

(1) 原著論文(accept を含む) / Original Papers

1. Z. Wang, Y. Liao, P. Wang, J. Qi, L. Qiao, K. Sugioka, and Y. Cheng, "Formation of in-volume nanogratings in glass induced by spatiotemporally focused femtosecond laser pulses", *Adv. Opt. Technol.* (in press).
2. B. Xu, W. Du, J. Li, Y. Hu, L. Yang, C. Zhang, G. Li, Z. Lao, J. Ni, J. Chu, D. Wu, S. Liu, and K. Sugioka, "High efficiency integration of three-dimensional functional microdevices inside a microfluidic chip by using femtosecond laser multifoci parallel microfabrication", *Sci. Rep.* 6, 19989 (2016).
3. J. Xu, D. Wu, J. Y. Ip, K. Midorikawa, and K. Sugioka, "Vertical sidewall electrodes monolithically integrated into 3D glass microfluidic chips using water-assisted femtosecond-laser fabrication for in situ control of electrotaxis", *RSC Adv.* 5, 24072-24080 (2015).
4. N. Nemoto, N. Kanda, R. Imai, K. Konishi, M. Miyoshi, S. Kurashina, T. Sasaki, N. Oda, and M. Kuwata-Gonokami, "High-sensitivity and broadband, real-time terahertz camera incorporating micro-bolometer array with resonant cavity structure", *IEEE Trans. THz Sci. Technol.*, Volume:PP, Issue:99, 108 (2015) DOI:10.1109/TTHZ.2015.2508010
5. H.-W. Du, H. Hoshina, C. Otani, and K. Midorikawa, "Terahertz waves radiated from two noncollinear femtosecond plasma filaments", *Appl. Phys. Lett.* 107, 21113 (2015).
6. Y. Fu, E. J. Takahashi, Q. Zhang, P. Lu, and K. Midorikawa, "Optimization and characterization of dual-chirped optical parametric amplification", *J. Opt.* 17, 124001 (2015).
7. E. J. Takahashi, Y. Fu and K. Midorikawa, "Carrier-envelope phase stabilization of a 16 TW, 10 Hz Ti:sapphire laser", *Opt. Lett.* 40, 4835 -4838 (2015), doi: 10.1364/OL.40.004835.
8. Y. Fu, E. J. Takahashi and K. Midorikawa, "High-energy infrared femtosecond pulses generated by dual-chirped optical parametric amplification", *Opt. Lett.* 40(21), 5082-5085 (2015), doi: 10.1364/OL.40.005082.
9. K. Umemura, Y. Sadoya, K. Nagao, R. Oikawa, Y. Hanada, K. Sugioka, and S. Mayama, "Single cell analysis using a glass microchamber for studying movement fluctuations of *Navicula pavillardii* and *Seminavis robusta* diatom cells", *Micron*, 77, 41-43 (2015).
10. T. Kan, A. Isozaki, N. Kanda, N. Nemoto, K. Konishi, H. Takahashi, M. Kuwata-Gonokami, K. Matsumoto and I. Shimoyama, "Enantiomeric switching of chiral metamaterial for terahertz polarization modulation employing vertically deformable MEMS spirals", *Nature*

Communications 6, 8422 (2015).

