinozaki¹, Motomichi Yamamoto¹, ¹*Graduate School of Engineering, Hiroshima University, Japan*

15:10 We4-H0-9

A073

Overlap welding characteristics of Al and Ni foils for the secondary battery and ESS applications, KaRam Lee¹, Kwang H. Oh¹, SangZoon Lee¹, YoungTae Yoo², ¹*Laser Center, Jeonnam Technopark Stiftung, South Korea*, ²*Dept. of Mechanical System Engineering, Chosun University, South Korea*

15:30 We4-H0-10

Student

A099

Comparison of different irradiation methods in absorber-free laser transmission welding, Viktor Mamuschkin¹, Christoph Engelmann², Mirko Aden², Alexander Olowinsky², ¹*Chair for Technology of Optical Systems, Steinbachstraße 15, 52074 Aachen, Germany*, ²*Laser Institute for Laser Technology, Steinbachstraße 15, 52074 Aachen, Germany*

15:50 Coffee Break

11. LPM

Room 1

**L1-3: Hybrid Femtosecond Laser Manufacturing
—Hybrid technology—**

Chair: Lorand Kelemen (Biological Research Centre, Hungarian Academy of Sciences, Hungary)

16:00 We1-LI-9 **Invited** A257

Hybrid femtosecond laser microfabrication, Roberto Osellame¹, ¹*Istituto di Fotonica e Nanotecnologie (IFN-CNR), Italy*

16:30 We1-L0-10 A016

Ship-in-a-bottle fs laser integration of center-pass microlens arrays enabling coupling-free parallel cell counting with 100% success rate, Dong Wu¹, Sizhu Wu², Jian Xu³, Katsumi Midorikawa³, Koji Sugioka³, ¹*USTC, China*, ²*Hefei University of Technology, China*, ³*RIKEN, Japan*

16:50 We1-L0-11 A101

Hybrid femtosecond laser micro-integration of polymeric patterns inside glass channels for cell manipulation, Felix Sima¹, Dong Wu¹, Jian Xu¹, Katsumi Midorikawa², Koji Sugioka¹, ¹*RIKEN-SIOM Joint Research Unit, Japan*, ²*RIKEN Center for Advanced Photonics, Japan*

17:10 We1-L0-12 A159

Three-dimensional manipulation of biological samples using electrofluidic platform fabricated by hybrid femtosecond laser microfabrication , Jian Xu¹, Hiroyuki Kawano², Dong Wu¹, Sima Felix¹, Katsumi Midorikawa¹, Koji Sugioka¹, ¹*RIKEN Center for Advanced Photonics, Japan*, ²*RIKEN Brain Science Institute, Japan*

14. LPM

Room 2

Drilling and Cutting

Chair: Guido Hennig (Daetwyler Graphics AG, Switzerland)

16:00 We2-L0-10 A103

Ultrashort pulse laser cutting of glass by controlled fracture propagation, Konstantin Mishchik¹, Clémentine Javaux², Ophélie Dematteo-Caulier¹, Stefan Skupin¹, Benoit Chimier¹, Guillaume Duchateau¹, Antoine Bourgeade³, Rainer Kling², Clemens Hönninger⁴, John Lopez¹, ¹*Univ. Bordeaux CNRS CEA, CELIA UMR5107, 351 Cours de la Libération, 33405 Talence, France*, ²*ALPhANOV, Rue Francois Mitterrand, 33400 Talence, France*, ³*CEA/CESTA, 15 Avenue des Sablières, 33114 Le Barp, France*, ⁴*Amplitude Systèmes, 33600 Pessac, France*

16:20 We2-L0-11 A069

Formation of through holes in glass substrates by laser-assisted etching, Masatoshi Yonemura¹, Satoru Kato¹, Kazuo Hasegawa¹, Hidetomo Takahashi², ¹*Toyota Central R&D Labs., Inc, Japan*, ²*Aisin Seiki Co., Ltd., Japan*

16:40 We2-L0-12 **Student** A124

Multi-pulse laser hole drilling: Process rate dependence on pulse repetition rate, heat accumulation and plume shielding , Omer Dolev¹, Yuval Berg¹, Zvi Kotler¹, ¹*Additive Manufacturing Group, Orbotech Ltd., Yavne, Israel, Israel*

17:00 We2-L0-13 A014

Comparative study of experimentally determined and simulated mechanical strength of fiber laser cut geometries in alumina substrates, Benedikt Adelman¹, Ralf Hellmann¹, ¹*University of Applied Sciences Aschaffenburg, Germany*

17:20 We2-L0-14 A205

Micro machining of through hole arrays in copper foil using picosecond green laser, Susumu Nakamura¹, ¹*National Institute of Technology, Nagaoka College, Japan*

17. LPM

Room 3

Biomedical Applications

Chair: Yoshiaki Nakata (Osaka University, Japan)

16:00 We3-LI-9 **Invited** A019

Optodynamics in medical laser applications, Peter Gregorcic¹, Matija Jezersek¹, Janez Mozina¹,
¹*Faculty of Mechanical Engineering, University of Ljubljana, Slovenia*

16:30 We3-L0-10 A168

Femtosecond laser processing and manipulation of plant cells for investigation of plant physiology, Yoichiro Hosokawa¹, Takanori Iino¹, Akinori Shigemasa¹, Kazusato Oikawa², Junko Kobayashi³, Mikio Nishimura², Akira Nagatani³,
¹*Graduate School of Materials Science, Nara Institute of Science and Technology, Japan*, ²*Department of Cell Biology, National Institute for Basic Biology, Japan*, ³*Graduate School of Science, Kyoto University, Japan*

16:50 We3-L0-11 A040

Characterizing ultrashort pulse ablation of the cornea, Anca Marian¹, Ossama Nada^{1,2}, Louis Hoffart³, Philippe Lassonde⁴, Francois Vidal⁴, Jean Meunier⁵, Sebastien Roy⁵, Francois Legare⁴, Jean-Claude Kieffer⁴, Santiago Costantino¹, Isabelle Brunette¹,
¹*Department of Ophthalmology, University of Montreal, Maisonneuve-Rosemont Hospital Research Center, Canada*, ²*Ain Shams University, Egypt*, ³*Département d'Ophthalmologie, Université de la Méditerranée, France*, ⁴*Institut National de la Recherche Scientifique - Centre Energie, Matériaux et Télécommunications, Canada*, ⁵*Department of Mathematics and Statistics, University of Montreal, Canada*

17:10 close

20. HPL5

Room 4

Monitoring

Chair: Kiyokazu Mori (NISSAN MOTOR CO.,LTD, Japan)

16:10 We4-HI-11 **Invited** A242

High speed imaging in laser processing – fully developed technology or still a topic of research?, Felix Tenner^{1,2}, Johannes Heberle^{1,2}, Michael Dobler^{1,2}, Michael Schmidt^{1,2},
¹*Institute of Photonic Technologies, Friedrich-Alexander-Universität Erlangen-Nürnberg, Konrad-Zuse-Str. 3/5, 91052 Erlangen, Germany*, ²*Graduate School in Advanced Optical Technologies, Friedrich-Alexander-Universität Erlangen-Nürnberg, Paul-Gordan-Str. 6, 91052 Erlangen, Germany*

16:40 We4-HI-12 **Invited** A111

Comprehensive diagnostics of CW- and power modulated welding of dissimilar metals, Florian Fetzer¹, Michael Jarwitz¹, Peter Stritt¹, Rudolf Weber¹, Thomas Graf¹,
¹*Institut fuer Strahlwerkzeuge (IFSW), University of Stuttgart, Germany*

17:10 We4-H0-13 A248

Observation of space above specimen during laser welding, Masami Mizutani¹, Yousuke Kawahito¹, Seiji Katayama¹,
¹*Joining and Welding Research Institute, Osaka University, Japan*

17:30 We4-H0-14 **Student** A076

In-situ 2D temperature measurement using multi-sensor camera during laser welding, Shotaro Yamashita¹, Motomichi Yamamoto¹, Kenji Shinozaki¹, Kota Kadoi¹, Kenji Mitsui², Hiroyuki Usui³,
¹*Graduate School of Engineering, Hiroshima University, Japan*, ²*Mitsui Photonics Ltd., Japan*, ³*Nobby Tech. Ltd., Japan*

17:50 close

Day 3: May 28, Thursday

21. LPM

Room 1

Nanoparticles

Chair: Tsuyoshi Asahi (Ehime University, Japan)

8:50 Th1-L0-1 Student A181

Synthesis of metal atom clusters by pulsed laser fragmentation in liquid and investigation of their ripening dynamics, Sandra Jendrzej¹, Bilal Gökce¹, Stephan Barcikowski¹, ¹University of Duisburg-Essen (Technical Chemistry I and Center for Nanointegration Duisburg-Essen), Germany

9:10 Th1-L0-2 Student A114

Amplified laser fragmentation of microparticles in a free liquid jet, Marcus Lau¹, Stephan Barcikowski¹, ¹University of Duisburg-Essen, Technical Chemistry I and Center for Nanointegration Duisburg-Essen (CENIDE),

9:30 Th1-L0-3 A234

Photocatalytic activities of TiO₂ nanocrystallites agglomerated in self-organized web-structures by gas-phase pulsed laser ablation, Takehito Yoshida¹, Katsushi Wakamiya², Tei Watanabe¹, Tamao Aoki², Akira Sugimura², Ikurou Umezū², ¹Course of Chemical Engineering, Anan National College of Technology, JAPAN, ²Department of Physics, Konan University, JAPAN

9:50 Th1-L0-4 Student A269

Electrical properties and surface morphology of printed silver nanoparticle ink sintered with pulsed or continuous Nd:YAG laser, Kyongtae Ryu¹, Ik Sang Lee¹, Kyung-Hoon Park¹, Hee Lak Lee¹, Kyoung Tae Kang², Hee Seok Kang², Jun Young Hwang², Seung-Jae Moon¹, ¹Department of mechanical engineering, Hanyang university, Korea, ²Korean institute of industrial technology, Korea

10:10 Coffee Break

25. LPM

Room 2

Ultrafast Laser Micromachining of Glass

Chair: Yves Bellouard (École Polytechnique Fédérale de Lausanne, Switzerland)

9:10 Th2-L0-2 A158

Femtosecond lasers for precision micromachining of transparent materials, Victor Matylitsky¹, Frank Hendricks¹, ¹Spectra-Physics, Rankweil, Austria