11. E. J. Takahashi, P. Lan, O. D. Muecke, Y. Nabekawa, and K. Midorikawa, "Nonlinear Attosecond Metrology by Intense Isolated Attosecond Pulses", *IEEE J. Sel. Top. Quantum Electron*, 21(5), 8800112 (2015).
12. T. Okino, Y. Furukawa, Y. Nabekawa, S. Miyabe, A. A. Eilanlou, E. J. Takahashi, K. Yamanouchi, and K. Midorikawa, "Direct observation of an attosecond electron wave packet in a nitrogen molecule", *Sci. Adv.* 1, e1500356 (2015).
13. Y. Nabekawa, Y. Furukawa, T. Okino, A. Amani Eilanlou, E. J. Takahashi, K. Yamanouchi, and K. Midorikawa, "Settling time of a vibrational wavepacket in ionization", *Nat. Commun.* 6, 8197 (2015); doi: 0.1038/ncomms9197.
14. Q. Song, A. Nakamura, K. Hirosawa, K. Isobe, K. Midorikawa, and F. Kannari, "Two-dimensional spatiotemporal focusing of femtosecond pulses and its applications in microscopy", *Rev. Sci. Instrum.*, 86, 083701 (2015).
15. Y. Liao, W. J. Pan, Y. Cui, L. L. Qiao, Y. Bellouard, K. Sugioka, and Y. Cheng, "Formation of in-volume nanogratings with sub-100-nm periods in glass by femtosecond laser irradiation", *Opt. Lett.* 40, 3623-3626 (2015).
16. N. Ishikawa, Y. Hanada, I. Ishikawa, K. Sugioka, and K. Midorikawa, "Femtosecond laser-fabricated biochip for studying symbiosis between *Phormidium* and seedling root", *Appl. Phys. B*119, 503-508 (2015).
17. T. Ishikawa, A. Amani Eilanlou, Y. Nabekawa, Y. Fujihira, T. Imahoko, T. Sumiyoshi, F. Kannari, M. Kuwata-Gonokami, and K. Midorikawa, "Kerr lens mode-locked Yb:Lu<sub>2</sub>O<sub>3</sub> bulk ceramic oscillator pumped by a multimode laser diode", *Jpn. J. Appl. Phys.*, 54, 072703, 2015.6.22. (<http://dx.doi.org/10.7567/JJAP.54.072703>)
18. Y. Nabekawa, Y. Furukawa, T. Okino, A. Amani Eilanlou, E. J. Takahashi, K. Yamanouchi, and K. Midorikawa, "Frequency-resolved optical gating technique for retrieving the amplitude of a vibrational wavepacke", *Sci. Rep.* 5, 11366 (2015); doi: 10.1038/srep11366.
19. T. Fujino, Y. Tanaka, T. Harada, Y. Nagata, T. Watanabe, and H. Kinoshita, "Extreme ultraviolet mask observations using a coherent extreme ultraviolet scatterometry microscope with a high-harmonic-generation source", *Jpn. J. Appl. Phys.* 54, 06FC01 (2015).
20. T. Kobayashi and Y. Matsuo: "Production of warm aluminum cluster anions by femtosecond

laser ablation”, Appl. Phys. B, 119, 435-438 (2015).

21. H. Tomizawa, T. Sato, K. Ogawa, K. Togawa, T. Tanaka, T. Hara, M. Yabashi, H. Tanaka, T. Ishikawa, T. Togashi, S. Matsubara, Y. Okayasu, T. Watanabe, E. J. Takahashi, K. Midorikawa, M. Aoyama, K. Yamakawa, S. Owada, A. Iwasaki and K. Yamanouchi, "Stabilization of a high-order harmonic generation seeded extreme ultraviolet free electron laser by time-synchronization control with electro-optic sampling", High Power Laser Science and Engineering, 3, e14 (2015)
22. Y. Liao, J. Ni, L. Qiao, M. Huang, Y. Bellouard, K. Sugioka, and Y. Cheng, "High-fidelity visualization of formation of volume nanogratings in porous glass by femtosecond laser irradiation", Optica, 2, 329-334 (2015).

## (2) 著書・解説など / Book Editions, Review Papers

1. K. Sugioka, "Progress in ultrafast laser processing and future prospects", Nanophotonics. (in press)
2. 緑川克美, "超短パルスレーザーの進展とその応用", パリティ 30, No. 5, 19-20 (2015).
3. 沖野友哉, 古川裕介, 鍋川康夫, 山内薫, 緑川克美, 「アト秒非線形フーリエ分子分光」、レーザー研究第 43 巻 4 号, 217-221(2015).
4. 鍋川康夫, 古川裕介, 沖野友哉, 山内薫, 緑川克美, 「高強度アト秒パルス列を用いた水素イオン振動波束の研究」、レーザー研究第 43 巻 12 号, 823-827 (2015).
5. 磯部圭佑, 緑川克美, 「生体試料の深部イメージングを可能にする空間重なり変調非線形光学顕微鏡」日本レーザー医学会誌, 36, 210-215 (2015).
6. 杉岡幸次, "2.7 レーザ加工分野の市場動向: 2.7.1 はじめに", 平成 26 年度光産業技術に関する報告書 ((財) 光産業技術振興協会編) p.205-209 (2015).
7. 杉岡幸次, "2.7 レーザ加工分野の市場動向: 2.7.3 おわりに", 平成 26 年度光産業技術に関する報告書 ((財) 光産業技術振興協会編) p.234-235 (2015).
8. 杉岡幸次, "超短パルスレーザー微細加工技術の動向と展望", 精密工学会誌, 81, 709-713 (2015). (査読有り)
9. 杉岡幸次, "超短パルスレーザー加工の実用化技術", 電気学会論文誌 C, 135, 1037-1042 (2015).