9:30 Th2-L0-3 A281

Femtosecond laser structuring in glass for opening novel fiber and film technologies, Peter Robert Herman¹, ¹Department of Electrical and Computer Engineering, University of Toronto, Canada

9:50 Th2-L0-4 A049

Micromachining of transparent, semiconducting and metal substrates using femtosecond laser beams, Simas Butkus¹, Domas Paipulas¹, Aleksandr Alesenkov¹, Mangirdas Malinauskas¹, Dalia Kaškelytė¹, Valdas Sirutkaitis¹, ¹Vilnius University, Laser Research Center, Lithuania

10:10 Coffee Break

Day 3: May 28, Thursday

29. LPM

Room 3

Surface Processing

Chair: Tetsuya Makimura (University of Tsukuba, Japan)

8:50 Th3-L0-1 A162

Micro/nanostructuring and surface modification of iron thin film by 157 nm F₂ laser, Masayuki Okoshi^{1,2}, Tsugito Yamashita², ¹National Defense Academy, Japan, ²Kanto Gakuin University, Japan

9:10 Th3-L0-2 A023

Substrate thinning of SiC semiconductor components using fiber laser, Benedikt Adelmann¹, Andreas Huerner², Gian Luca Roth¹, Ralf Hellmann¹, ¹University of Applied Sciences Aschaffenburg, Germany, ²Chair of Electron Devices, University of Erlangen-Nuremberg, Germany

9:30 Th3-L0-3 A121

Laser polarization condition affecting ablation quality of thin membranes for SiC or ceramic based GaN/ferroelectric thin film MEMS and pressure sensors, Johann Zehetner¹, Gabriel Vanko², J. Dzuba², Ivan Ryger², T. Lalinsky², Manuel Benkler³, Michal Lucki⁴, ¹Research Centre for Microtechnology, University of Applied Sciences, Hochschulstrasse 1, 6850 Dornbirn, Austria, Austria, ²Institute of Electrical Engineering, Slovak Academy of Sciences, Bratislava, Slovakia University of Applied Sciences, Slavakia, ³University of Freiburg, Department of Microsystems Engineering - IMTEK, Georges-Köhler-Allee102, D-79110 Freiburg, Germany, ⁴Czech Technical University, Faculty of Electrical Engineering, Dep. of Telecommunication Eng. Technicka 2, 16627 Prague 6, Czech Republic

9:50 Th3-L0-4 A091

Experimental research on laser machining of surface micro-textures of ceramic tool, Xin Wei¹, ¹Faculty of Electromechanical Engineering, Guangdong University of Technology, China

10:10 Coffee Break

33. HPL6

Room 4

Welding 3 (Plastic)

Chair: Kazuhisa Mikame (Maeda Industry Co., Ltd., Japan)

8:30 Th4-H0-1 A038

Laser-based joining of thermoplastics to metals: Influence of varied ambient conditions on joint performance and microstructure, Klaus Schrickler¹, Martin Stambke¹, Jean Pierre Bergmann¹, Kevin Bräutigam¹, ¹Technische Universität Ilmenau, Department of Production Technology, Germany

8:50 Th4-H0-2 A152

Effect of pin-like structures on laser-based joining of thermoplastic metal hybrids, Philipp Amend¹, Oliver Hentschel^{2,3}, Christian Scheitler^{2,3}, Stephan Roth^{1,2}, Michael Schmidt^{1,2,3}, ¹Bayerisches Laserzentrum GmbH, Germany, ²University of Erlangen-Nürnberg, Institute of Photonic Technologies, Germany, ³Erlangen Graduate School in Advanced Optical Technologies, Germany

9:10 Th4-H0-3 A153

Experimental and simulative investigations on laser-based joining of thermoplastic metal hybrids, Philipp Amend¹, Bernd Kohl², Stephan Roth^{1,4}, Michael Schmidt^{1,3,4}, ¹Bayerisches Laserzentrum GmbH, Germany, ²POLYPLAST SANDER GmbH, Germany, ³University of Erlangen-Nürnberg, Institute of Photonic Technologies, Germany, ⁴Erlangen Graduate School in Advanced Optical Technologies, Germany

9:30 Th4-H0-4 A214

Strength and fracture behaviour of dissimilar materials laser lap joint between SUS304 and PC, Yukio Miyashita¹, Akira Fujii², Yuichi Otsuka³, ¹Department of Mechanical Engineering, Nagaoka University of Technology, Japan, ²Graduate school of engineering, Nagaoka University of Technology, Japan, ³Department of System Safety, Nagaoka University of Technology, Japan

9:50 Th4-H0-5 **Student** A100

Examination of the bond strength of laser assisted plastic-metal-joints considering different load directions, Christoph Engelmann¹, Mirko Aden¹, Johannes Eckstädt¹, Alexander Olowinsky¹, Viktor Mamuschkin², ¹Fraunhofer Institute for Laser Technology ILT, Steinbachstr. 15, 52074 Aachen, Germany, ²Chair for Technology of Optical Systems, Steinbachstr. 15, 52074 Aachen, Germany

10:10 Coffee Break

22. LPM

Room 1

**L3-1: Laser Synthesis and Excitation of Nanoparticles
—Fundamentals and Integration of Laser Generated Nanoparticles—**

Chairs: Stephan Barcikowski (University of Duisburg-Essen, Germany) / Hiroyuki Wada (Tokyo Institute of Technology, Japan)

10:40 Th1-LI-5 **Invited** A050

Laser-induced picosecond-to-nanosecond dynamics of aqueous colloidal gold nanoparticles, Shuichi Hashimoto¹, ¹University of Tokushima, Japan

11:10 Th1-L0-6 **Student** A002

The effect of electrolyte concentration on silicon nanoparticles prepared by laser ablation in liquid, Pattarin Chewchinda¹, Yoshitaka Kitamoto¹, Hiroshi Funakubo¹, Michikazu Hara¹, Osamu Odawara¹, Hiroyuki Wada¹, ¹Tokyo Institute of Technology, Japan

11:30 Th1-L0-7 **Student** A233

Femtosecond laser ablation of iron in liquid environments, Alexander Kanitz¹, Jan Hoppius¹, M'Barek Chakif¹, Evgeny Gurevich¹, Andreas Ostendorf¹, ¹Applied Laser Technology, Ruhr-University Bochum, Germany

11:50 Th1-L0-8 A104

Rapid nanoparticle polymer composites prototyping by laser ablation in liquids, Stephan Barcikowski¹, ¹Technical Chemistry I, University of Duisburg-Essen and Center for Nanointegration Duisburg-Essen CENIDE, Universtitaetsstrasse 5, 45141 Essen, Germany,

12:10 Lunch Time

26. LPM

Room 2

Glass Drilling

Chair: Razvan Stoian (Université de Lyon, Université Jean Monnet, St. Etienne, France)

10:40 Th2-LI-5 **Invited** A017

Through-glass-vias with pulsed CO₂ laser, Junichi Nishimae¹, Tomotaka Katsura¹, Reona Hirayama¹, ¹Advanced Technology R&D Center, Mitsubishi Electric Corporation, Japan

11:10 Th2-L0-6 A194

Deep hole-drilling in silica glass using high repetition rate microsecond CO₂ laser pulses, Barada Nayak¹, Ravindra Akarapu¹, Joel Carberry¹, Anping Liu¹, ¹Corning Incorporated, USA

11:30 Th2-L0-7 A151

Laser processing of Borofloat[®]33 glass, Krystian L. Wlodarczyk¹, William N. MacPherson¹, Duncan P. Hand¹, ¹Heriot-Watt University, United Kingdom

11:50 Th2-L0-8 A197

Numerical modeling of CO₂ laser drilling of silica: Effect of multiple pulses, Ravindra Akarapu¹, Barada Nayak¹, Joel Carberry¹, Anping Liu¹, ¹Corning, USA

12:10 Lunch Time

Event Hall

Poster II

12:10 Poster Session II and Exhibition (Event Hall)

⌘ Lunch Time (up to 14:00)

30. LPM

Room 3

Micro-Machining

Chair: Masayuki Okoshi (national Defence Academy, Japan)

10:40 Th3-L0-5 A210

Micrometer-scale photo direct machining of polydimethylsiloxane using laser plasma EUV sources, Mizuki Ogawa¹, Hikari Urai², Shintaro Fukami¹, Shuichi Torii¹, Tetsuya Makimura¹, Daisuke Nakamura³, Tatsuo Okada³, Akihiko Takahashi⁴, Hiroyuki Niino⁵, Kouichi Murakami¹, ¹*Institute of Applied Physics, University of Tsukuba, Japan*, ²*College of Engineering Sciences, University of Tsukuba, Japan*, ³*Graduate School of Information Science and Electrical Engineering, Kyushu University, Japan*, ⁴*Graduate School of Health Science, Kyushu University, Japan*, ⁵*ISC, National Institute of Advanced Industrial Science and Technology (AIST), Japan*

11:00 Th3-L0-6 **Student** A060

Drilling of holes for force transmission elements in CFRP-preforms via ultra-short pulse laser radiation, Stefan Janssen¹, Niklas Fögen², Ingomar Kelbassa², Mesut Cetin³, Sebastian Oppitz³, ¹*RWTH Aachen University, Chair for Laser Technology (LLT), Germany*, ²*Fraunhofer Institute for Laser Technology (ILT), Germany*, ³*Institut für Textiltechnik (ITA) of RWTH Aachen University, Germany*

11:20 Th3-L0-7 A032

High-quality surface micromachining on polymer using visible-LIBWE, Ji-Yen Cheng^{1,2,3,4,5}, Wen-Chi Hsu¹, Wesley Wei-Cheng Kao¹, Mansoureh Mousavi¹, ¹*Research Center for Applied Sciences, Academia Sinica TAIWAN, Taiwan*, ²*Institute of Biophotonics, National Yang-Ming University, Taiwan*, ³*Biophotonics & Molecular Imaging Research Center (BMIRC), National Yang-Ming University, Taiwan*, ⁴*Department of Mechanical and Mechatronic Engineering, National Taiwan Ocean University, Taiwan*, ⁵*Ph.D. Program in Microbial Genomics, National Chung Hsing University, Taiwan*

11:40 Th3-L0-8 A192

Laser cutting of carbon fiber reinforced plastics (CFRP and CFRTP) by IR fiber laser irradiation, Hiroyuki Niino^{1,2}, Yoshihisa Harada^{1,2}, Kenji Anzai^{1,3}, Mitsuaki Aoyama^{1,3}, Masafumi Matsushita^{1,4}, Koichi Furukawa^{1,4}, Michiteru Nishino^{1,5}, Akira Fujisaki^{1,6}, Taizo Miyato^{1,6}, Takashi Kayahara^{1,6}, ¹*Advanced Laser and Process Technology Research Association (ALPROT), Japan*, ²*National Institute of Advanced Industrial Science and Technology (AIST), Japan*, ³*AMADA MIYACHI CO., LTD., Japan*, ⁴*Shin Nippon Koki Co., Ltd., Japan*, ⁵*Mitsubishi Chemical Corporation, Japan*, ⁶*Furukawa Electric Co., Ltd., Japan*

12:00 Lunch Time

34. HPL7

Room 4

Cutting and Drilling

Chair: Akihiko Nishimura (Japan Atomic Energy Agency, Japan)

10:50 Th4-H0-6 A102

Laser cutting and joining of fibre reinforced plastics within novel process chains, Frank Schneider¹, Christoph Engelmann¹, Dirk Petring¹, Norbert Wolf¹, Wolfgang Moll², ¹*Fraunhofer Institut for Lasertechnology, 52074 Aachen, Germany*, ²*Reis GmbH & Co. KG Maschinenfabrik, 52146 Würselen, Germany*

11:10 Th4-H0-7 A170

The study on application of laser technology for the reactor core dismantling, Hiroki Iwai¹, Yasuyuki Nakamura¹, Hiroyuki Mizui¹, Kazuya Sano¹, Yoshitsugu Morishita¹, ¹*Japan Atomic Energy Agency, Japan*

11:30 Th4-H0-8 A021

High speed and quality laser drilling technology by using prism rotating system, Toshiya Watanabe¹, Saneyuki Goya¹, Minoru Danno¹, Masato Kinouchi¹, Takashi Ishide¹, ¹*Mitsubishi Heavy Industries, Ltd, JAPAN*

11:50 Th4-H0-9 **Student** A001

Hybrid laser drilling of cooling holes by using millisecond pulsed fiber laser radiation and ultrashort pulsed laser radiation, Hermann Uchtmann¹, Ingomar Kelbassa², ¹*Chair for Laser Technology of RWTH Aachen University, Germany*, ²*Fraunhofer Institute for Laser Technology, Germany*

12:10 Lunch Time

Event Hall

Poster II

12:10 Poster Session II and Exhibition (Event Hall)

⊗ Lunch Time (up to 14:00)

23. LPM

Room 1

**L3-2: Laser synthesis and excitation of nanoparticles
—Optically active Nanoparticles—**

Chair: Hiroyuki Wada (Tokyo Institute of Technology, Japan)

14:00 Th1-LI-9 **Invited** A271

Preparation of functional nanoparticles by femtosecond laser ablation in liquid, Jianrong Qiu¹, ¹South China University of Technology, China

14:30 Th1-L0-10 **Student** A046

Preparations of Ca- α -SiAlON:Eu²⁺ nanoparticles by laser ablation in water, Haohao Wang¹, Touichirou Tomiya¹, Takashi Takeda², Naoto Hirotsaki², Osamu Odawara¹, Hiroyuki Wada¹, ¹Tokyo Institute of Technology, JAPAN, ²National Institute for Materials Science, JAPAN

14:50 Th1-L0-11 A161

Single-digit fluorescent nanodiamonds from raw high-pressure and high-temperature diamonds, G.W. Yang¹, J. Xiao¹, P. Liu¹, ¹Sun Yat-sen University, China

15:10 Th1-L0-12 A186

Optically transparent and electrically conductive composites made with laser-generated chained nanoparticles, Bilal Goekce, Jurij Jakobi, Stephan Barcikowski, ¹University of Duisburg-Essen, Germany

15:30 Coffee Break

27. LPM

Room 2

Nano Ripple Formation

Chair: Chunlei Guo (University of Rochester, USA)

14:00 Th2-LI-9 **Invited** A035

Laser-induced periodic surface structures (ripples): Current state of the art, Jörn Bonse¹, Sandra Höhm², Thibault J.-Y. Derrien^{1,3}, Arkadi Rosenfeld², Jörg Krüger¹, ¹BAM Federal Institute for Materials Research and Testing, Berlin, Germany, ²Max-Born-Institute for Nonlinear Optics and Short Pulse Spectroscopy, Berlin, Germany, ³HiLASE Centre, Institute of Physics ASCR, Dolní Břežany, Czech Republic

14:30 Th2-L0-10 A026

Dynamics of the formation of laser-induced periodic surface structures on dielectrics, semiconductors and metals upon femtosecond two-color double-pulse irradiation, Sandra Höhm¹, Marcel Herzlieb¹, Arkadi Rosenfeld¹, Jörg Krüger², Jörn Bonse², ¹Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie, Germany, ²BAM Bundesanstalt für Materialforschung und -prüfung, Germany

14:50 Th2-L0-11 A141

On large area LIPSS coverage by multiple pulses, Juergen Reif¹, Christian Martens¹, Markus Ratzke¹, Olga Varlamova¹, Stéphane Valette², Stéphane Benayoun², ¹Brandenburgische Technische Universität – BTU, Cottbus-Senftenberg, Germany, ²LTDS, Ecole Centrale de Lyon, Ecully, France

15:10 Th2-L0-12 **Student** A222

Influence of surface finish on the generation of LIPSS, Florian Preusch¹, Stefan Rung¹, Ralf Hellmann¹, ¹University of Applied Sciences Aschaffenburg, Germany

15:30 Coffee Break

31. LPM

Room 3

Internal Processing by Ultrafast Laser

Chair: Peter Herman (University of Toronto, Canada)

14:00 Th3-L0-9 A227

Visualisation of femtosecond laser-induced stress anisotropy in amorphous and crystalline materials, Ben McMillen¹, Feng Chen², Yves Bellouard¹, ¹*Galatea lab, STI/IMT, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland*, ²*Shandong University, School of Physics, China*

14:20 Th3-L0-10 A154

Femtosecond-laser induced ion-migration effects for the production of photonic elements, Jesus Hoyo¹, Belen Sotillo², Rebeca Martinez Vazquez³, Toney Teddy Fernandez¹, Jan Siegel¹, Paloma Fernandez², Roberto Osellame³, Javier Solis¹, ¹*Laser Processing Group, Instituto de Optica, CSIC, Serrano 121, 28006 Madrid, SPAIN*, ²*Depto. de Física de Materiales, Facultad de Fisicas, Univ. Complutense, 28040 Madrid, SPAIN*, ³*Instituto di Fotonica e Nanotecnologie, CNR, Piazza Leonardo da Vinci 32, 20133 Milano, ITALY*

14:40 Th3-L0-11 A115

Evolution from a single nanovoid to a nanocrack over multi-shots of femtosecond laser pulses, Yang Liao¹, Jielei Ni¹, Lingling Qiao¹, Min Huang², Yves Bellouard³, Koji Sugioka⁴, Ya Cheng¹, ¹*Shanghai Institute of Optics and Fine Mechanics, China*, ²*Sun Yat-sen University, China*, ³*Eindhoven University of Technology, Netherlands*, ⁴*RIKEN Center for Advanced Photonics, Japan*

15:00 Th3-LI-12 A025 **Invited**

Controlled ultrafast laser nanostructuring via spatiotemporal pulse design; applications in 3D photonics, Razvan Stoian¹, ¹*Laboratoire Hubert Curien, CNRS UMR 5516, Université Jean Monnet, France*

15:30 Coffee Break

35. HPL8

Room 4

Additive Manufacturing 1

Chair: Dirk Petring (Fraunhofer-Institute for Laser Technology ILT, Germany)

14:00 Th4-HI-10 A278 **Invited**

Microstructure and mechanical properties evolution of biomedical Co-Cr-Mo alloys produced by electron beam additive manufacturing in comparison with laser beam additive manufacturing, Akihiko Chiba¹, Yuichiro Koizumi¹, Shihai SUN¹, Shingo Kurosu¹, ¹*Deformation Processing, Institute for Materials Research, Tohoku University, Japan*

14:30 Th4-H0-11 A198

Effect of energy input on microstructure and mechanical properties of selective laser melted Ti6Al4V alloy, Jie Han¹, Jingjing Yang¹, Hanchen Yu¹, Zemin Wang¹, Xiaoyan Zeng¹, ¹*Wuhan National Laboratory for Optoelectronics, Huazhong University of Science and Technology, China*

14:50 Th4-H0-13 A215 **Student**

Influence of Cu addition to improve shape memory characteristics in NiTi alloys developed by laser rapid manufacturing, Shiva Sekar¹, I. A. Palani¹, S. K. Mishra², C. P. Paul², L. M. Kukreja², ¹*Mechatronics and Instrumentation Laboratory, Indian Institute of Technology, Indore, India*, ²*Laser Materials Processing Division, Raja Ramanna Centre for Advanced Technology, Indore, India*

15:10 Coffee Break

24. LPM

Room 1

L3-3: Laser Synthesis and Excitation of Nanoparticles —Laser Fragmentation and Laser Melting—

Chair: Bilal Goekce (University of Duisburg-Essen, Germany)

16:00 Th1-LI-13 **Invited** A258

Nanoparticle formation by pulsed-laser fragmentation in liquid: Mechanism and applications, Tsuyoshi Asahi¹,
¹Ehime University, Japan

16:30 Th1-L0-14 A106

How to fabricate a high quality heterogeneous catalyst by laser ablation?, G. Marzun^{1,2}, P. Wagener^{1,2}, Stephan Barcikowski¹,¹University of Duisburg-Essen, Technical Chemistry I and Center of Nanointegration Duisburg-Essen (CENIDE), Germany, ²University of Duisburg-Essen, NanoEnergieTechnikZentrum NETZ, Germany

16:50 Th1-L0-15 A045

Preparation of titanium nitride spherical particles by laser melting in water, Hiroyuki Wada¹, Kosuke Kawasoe¹, Yoshie Ishikawa², Naoto Koshizaki³, Osamu Odawara¹,¹Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology, Japan, ²Nanosystem Research Institute, National Institute of Advanced Industrial Science and Technology, Japan, ³Factory of Engineering, Hokkaido University, Japan

17:10 Th1-L0-16 A092

Laser-induced melting in liquids using gold nanoparticles stabilized by Na₂CO₃, Takeshi Tsuji¹, Isami Takade¹, Masaharu Tsuji², Yoshie Ishikawa³, Naoto Koshizaki⁴,¹Shimane University, Japan, ²Kyushu University, Japan, ³AIST, Japan, ⁴Hokkaido University, Japan

28. LPM

Room 2

Electronics Applications

Chair: Toshihiko Ooie (AIST, Japan)

16:00 Th2-L0-13 **Student** A137

Micro scribing of copper thin film in air and water using pulsed Nd³⁺:YAG laser, Srinagalakshmi Nammi¹, Nilesh J Vasa¹, Balaganesan G², Sanjay Gupta³, Anil C Mathur³,
¹Department of Engineering Design, Indian Institute of Technology Madras, India, ²Department of Mechanical Engineering, Indian Institute of Madras, India, ³Scientist, Antenna Mechanical Design Division, Indian Space Research Organization, India

16:20 Th2-L0-14 A039

Innovative strategies for the removal of organic compounds in nanoparticle ITO layer, Florian Mikschl^{1,2}, Marcus Baum^{1,2}, Michael Schmidt^{1,2},¹Institute of Photonic Technologies, Friedrich-Alexander-University Erlangen-Nuremberg, Germany, ²Erlangen Graduate School in Advanced Optical Technologies (SAOT), Friedrich-Alexander-University Erlangen-Nuremberg, Germany

16:40 Th2-L0-15 A072

Twin gas jet-assisted pulsed green laser scribing of sapphire substrate, Xiaozhu Xie^{1,2}, Zhiqiang Luo¹, Xin Wei¹, Wei Hu¹,¹School of Electromechanical Engineering, Guangdong University of Technology, China, ²Guangdong Provincial Key Laboratory of Micro-nano Manufacturing Technology and Equipment, China

17:00 Th2-L0-16 **Student** A231

Modification of the CdTe-In interface by irradiation with nanosecond laser pulses through the CdTe crystal, Kateryna S. Zelenska¹, Dmytro V. Gnatyuk², Toru Aoki^{3,4},¹Taras Shevchenko National University of Kyiv, Ukraine, ²Graduate School of Science and Technology, Shizuoka University, Japan, ³Graduate School of Informatics, Shizuoka University, Japan, ⁴Research Institute of Electronics, Shizuoka University, Japan

17:20 Th2-L0-17 **Student** A294

Laser-induced creation of marks as information carriers for digital recording, Volodymyr A. Gnatyuk¹, Oleksandr I. Vlasenko¹, Sergiy N. Levytskyi¹, Toru Aoki^{2,3}, Vygantas Mizeikis³, Sergey V. Gagarsky⁴, Kateryna S. Zelenska⁵, Dmytro V. Gnatyuk⁶,¹V.E. Lashkaryov Institute of Semiconductor Physics of the National Academy of Sciences of Ukraine, 41 Nauky Ave., Kyiv 03028, Ukraine, ²Graduate School of Informatics, Shizuoka University, 3-5-1 Johoku, Naka-ku, Hamamatsu 432-8011, Japan, ³Research Institute of Electronics, Shizuoka University, 3-5-1 Johoku, Naka-ku, Hamamatsu 432-8011, Japan, ⁴ITMO University, 49 Kronverksky Ave., Saint Petersburg 197101, Russia, ⁵Taras Shevchenko National University of Kyiv, 64/13 Volodymyrska Str., Kyiv 01601, Ukraine, ⁶Graduate School of Science and Technology, Shizuoka University, 3-5-1 Johoku, Naka-ku, Japan

Banquet

18:30 from the venue to Banquet on foot

19:00 Banquet (Rihga Royal Hotel Kokura, 4th Floor, "Royal Hall")

32. LPM

Room 3

Surface Formation and Deposition

Chair: Ajoy Kumar Kar (Heriot Watt University, UK)

16:00 Th3-L0-13 A164

Resonant vibrational excitation of ethylene molecules in laser-assisted diamond deposition, L.S. Fan¹, Y.S. Zhou¹, M.X. Wang¹, Y. Gao¹, J.F. Silvain², Y.F. Lu¹, ¹*University of Nebraska-Lincoln, United States*, ²*Institut de Chimie de la Matière Condensée de Bordeaux, France*

16:20 Th3-L0-14 A067

Nanostructures on silicon induced by nanosecond laser in water, Xiaohong Li¹, Yongjia Yang¹, Rong Qiu¹, Sifu Hu¹, Zhihui Li², ¹*Southwest University of Science and Technology, China*, ²*Sichuan University, China*

16:40 Th3-L0-15 **Student** A226

Transition from femtosecond laser induced bubbles modification to nanogratings in fused silica on the boundary of the cumulative regime, Eric Ofosu Kissi¹, Yves Bellouard¹, ¹*Galatea Lab, STI/IMT, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland*

17:00 Th3-L0-16 **Student** A125

Pulsed Nd³⁺:YAG laser assisted micro dimple formation in chromium films under different ambient conditions, Ezhil Maran V¹, ¹*Department of Mechanical Engineering, Indian Institute of Technology Madras, INDIA*

17:20 Th3-L0-17 A139

Influence of laser beam profile on Nd³⁺:YAG laser assisted formation of polycrystalline-Si films in underwater conditions, Esther Blesso Vidhya Y¹, Sriram R¹, Nilesh J Vasa¹, ¹*Indian Institute of Technology Madras, India*

36. HPL9

Room 4

Surface Treatment

Chair: Seiji Katayama (Osaka University, Japan)

16:00 Th4-H0-14 A160

Systems engineering for laser heat treatment, Jan Hannweber¹, Steffen Bonß¹, Stefan Kuehn¹, Marko Seifert¹, Dirk Poegen¹, Eckhard Beyer^{1,2}, ¹*Fraunhofer IWS, Winterbergstrasse 28, 01277 Dresden, Germany*, ²*Technische Universität Dresden, Institute of Manufacturing Technology, George-Baehr-Strasse 3c, 01069 Dresden, Germany*

16:20 Th4-H0-15 A206

Heat-sink assisted laser transformation hardening of carbon steel sheets, Hyungson Ki¹, Sangwoo So¹, Sanseo Kim¹, ¹*Ulsan National Institute of Science and Technology (UNIST), South Korea*

16:40 Th4-H0-16 A063

Laser assisted rollforming process of ultra-high strength steel using a novel plug-in diode heating system, Pablo M. Romero¹, Nerea Otero¹, Jacobo Otero¹, Jordi García², Andreas Dannheisig³, ¹*AIMEN, Laser Applications Centre, Relva 27A, 36410, Porriño, Spain*, ²*MONOCROM SL, Rda. Europa SN, 08800, Vilanova i la Gertrú, Spain*, ³*Johnson Controls Inc., Industriestrasse 20-30, 51399, Burscheid, Germany*

17:00 Th4-H0-17 A221

Quality aspects in selective laser melting, Henry Köhler¹, Thomas Seefeld¹, Claus Thomy¹, Frank Vollertsen^{1,2}, ¹*BIAS - Bremer Institut für angewandte Strahltechnik GmbH, Klagenfurter Str. 2, 28359 Bremen, Germany*, ²*University Bremen, Bibliothekstr. 1, 28359 Bremen, Germany*

17:20 Th4-H0-18 **Student** A284

LSM rejuvenation for the decayed nickel-based alloys in nuclear industry, Hwa-Teng Lee¹, Bing-Chun Tseng¹, Yuan-Chih Chang¹, ¹*National Cheng Kung University, TAIWAN*

Banquet

18:30 from the venue to Banquet on foot

19:00 Banquet (Rihga Royal Hotel Kokura, 4th Floor, "Royal Hall")

Day 4: May 29, Friday

37. LPM

Room 1

Industrial Applications

Chair: Kunihiko Washio (Paradigm Laser Research Ltd., Japan)

8:50 Fr1-L0-1 A033

Evaluation of scanner-based focus finding methods on rough surfaces, Kristian Cvecek^{1,3,4}, Johannes Eckl², Sasia Eiselen³, Heinz Huber², Michael Schmidt^{1,3,4}, ¹*Institute of Photonic Technologies, Friedrich-Alexander-University of Erlangen-Nuremberg, Germany*, ²*Laserzentrum Hochschule München, Fakultät 06, Germany*, ³*blz - Bayerisches Laserzentrum, Germany*, ⁴*SAOT - Erlangen Graduate School in Advanced Optical Technologies, Friedrich-Alexander-University of Erlangen-Nuremberg, Germany*

9:10 Fr1-L0-2 **Student** A174

Hole shape control by a non-axisymmetrically polarized laser beam, Hiroshi Kikuchi¹, Akio Mizutani¹, Hisao Kikuta¹, ¹*Department of Mechanical Engineering, Graduate school of Engineering, Osaka Prefecture University, Japan*

9:30 Fr1-L0-3 **Student** A228

A monolithic micro-tensile tester fabricated by femtosecond laser to investigate fused silica mechanical properties, Christos Edward Athanasiou¹, Yves Bellouard¹, ¹*Galatea lab, STI/IMT, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland*

9:50 Fr1-L0-4 **Student** A270

Comparison of calibration method for calorific value analysis of a coal using laser induced breakdown spectroscopy, Kyung-Hoon Park¹, Soo-Min Kim¹, Jung-Hyun Choi², Seung-Jae Moon¹, ¹*Department of mechanical engineering, Hanyang university, Korea*, ²*Department of environmental science and engineering, Ewha University, Korea*

10:10 Coffee Break

40. LPM

Room 2

Solar Cells

Chair: Shuichi Hashimoto (The University of Tokushima, Japan)

8:50 Fr2-L0-1 A150

Laser processing of thin flex glass for microelectronic, OLED lighting, display and photovoltaic applications, Krystian L. Wlodarczyk¹, Adam Brunton², Phil Rumsby², Duncan P. Hand¹, ¹*Heriot-Watt University, United Kingdom*, ²*M-Solv, United Kingdom*

9:10 Fr2-L0-2 A128

Femtosecond and picosecond laser ablation of CIGS solar cell, Stephanie Leyder¹, Gaelle Coustillier¹, Brendan Dunne², Philippe Delaporte¹, ¹*Aix-Marseille University, CNRS, LP3 Laboratory, FRANCE*, ²*NEXCIS photovoltaic technology, FRANCE*

9:30 Fr2-L0-3 A089

Femtosecond laser scribing of Cu(In,Ga)Se₂ thin-film solar cell, Aiko Narazaki¹, Ryuzo Kurosaki¹, Tadatake Sato¹, Hiroyuki Niino¹, Hideyuki Takada², Kenji Torizuka², Jiro Nishinaga³, Yukiko Kamikawa-Shimizu³, Shogo Ishizuka³, Hajime Shibata³, ¹*Research Institute for Innovation in Sustainable Chemistry, AIST, Japan*, ²*Electronics and Photonics Research Institute, AIST, Japan*, ³*Research Center for Photovoltaic Technologies, AIST, Japan*

9:50 Fr2-L0-4 A187

Picosecond laser modification of CIGS active layer, Paulius Gecys¹, Edgaras Markauskas¹, Andrius Zemaitis¹, Gediminas Raciukaitis¹, ¹*Center for Physical Sciences and Technology, Lithuania*

10:10 Coffee Break

Day 4: May 29, Friday

43.

Room 3

46. HPL10

Room 4

No Session

Welding 4

Chair: Koji Hirano (NIPPON STEEL & SUMITOMO METAL CORPORATION, Japan)

8:50 Fr4-H0-1 A240

Laser welding of 9%Ni steel using a 3kW single mode fiber laser, Muneharu Kutsuna¹, ¹*Advanced Laser Technology Research Center Co., Ltd., Japan*

9:10 Fr4-H0-2 A133

High-speed laser welding of different steel grades with a 3 kW single-mode cw fiber laser, Jan Drechsel¹, Udo Löschner¹, Matthias Wagner¹, Johannes Barth¹, Jörg Schille¹, ¹*Laserinstitut Hochschule Mittweida - University of Applied Sciences, Laserinstitut, Germany*

9:30 Fr4-H0-3 A275

Remote laser welding for closure parts, Kazuhiko Kagiya¹, Kiyokazu Mori¹, Taishi Tarui¹, ¹*Nissan Motor Co., Ltd., Japan*

9:50 Fr4-H0-4 **Student** A013

Investigation of the influence of the joining gap size on the fluid dynamics in laser welding of zinc-coated steel sheets, Felix Tenner^{1,2}, Florian Klämpfl¹, Michael Schmidt^{1,2}, ¹*Institute of Photonic Technologies, Friedrich-Alexander-Universität Erlangen-Nürnberg, Konrad-Zuse-Str. 3/5, 91052 Erlangen, Germany*, ²*Graduate School in Advanced Optical Technologies, Friedrich-Alexander-Universität Erlangen-Nürnberg, Paul-Gordan-Str. 6, 91052 Erlangen, Germany*

10:10 Coffee Break

38. LPM

Room 1

Sensor Fabrication

Chair: Roger Jagdish Narayan (University of North Carolina, USA)

10:30 Fr1-L0-5 A177

Fabrications of heat resistant FBG sensor and the installation on a sodium circulation loop, Takuya Shimomura, Akihiko Nishimura, Takaya Terada, Yusuke Takenaka, Hiroyuki Daido, ¹Japan atomic Energy Agency, Kizaki Tsuruga Fukui, Japan, ²Japan Atomic Energy Agency, Umebidai Kizugawa Kyoto, Japan, ³A-Tech, Japan

10:50 Fr1-L0-6 A020

Zinc oxide film applied on optical fiber sensors in different materials and sizes, Yi-Cheng Hsu¹, Shang-Chao Hung², Wei-Jen Cheng¹, Hsin-Hong Lin¹, Yu-Sheng Zhu¹, ¹Department of Biomechatronics Engineering, National Pingtung University of Science and Technology 912, Taiwan, ²Department of Information Technology and Communication, Shih Chien University, Kaohsiung Campus 845, Taiwan

11:10 Fr1-L0-7 A129

Characteristics of side-polished fiber sensor with grating film based on intensity and wavelength shift, Yi-Cheng Hsu¹, Sin-Hong Lin¹, Yu-Sheng Zhu¹, ¹Department of Biomechatronics Engineering, National Pingtung University of Science and Technology, Pingtung, Taiwan

11:30 Fr1-L0-8 A009

Fabrication and sensing characteristics of microfluidic refractive index Mach-Zehnder interferometers, Jian-Neng Wang¹, Chen-Han Jan², Wei-Te Wu³, Chien-Hsing Chen⁴, Yu-Xiang Zheng¹, Jun-Ting Huang³, ¹National Yunlin University of Science and Technology, Taiwan, ²National Taiwan University, Taiwan, ³National Pingtung University of Science and Technology, Taiwan, ⁴National Chung Cheng University, Taiwan

11:50 Fr1-L0-9 A012

The study of the phase difference of beam splitters structure in the fiber-optic Mach-Zehnder interferometer, Wei-Te Wu¹, Jian-Neng Wang², Pei-Hsing Huang³, Chien-Hsing Chen⁴, Jun-Ting Huang¹, Yu-Ren Wu⁵, ¹Dept. of Biomechatronics Eng., Natl. Pingtung Univ. of Sci. and Technol., Pingtung, Taiwan, ²Dept. of Construction Eng., Natl. Yunlin Univ. of Sci. and Technol., Douliou, Taiwan, ³Dept. of Mechanical Eng., Natl. Pingtung Univ. of Sci. and Technol., Pingtung, Taiwan, ⁴Center for Nano Bio-detection, Natl. Chung Cheng Univ., Chiayi, Taiwan, ⁵Dept. of Mechanical Eng., Natl. Central Univ., Taoyuan, Taiwan

12:10 Lunch Time

41. LPM

Room 2

Laser Printing and Devices

Chair: Yoichiroh Hosokawa (Nara Institute of Science and Technology, Japan)

10:30 Fr2-LI-5 Invited A077

Laser printing and functionalisation of sensors, Ioanna Zergioti¹, ¹Physics Department, National Technical University of Athens, Greece

11:00 Fr2-L0-6 A147

Femtosecond laser-induced patterned transfer of intact semiconductor and polymer thin films via a digital micromirror device, Matthias Feinaeugle, Dan J Heath, Ben Mills, James A Grant-Jacob, Goran Z Mashanovich, Rob W Eason, ¹Optoelectronics Research Centre, University of Southampton, SO17 1BJ, United Kingdom

11:20 Fr2-L0-7 A117

High speed photography of laser induced forward transfer (LIFT) of single and double-layered transfer layers for single cell transfer, Dominik Arthur Riestler¹, Jan-Hendrik Budde¹, Arnold Gillner¹, Martin Wehner¹, ¹Fraunhofer Institute for Laser Technology, Germany

11:40 Fr2-LI-8 Invited A268

Bioinspired microfabrication of smart structures using femtosecond laser, Feng Chen¹, Qing Yang¹, Jiale Yong¹, Dongshi Zhang¹, Xun Hou¹, ¹State Key Laboratory for Manufacturing System Engineering & Key Laboratory of Photonics Technology for Information of Shaanxi Province, School of Electronics & Information Engineering, Xi'an Jiaotong University, P. R. China

12:10 Lunch Time

44. LPM

Room 3

Micro-processing with fs Laser

Chair: Shoji Maruo (Yokohama National University, Japan)

10:30 Fr3-L0-1 **Student** A098

Femtosecond double pulse laser ablation of silicon, Daniel Johannes Förster^{1,2}, André Lucke², Rudolf Weber², Thomas Graf², ¹Graduate School of Excellence advanced Manufacturing Engineering GSaME, University of Stuttgart, Nobelstrasse 12, 70569 Stuttgart, Germany, ²Institut für Strahlwerkzeuge IFSW, University of Stuttgart, Pfaffenwaldring 43, 70569 Stuttgart, Germany

10:50 Fr3-L0-2 A191

Influence of spatial and temporal pulse overlap on ultra-short pulsed laser ablation of thin layers, Daniel Trusheim¹, Michael Juengst¹, ¹Fraunhofer Institute for Laser Technology ILT, Germany

11:10 Fr3-L0-3 A189

From picosecond to femtosecond pulses in laser microprocessing: Where is the optimum?, Christof Siebert¹, Simone Russ², Bastian Becker³, Matthias Koitzsch¹, ¹TRUMPF Laser- und Systemtechnik GmbH, Johann-Maus-Str. 2, 71254 Ditzingen, Germany, ²TRUMPF Laser GmbH + Co. KG, Aichhalder Straße 39, 78713 Schramberg, Germany, ³TRUMPF Corporation, 1-18-2, Hakusan, Midori-ku, Yokohama, 226-0006, Japan

11:30 Fr3-L0-4 A149

Power scaling into the 100W regime for surface texturing of metals with ultra-short laser pulses, Beat Neuenschwander¹, Beat Jaeggi¹, Markus Zimmermann¹, Guido Hennig², Kurt Weingarten³, Bojan Resan³, Ronny de Loor⁴, Lars Penning⁴, Vesna Markovic³, ¹Bern University of Applied Sciences, Pestalozzistrasse 20, CH-3400 Burgdorf, Switzerland, ²Daetwyler Graphics, Flugplatz, CH-3368 Bleienbach, Switzerland, ³JDSU Ultrafast Lasers AG, Ruetistrasse 12, CH-8952 Schlieren, Switzerland, ⁴Next Scan Technology, Ulftseweg 14, 7064 BD Silvolde, The Netherlands

11:50 Fr3-L0-5 A031

High-energy sub-50 fs pulses via nonlinear compression in hypocycloid-core Kagome fiber, Florent Guichard^{1,2}, Yoann Zaouter², Marc Hanna¹, Quentin Mocaer², Guillaume Machinet², Benoit Debord⁴, Frederic Gerome^{4,5}, Pascal Dupriez³, Clemens Honninger², Eric Mottay², Fetah Benabid^{4,5}, Patrick Georges¹, ¹Laboratoire Charles Fabry, Institut d'Optique, CNRS, France, ²Amplitude Systèmes, France, ³Alphanov, France, ⁴GPPMM Group, Xlim Research Institute, CNRS, France, ⁵GLOphotonics, France

12:10 Lunch Time

47. HPL11

Room 4

Surface Treatment (Cladding)

Chair: Wang Jing-Bo (Panasonic Welding Systems Co., Ltd., Japan)

10:30 Fr4-H0-5 A183

Impact of material and process parameters on particle distribution during laser deep alloying processes and resulting wear resistance, Joerg Volpp¹, Alexander Zingraf¹, Frank Vollertsen^{1,2}, ¹BIAS - Bremer Institut fuer angewandte Strahltechnik GmbH, Germany, ²University of Bremen, Germany

10:50 Fr4-H0-6 A041

Laser cladding and tribocorrosion testing of cobalt-free hardfacing materials for sodium fast reactors, Pascal J. Aubry¹, Van De Tran¹, Cécile Blanc¹, Varlet Jérôme¹, ¹CEA/DEN/DANS/DPC/SEARS/LISL, CEA Saclay, 91191 Gif-sur-Yvette, France

11:10 Fr4-H0-7 A229

On the formation of solidification and liquation cracking during laser metal deposition of Ni-based superalloys, James Chen, ¹CanmetMATERIALS, Natural Resources Canada, Canada

11:30 Fr4-H0-8 A196

The latest laser metal deposition technology, Tsuyoshi Nakamura¹, Bastian Becker¹, ¹TRUMPF Corporation, Japan

11:50 Fr4-H0-9 **Student** A024

Effect of particle diameter on heat input in laser cladding, Daichi Tanigawa¹, Nobuyuki Abe², Masahiro Tsukamoto², Hiroyuki Yamazaki², Yoshihiko Hayashi², Yoshihiro Tatsumi³, Mikio Yoneyama³, ¹Graduate school of Engineering, Osaka University, Japan, ²Joining and Welding Research Institute, Osaka University, Japan, ³Osaka Fuji Corporation, Japan

12:10 Lunch Time

39. LPM

Room 1

Laser-Based Direct Write Technologies

Chair: Ioanna Zergioti (National Technical University of Athens, Greece)

13:10 We3-LI-12 **Invited** A254

Two photon polymerization-based manufacturing of medical devices, Roger Jagdish Narayan¹, ¹UNC/NCSU Joint Department of Biomedical Engineering, USA

13:40 Fr1-L0-10 A165

Laser direct writing of graphene patterns on dielectric surfaces under ambient conditions, W. Xiong¹, Y. S. Zhou¹, W. J. Hou¹, L. J. Jiang¹, Y.F. Lu¹, ¹University of Nebraska-Lincoln, United States

14:00 Fr1-L0-11 A065

Direct laser writing of micropillars on siloxane moulds for microrreplication, Nerea Otero¹, Pablo M. Romero¹, George Goh¹, Daniel Sanmartin², ¹AIMEN Laser Applications Centre, Spain, ²Applied Functional Materials, United Kingdom

14:20 Fr1-LI-12 **Invited** A282

3-D chalcogenide photonic devices, Ajoy Kumar Kar¹, ¹Institute of Photonics and Quantum Sciences, Heriot Watt University, UK

14:50 Coffee Break

42. LPM

Room 2

Advanced Laser Materials Processing

Chair: Etsuji Ohmura (Osaka University, Japan)

13:30 Fr2-LI-9 **Invited** A252

Black and colored metals and applications, Chunlei Guo¹, ¹The Institute of Optics, University of Rochester, USA

14:00 Fr2-L0-10 A120

High rate micro cladding using a short pulsed fiber laser, Martin Erler¹, Robby Ebert¹, Stefan Gronau¹, Matthias Horn¹, Sascha Klötzer¹, Horst Exner¹, ¹Laserinstitut Hochschule Mittweida, Germany

14:20 Fr2-L0-11 **Student** A235

Thin film interference effects during laser ablation of stratified film systems, Jan Friedrich Duesing¹, Juergen Koch¹, Oliver Suttman¹, Ludger Overmeyer¹, ¹Laser Zentrum Hannover e.V., Hollerithalle 8, 30419 Hannover, Germany

14:40 Coffee Break

45. LPM

Room 3

Laser-Induced Modification and Patterning for 2D and 3D Devices

Chair: Feng Chen (Xian Jiaotong University, China)

13:30 Fr3-L0-6 A068

Local photorefractive modification in lithium niobate using ultrafast direct laser write technique, Domas Paipulas^{1,3}, Ričardas Buividas², Saulius Juodkazis², Vyngantas Mizeikis³, ¹*Laser Research Center, Department of Quantum Electronics, Vilnius University, Lithuania*, ²*Centre for Micro-Photonics, Swinburne University of Technology, Australia*, ³*Research Institute of Electronics, Shizuoka University, Japan*

13:50 Fr3-L0-7 A011

Large mode area waveguides by ultrafast laser photoinscription, Xin Liu¹, Razvan Stoian², Guang Hua Cheng¹, ¹*State Key Laboratory of Transient Optics and Photonics, Xi'an Institute of Optics and Precision Mechanics of CAS, china*, ²*Laboratoire Hubert Curien, UMR 5516 CNRS, Université de Lyon, Université Jean Monnet, france*

14:10 Fr3-L0-8 A057

Reversible deformation of laser-patterned photoresist structures, Sima Rekštytė¹, Domas Paipulas¹, Vyngantas Mizeikis², ¹*Laser Research Center, Department of Quantum Electronics, Vilnius University, Lithuania*, ²*Research Institute of Electronics, Shizuoka University, Japan*

14:30 Fr3-L0-9 A126

Reduction of CuO nanoparticles for Cu micropatterning by femtosecond laser pulses, Mizue Mizoshiri¹, Shun Arakane¹, Junpei Sakurai¹, Seiichi Hata¹, ¹*Department of Micro-Nano Systems Engineering, Graduate School of Engineering, Nagoya University, Japan*

14:50 Coffee Break

48. HPL12

Room 4

Additive Manufacturing 2

Chair: Takashi Ishide (Mitsubishi Heavy Industries, Japan)

13:30 Fr4-HI-10 Invited A277

Additive manufacturing in series production: Recent research topics at Fraunhofer ILT with a focus on turbomachinery, Jeroen Risse¹, Wilhelm Meiners¹, ¹*Fraunhofer Institute for Laser Technology, Germany*

14:00 Fr4-H0-11 A059

Additive manufacturing of a blade integrated disk (BLISK) with laser metal deposition, Johannes Michael Witzel^{1,2}, Norbert Pirch², Andres Gasser², ¹*RWTH Aachen University, Germany*, ²*Fraunhofer Institute for Lasertechnology, Germany*

14:20 Fr4-H0-12 A042

Instrumentation, modelling, and robust control of direct metal deposition for direct manufacturing of aeronautics components, Rezak Mezari¹, Pascal Aubry¹, Thierry Malot¹, ¹*PIMM, Arts et Métiers ParisTech, 151 Bd de l'Hopital, 75013 Paris, France*

14:40 Coffee Break

49. LPM-HPL**Main Hall****Joint Session**

Chair: Yongfeng Lu (University of Nebraska-Lincoln, USA)

15:10 FrM-JI-1 **Invited** A006

Properties of laser-beam welded ultra-high strength martensitic stainless steels, Martin Dahmen¹, Vitalij Janzen², Stefan Lindner³, Rainer Wagener⁴, Dirk Petring¹, ¹*Fraunhofer Institute for Laser Technology, Germany*, ²*Laboratory for Materials and Joining Technology, Paderborn University, Germany*, ³*Outokumpu Nirosta GmbH, Germany*, ⁴*Fraunhofer Institute for Structural Durability and System Reliability, Germany*

15:40 FrM-JI-2 **Invited** A167

Performance of one hundred watt HVM LPP-EUV source, Hakaru Mizoguchi¹, Hiroaki Nakarai¹, Tamotsu Abe¹, Krzysztof M Nowak¹, Yasufumi Kawasuji¹, Hiroshi Tanaka¹, Yukio Watanabe¹, Tsukasa Hori¹, Takeshi Kodama¹, Yutaka Shiraiishi¹, Tatsuya Yanagida¹, Georg Soumagne¹, Tsuyoshi Yamada¹, Taku Yamazaki¹, Shinji Okazaki¹, Takashi Saitou¹, ¹*Gigaphoton Inc., Japan*

Main Hall**Closing**

Chair: Hiroyuki Niino

16:10 Outstanding Awards

Closing Remark

16:30 close

Poster Session

May 27, 10:30 Short Presentation for Poster Session I & II (Room 1)

May 27, 12:10 Poster Session I and Exhibition (Event Hall)

May 28, 12:10 Poster Session II and Exhibition (Event Hall)

The authors should be present in front of their posters

during 12:10-14:00 on May 27 and May 28.

LPM

- P-1 **Student** A071
The shape of the exfoliated surface during femtosecond laser ablation, Naoya Kakimoto¹, Takashi Eyama¹, Idustu Rui¹, Takuro Tomita¹, Noboru Hasegawa², Masaharu Nishikino², Yasuo Minami³, Motoyoshi Baba³, Tetsuya Kawachi², Mitsuru Yamagiwa², Tohru Suemoto³, ¹*Faculty of Engineering, The Tokushima University, Japan*, ²*Quantum Beam Science Center, Japan Atomic Energy Agency, Japan*, ³*Institute for Solid State Physics, The University of Tokyo, Japan*
- P-2 A175
Laser induced minority carrier lifetime in pn junction, Toshiyuki Sameshima¹, Tomohiko Nakamura¹, Shinya Yoshidomi¹, Masahiko Hasumi¹, ¹*Tokyo University of Agriculture & Technology, Japan*
- P-3 A142
Oxidative laser fragmentation for ultra-small pure gold clusters with subsequent support to graphene nanosheets, Ina Haxhiaj¹, Marcus Lau¹, Junji Nakamura², Philipp Wagener¹, Stephan Barcikowski¹, ¹*University of Duisburg-Essen, Technical Chemistry I and Center for Nanointegration Duisburg-Essen (CENIDE), Universitätsstr. 7, Essen, D-45141, Germany*, ²*Faculty of Pure and Applied Sciences, University of Tsukuba, Tsukuba, Ibaraki 305-8573, Japan*
- P-4 **Student** A034
Patterning properties of nickel microstructures using femtosecond laser induced reduction, Kenki Tamura¹, Mizue Mizoshiri², Junpei Sakurai², Seiichi Hata², ¹*Department of Mechanical and aerospace Engineering, Faculty of Engineering, Nagoya University, Japan*, ²*Department of Micro-Nano Systems Engineering, Graduate School of Engineering, Nagoya University, Japan*
- P-5 A048
Laser induced forward transfer of Ag and Cu NP inks for micro-electrodes fabrication, Ioanna Zergioti¹, Marina Makrygianni¹, Filimon Zacharatos¹, ¹*National Technical University of Athens, Greece*
- P-6 A182
Influence of periods of periodic nanostructures formed with femtosecond laser on cell spreading, Togo Shinonaga¹, Masahiro Tsukamoto², Takuya Kawa³, Peng Chen⁴, Akiko Nagai⁴, Takao Hanawa⁴, ¹*Okayama University (formerly Joining and Welding Research Institute, Osaka University), Japan*, ²*Joining and Welding Research Institute, Osaka University, Japan*, ³*Graduate School of Engineering, Osaka University, Japan*, ⁴*Institute of Biomaterials and Bioengineering, Tokyo Medical and Dental University, Japan*
- P-7 **Student** A081
Self-assembled nanostructures inside indirect bandgap GaP semiconductor, Tomoaki Sei¹, Yasuhiko Shimotsuma¹, Masaaki Sakakura², Kiyotaka Miura¹, ¹*Department of Material Chemistry, Graduate School of Engineering, Kyoto University, Kyoto 615-8510, Japan*, ²*Society-Academia Collaboration for Innovation, Kyoto University, Kyoto 615-8510, Japan*
- P-8 **Student** A086
Femtosecond laser processing of polymethyl methacrylate with an axicon, Yu Matusiro¹, Wataru Watanabe¹, ¹*Ritsumeikan University, Japan*

- P-9 Student A097**
Picosecond laser induced welding of glass sheets without a clamping Zig, Seung Sik Ham¹, Min Gi Kang¹, Hong Seok Jang¹, Chang Hwan Kim¹, Tae Dong Kim¹, Yong Joong Lee¹, Ho Lee¹, ¹*school of mechanical engineering , Kyungpook National University, South Korea*
- P-10 Student A078**
Control of periodic nanostructure embedded in SiO₂ glass under femtosecond-double pulse irradiation, Atsushi Murata¹, Yasuhiko Shimotsuma¹, Masaaki Sakakura², Kiyotaka Miura¹, ¹*Department of Material Chemistry, Graduate School of Engineering, Kyoto University, japan,* ²*Society-Academia Collaboration for Innovation, Kyoto University, japan*
- P-11 Student A080**
Nanogratings embedded in Al₂O₃-Dy₂O₃ glass by femtosecond laser irradiation, Satoshi Mori¹, Torataro Kurita¹, Yasuhiko Shimotsuma¹, Masaaki Sakakura², Kiyotaka Miura¹, ¹*Department of Material Chemistry, Graduate School of Engineering, Kyoto University, Japan,* ²*Society-Academia Collaboration for Innovation, Kyoto University, Japan*
- P-12 Student A056**
Femtosecond laser sintering of aerosol jet printed silver nanoparticle inks, Wei-Cheng Chang¹, Chung-Wei Cheng¹, Chium-Hsun Chen¹, Yung-Hang Chang², Kan Wang², Chuck Zhang², Ben Wang², ¹*Department of Mechanical Engineering, National Chiao Tung University, Taiwan,* ²*H. Milton Stewart School of Industrial and Systems Engineering & Manufacturing Research Center, Georgia Institute of Technology, United States*
- P-13 Student A203**
Low-temperature diffusion at Ni/SiC interface with the aid of femtosecond laser-induced strain, Yusuke Takidani¹, Kazuki Morimoto¹, Kenta Kondo¹, Tomoyuki Ueki², Takuro Tomita², Yasuhiro Tanaka³, Tatsuya Okada², ¹*Graduate School of Advanced Technology and Science, Tokushima University, Japan,* ²*Institute of Technology and Science, Tokushima University, Japan,* ³*Department of Advanced Materials Science, Faculty of Engineering, Kagawa University, Japan*
- P-14 A064**
Surface conditioning of copper for enhancing the process stability in laser micro welding, Nerea Otero¹, Pablo M. Romero¹, Christian Hoff², Jörg Hermsdorf², ¹*AIMEN Laser Applications Centre, Spain,* ²*Laser Zentrum Hannover, Germany*
- P-15 A007**
Frequency modulation and device repaired by laser surface treatment in film bulk acoustic filters, C. C. Cheng¹, R. C. Lin², H. K. Lin³, K. S. Kao⁴, Y. C. Chen⁵, ¹*De Lin Institute of Technology, Taiwan,* ²*Industrial Technology Research Institute, Taiwan,* ³*National Pingtung University of Science and Technology, Taiwan,* ⁴*Shu-Te University, Taiwan,* ⁵*National Sun Yat-Sen University, Taiwan*
- P-16 A241**
Surface modification effects on the hydrogen absorption property of a hydrogen storage alloy by a short pulse laser irradiation, Hiroshi Abe¹, Takuya Shimomura², Shinnosuke Tokuhira³, Yukihiro Shimada², Yusuke Takenaka⁴, Yuta Furuyama⁴, Akihiko Nishimura^{2,5}, Hirohisa Uchida³, Hiroyuki Daido², Takeshi Ohshima¹, ¹*Quantum Beam Science Center, Japan Atomic Energy Agency, Japan,* ²*Advanced Photon Research Center, Japan Atomic Energy Agency, Japan,* ³*Department of Applied Science, Graduate School of Engineering, Tokai University, Japan,* ⁴*A-Tech co., Ltd., Japan,* ⁵*Applied Laser Technology Institute, Japan Atomic Energy Agency, Japan*
- P-17 A190**
Laser irradiation of materials for fusion devices, Aurelian Marcu¹, Mihai Lungu², Corneliu Porosnicu¹, Liga Avotina³, Cristiana A Grigorescu⁴, Cristian P Lungu¹, Alexandru Marin⁵, Gunta Kizane³, Stefan Antohe⁶, ¹*National Institute for Laser Plasma and Radiation Physics, Laser Department, Atomistilor 409, P.O.BOX-MG-36, Bucharest-Magurele, Romania,* ²*National Institute for Material Physics, 077125 Bucharest-Magurele, Romania,* ³*Institute of Chemical Physics, University of Latvia, Kronvalda 4, LV 1010 Riga, Romania,* ⁴*National Institute R&D for Optoelectronics INOE 2000, 077125 Bucharest, Romania,* ⁵*Institute of Physical Chemistry "Ilie Murgulescu", 060021, Bucharest, Romania,* ⁶*University of Bucuresti, Faculty of Physics, Bucharest-Magurele, Romania*
- P-18 Student A148**
Holographic laser sweep using line-focused beams with optical time delay, Kazuki Sakuma¹, Tetsuya Abe¹, Satoshi Hasegawa¹, Hidetomo Takahashi², Michiharu Ota², Yoshio Hayasaki¹, ¹*Utsunomiya University Center for Optical Research & Education (CORE), Japan,* ²*AIN SEIKI CO., LTD., Japan*

- P-19 A204
Laser micro patterning system in three-dimensional surface larger than scanning area, kyunghan kim¹, Jaehoon Lee¹, Kwangho Yoon¹, Jongkweon Park¹, ¹*Korea Institute of Machinery and Materials, Republic of Korea*
- P-20 A217
Laser lithography for fabricating computer generated hologram with submicron pixel-size for wide viewing angle, Sumio Nakahara¹, Kyoji Matsushima², ¹*Kansai University, Dept. of Mechanical Engineering, Japan*, ²*Kansai University, Dept. of Electrical and Electronic Engineering, Japan*
- P-21 A036
Tribological performance of femtosecond laser-induced periodic surface structures on titanium, Jörn Bonse¹, Sandra Höhm², Manfred Hartelt¹, Dirk Spaltmann¹, Robert Koter¹, Simone Pentzien¹, Stephan Marschner², Arkadi Rosenfeld², Jörg Krüger¹, ¹*BAM Federal Institute for Materials Research and Testing, Berlin, Germany*, ²*Max-Born-Institute for Nonlinear Optics and Short Pulse Spectroscopy, Berlin, Germany*
- P-22 **Student** A112
Formation of fine periodic structure on rear-surface of silicon substrate by femtosecond laser at 1552nm, Chiah Sin Ying¹, Kataoka Daiki¹, Tanabe Rie¹, Ito Yoshiro¹, ¹*Department of Mechanical Engineering, Nagaoka University Technology, Japan*
- P-23 **Student** A085
Surface microfabrication of UV transparent fluoric polymer using a conventional green laser, Tatsuya Ogawa¹, Ryota Oikawa², Yasutaka Hanada³, ¹*Graduate school, Hirosaki univ., Japan*, ²*Graduate school, Hirosaki univ., Japan*, ³*Graduate school, Hirosaki univ., Japan*
- P-24 A163
Mechanism of micro-machining CVD diamond film by pulsed green laser, Feng-Lin Zhang¹, ¹*School of Mechanical and Electronic Engineering, Guangdong University of Technology, P.R.CHINA*
- P-25 **Student** A223
Internal-to-external microfluidic device for ellipsometric biosensor application, Valdemar Stankevič², Tomas Rakickas¹, Gediminas Račiukaitis¹, ¹*Center for Physical Sciences and Technology, Lithuania*, ²*Center for Physical Sciences and Technology, ELAS, Ltd., Lithuania*
- P-26 **Student** A213
Experiment study on CFRP processing with nanosecond laser under several gas ambiances, Fumihito Matsuoka¹, Masahiro Tsukamoto², Kensuke Yamashita³, Yuji Sato², Kenjiro Takahashi², Shinjiro Masuno², ¹*Graduate School of Engineering, Osaka University, Japan*, ²*Joining and Welding Research Institute, Osaka University, Japan*, ³*School of Engineering, Osaka University, Japan*
- P-27 A184
Longitudinally excited CO₂ laser and glass drilling, Kazuyuki Uno¹, Takuya Yamamoto¹, Tetsuya Akitsu¹, Takahisa Jitsuno², ¹*University of Yamanashi, Japan*, ²*Institute of Laser Engineering, Osaka University, Japan*
- P-28 A005
Carbon-encapsulated metal nanoparticles deposited by plasma enhanced magnetron sputtering, Wei Dai¹, M. W. Moon², ¹*School of Electromechanical Engineering, Guangdong University of Technology, China*, ²*Institute for Multi-disciplinary Convergence of Matters, Korea Institute of Science and Technology, Korea*
- P-29 **Student** A131
Surface refractive index dependence on the oscillation peak of photoexcited ZnO microspheres, Takeshi Ueyama¹, Yuta Sato¹, Mitsuhiro Higashihata¹, Daisuke Nakamura¹, Hiroshi Ikenoue¹, Tatsuo Okada¹, ¹*Graduate school of information science and electrical engineering, Kyushu University, Japan*
- P-30 **Student** A079
Optical properties of nanodiamonds prepared by femtosecond laser ablation in liquid, Yusei Fujimatsu¹, Yasuhiko Shimotsuma¹, Masaaki Sakakura², Kiyotaka Miura¹, ¹*Department of Material Chemistry, Graduate School of Engineering, Kyoto University, Kyoto 615-8510, Japan*, ²*Society-Academia Collaboration for Innovation, Kyoto University, Kyoto 615-8510, Japan*

- P-31 A130
Biomimetic coatings on the Nd-YAG laser surface modified Ti-6Al-4V, T.F. Hong^{1,2}, L.M. Fu^{1,3}, B.S. Wu², K.Y. Lin², H.K. Lin¹, T.Y. Guo⁴, ¹Graduate Institute of Materials Engineering, National Pingtung University of Science and Technology, TAIWAN, ²Department of Vehicle Engineering, National Pingtung University of Science and Technology, TAIWAN, ³Department of Biomechatronics Engineering, National Pingtung University of Science and Technology, TAIWAN, ⁴Department of Mechanical Engineering, Southern Taiwan University of Science and Technology, TAIWAN
- P-32 A096
Automatic performance recovering system for via-drilling machine's galvanometer scanner, Naoya Kato¹, Atsushi Mori¹, Masashi Ishiguro¹, Tsutomu Sugiyama¹, Hidehiko Karasaki¹, ¹Panasonic Welding Systems Co.,Ltd., Japan
- P-33 A134
Ordered arrays of nanostructures by microsphere-laser joint methods, Catalin Constantinescu¹, Kallepali Deepak¹, Luca Boarino², Philippe Delaporte¹, Natalia De Leo², Michael Laus³, Antonio Pereira⁴, Katia Sparnacci³, Olivier Uteza¹, David Grojo¹, ¹Aix-Marseille University-CNRS, LP3 UMR 7341, F-13288, Marseille, France, ²INRIM, NanoFacility, Division Electromagnetism, I-10135 Torino, Italy, ³Department of Science and Technology, University of Eastern Piedmont Amedeo Avogadro, I-15121 Alessandria, Italy, ⁴Inst. Lumiere Matiere, Lyon University, CNRS UMR 5306, F-69622 Villeurbanne, France
- P-34 A283
A preventive measure against fiber damage of a femtosecond 1.55- μ m Er-doped fiber laser system using multimode optical fiber, Toru Mizunami¹, Junpei Takahashi¹, ¹Department of Electrical Engineering and Electronics, Graduate School of Engineering, Kyushu Institute of Technology, Japan
- P-35 **Student** A285
Laser texturing of polycrystalline Si wafer for photovoltaic cells, Seung Hyun Ha¹, Ji Hyeon Kim¹, Hun Park², Chun Jae Lee², Sang Joon Park¹, ¹Department of Chemical and Biological Engineering, Gachon University, Korea, ²Cowin DST Co. Ltd., Korea
- P-36 **Student** A287
Vibration assisted hole taper angle control on Invar alloy (Fine Metal Mask) using a femtosecond laser, Wonsuk Choi^{1,2}, Sung Hak Cho^{1,2}, ¹Department of Nano-Mechatronics, University of Science and Technology (UST), 217, Gajeong-ro, Yuseong-gu, Daejeon, 305-350, Republic of Korea, Republic of Korea, ²Femto Process Team, Nano Machining Lab., Korea Institute of Machinery & Materials (KIMM), 171, Jang-dong, Yuseong-gu, Daejeon, 305-343, Republic of Korea, Republic of Korea
- P-37 A288
Microstructuring of PEDOT:PSS/graphene composite films using pulsed ultraviolet laser beams, Chien-Kai Chung¹, Wen-Tse Hsiao¹, Tien-Li Chang², Donyau Chiang¹, Shih-Feng Tseng¹, ¹Instrument Technology Research Center, National Applied Research Laboratories, Taiwan, ²Department of Mechatronic Engineering, National Taiwan Normal University, Taiwan
- P-38 A052
Mask assisted laser percussion drilling, K.-Y. Shen¹, Y.-H. Luo¹, Y.-J. Chang¹, J.-C. Hsu¹, C.-L. Kuo¹, C.-C. Ho¹, ¹National Yunlin University of Science and Technology, Taiwan
- P-39 A289
Optical glass substrates forming processes using pulsed ultraviolet laser micromilling technology, Wen-Tse Hsiao¹, Chih-Chung Yang¹, Kuo-Cheng Huang¹, Chien-Kai Chung¹, Shih-Feng Tseng¹, Donyau Chiang¹, Ming-Fei Chen², ¹Instrument Technology Research Center, National Applied Research Laboratories, Taiwan, ²Department of Mechatronics Engineering, National Changhua University of Education, Taiwan
- P-40 **Student** A290
Study of morphological properties and elemental micro-composition of ZnO grown by femtosecond pulsed laser deposition, Joseph Aban De Mesa¹, Annaliza Amo¹, Luce Vida Sayson¹, Roland Villano Sarmago¹, Wilson Ong Garcia¹, ¹NIP, Philippines
- P-41 A291
Direct laser beam scribing of sapphire wafer, Wen-Tse Hsiao¹, Chien-Kai Chung¹, Shih-Feng Tseng¹, Donyau Chiang¹, Kuo-Cheng Huang¹, Chih-Chung Yang¹, ¹Instrument Technology Research Center, Taiwan

P-42 A051
Investigation of thermochemical reaction of metallic grooves manufactured with the laser micromachining in liquid, Kwang H. Oh¹, S. Z. Lee¹, S. H. Jeong², ¹*Laser Center, Jeonnam Technopark Stiftung, Republic of Korea*, ²*Department of Mechatronics, Gwangju Institute of Science and Technology, Republic of Korea*

HPL

P-43 A003
Two-photon and optical power-limiting properties of a dendrimer derived from functionalized indenoquinoline units, Tzu-Chau Lin¹, Che-Yu Liu¹, May-Hui Li¹, Yi-You Liu¹, Sheng-Yang Tseng², Yu-Ting Wang², Ya-Hsin Tseng², Hui-Hsin Chu², Chih-Wei Luo², ¹*Photonic Materials Research Laboratory, Department of Chemistry, National Central University, Zhong-Li 32001, Taiwan*, ²*Department of Electrophysics, National Chiao-Tung University, Hsinchu, Taiwan*

P-44 **Student** A110
Evaluation of center-line crack susceptibility in laser beam welds of reduced activation ferritic/martensitic steel F82H by side-bead test, Takaya Hitomi¹, Tatsuya Hama¹, Hiroaki Mori¹, Satoshi Kon², Satoki Kogita², Masakazu Shibahara², ¹*Osaka University, Graduated School of Engineering, Department of Industry and Technology, Japan*, ²*Osaka Prefecture University, College and Graduate School of Engineering, Department of Marine System Engineering, Japan*

P-45 **Student** A107
Metallurgical and numerical analyses of center-line crack behavior in laser beam welds of type 316L stainless steel using side-bead test, Hideki Mitsunari¹, Hiroaki Mori¹, Satoshi Kon², Masakazu Shibahara², ¹*Osaka University, Graduate School of Engineering, Department of Industry and Technology, Japan*, ²*Osaka Prefecture University, College and Graduate School of Engineering, Department of Marine System Engineering, Japan*

P-46 A212
Position welding for internal welded specimen using disk laser-GMA hybrid welding, Young-Nam Ahn¹, Cheolhee Kim¹, ¹*KITECH, Korea*

P-47 A246
Effect of oxide film covering groove face on properties of laser-arc hybrid-welded butt joints, Kaoru Takezaki¹, Tomo Ogura¹, Tomokazu Sano¹, Akio Hirose¹, Masami Mizutani², Seiji Katayama², Hikotaro Ochiai³, Ryosuke Kimura³, Shozo Ono³, ¹*Division of Materials and Manufacturing Science, Osaka University, Japan*, ²*Joining and Welding Research Institute, Osaka University, Japan*, ³*Mitsui Engineering & Shipbuilding Co., Ltd., Japan*

P-48 **Student** A054
Dual beam selective laser melting, Siang-Yang Wu¹, Chung-Wei Cheng², ¹*Department of Mechanical Engineering, National Chiao Tung University, Taiwan*, ²*Department of Mechanical Engineering, National Chiao Tung University, Taiwan*

P-49 A238
Development of laser cladding and non-destructive inspection technology in heat exchanger tube, Takaya Terada¹, Daisuke Kitsunai¹, Akihiko Nishimura¹, Fuyumi Ito², ¹*Japan Atomic Energy Agency, Japan*, ²*The Wakasa Wan Energy Research Center, Japan*

P-50 A055
Tribological properties of multilayered IN718 coating fabricated by high power diode laser processing, Yaocheng Zhang¹, Li Yang¹, Jun Dai¹, ¹*Changshu Institute of Technology, P.R. China*

P-51 **Student** A279
Polymer (PC+ABS) joining by laser hybrid process, Jin Young Yoon^{1,2}, Hae Woon Choi³, Cheolhee Kim¹, Sehun Rhee², ¹*Advanced Welding & Joining R&BD Group, KITECH, Korea*, ²*School of Mechanical Engineering, Hanyang University, Korea*, ³*Dept. of Mechanical and Automotive Engineering, Keimyung University, Korea*

P-52 A292
Development of high power single-mode fiber laser and its applications, Masahiro Hirao¹, Takashi Kayahara¹, Kanji Tanaka¹, Akira Fujisaki¹, ¹*Furukawa Electric Co., Ltd, Japan*

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