(3) 招待講演 / Invited Talks

1. K. Midorikawa: "Observation of attosecond quantum wavepackets in molecules by intense attosecond pulses", Conference on High Intensity Lasers and Attosecond Science in Israel, Tel-Aviv, Israel, Feb. (2016).
2. F. He, J. Yu, W. Chu, Z. Wang, Y. Tan, Y. Cheng, and K. Sugioka, "Tailored femtosecond Bessel beams for high-throughput, taper-free through-silicon vias (TSVs) fabrication", SPIE Int. Symp. on Laser Applications in Microelectronic and Optoelectronic Manufacturing XXI (LAMOM XXI), San Francisco, USA, Feb. (2016).
3. K. Midorikawa: "Observation of attosecond quantum wavepackets in molecules", The International Chemical Congress of Pacific Basin Society 2015, Honolulu, Hawaii, USA, Dec.15 (2015)
4. K. Midorikawa] "Observation of attosecond quantum wavepackets in molecules by intense attosecond pulses", International Symposium on Ultrafast Intense Laser Science 14, Kauai, Hawaii, USA, Dec.13 (2015)
5. K. Sugioka, J. Xu, and K. Midorikawa, "Nanoaquarium: manipulation of bio-cells in electrofluidics fabricated by hybrid femtosecond laser processing", 24th Int. Cong. on Applications of Lasers & Electro-Optics (ICALEO 2015), Atlanta, USA, Oct. (2015).
6. K. Sugioka, J. Xu, F. Sima, D. Wu, and K. Midorikawa, "Hybrid femtosecond laser 3D microprocessing consisting of subtractive and additive manufacturing", 23rd Int. Conf. on Advanced Laser Technology (ALT' 15), Faro, Portugal, Sept. (2015).
7. T. Okino, "Observation of Attosecond Electron Wavepacket in a Nitrogen Molecule with Nonlinear Fourier Transform Spectroscopy", 7th Asian Workshop on Generation and Application of Coherent XUV and X-ray Radiation, Gwangju, Korea, Sept. 1 (2015).
8. K. Midorikawa, "Observation of attosecond quantum waqvepackets in molecules", CLEO Pacific Rim 2015, Busan, Korea, Aug.25 (2015).
9. A. Amani Eilanlou, Y. Nabekawa, M. Kuwata-Gonokami, and K. Midorikawa, "Development of an ultrafast thin-disk ring oscillator with an intra-cavity average power higher than 1 kW", Conference on Lasers and Electro-Optics Pacific Rim, Optical Society of America, Optical Society of Korea, Busan, Korea, Aug.26 (2015).
10. E. J. Takahashi, Y. Fu and K. Midorikawa, "High-energy infrared pulses by dual-chirped

optical parametric amplification”, Ultrafast optics 2015 conference, Beijing, China, Aug. 16-21, 2015

11. K. Sugioka, J. Xu, F. Sima, D. Wu, and K. Midorikawa, “Manufacture of 3D functional biochips by hybrid additive and subtractive femtosecond laser processing (Tentative)”, 3rd Int. Academy of Photon. and Laser Engin. (IAPLE) Conference, Honolulu, USA, Aug. (2015). (Keynote talk)
12. K. Sugioka, K. Midorikawa, F. He, and Y. Cheng, “High performance materials processing using tailored femtosecond laser pulses”, 11th Pacific Rim Conf. on Lasers and Electro-Optics (CLEO/Pacific Rim 2015), Busan, Korea, Aug. (2015).
13. A. Amani Eilanlou, Y. Nabekawa, M. Kuwata-Gonokami, and K. Midorikawa, “Development of an ultrafast thin-disk ring oscillator with an intra-cavity average power higher than 1 kW,” Conference on Lasers and Electro-Optics Pacific Rim, Busan, Korea, Aug. (2015).
14. K. Midorikawa, “Generation and application of intense isolated attosecond pulses for observing attosecond quantum wavepackets in molecules,” Intense, Short Wavelength Atomic and Molecular Processes 3, Hamburg, Germany, July (2015).
15. T. Okino, Y. Furukawa, A. Amani Eilanlou, Y. Nabekawa, S. Miyabe, E. J. Takahashi, K. Yamanouchi, and K. Midorikawa, "Attosecond nonlinear Fourier transform spectroscopy of molecule with intense a-few-pulse attosecond pulse train: observation of vibrational and electron wavepackets", Attosecond Physics 2015, Quebec, Canada, July 9 (2015).
16. K. Sugioka, J. Xu, F. Sima, D. Wu, and K. Midorikawa, “Ship-in-a-bottle fabrication of functional biochips by hybrid femtosecond laser processing”, Conf. on Lasers and Electro-Optics Europe (CLEO/Europe 2015), Munich, Germany, June (2015).
17. A. Amani Eilanlou, Y. Nabekawa, M. Kuwata-Gonokami, and K. Midorikawa, “Development of a high-peak-power Kerr lens mode-locked thin-disk ring oscillator for intra-cavity high-order harmonic generation,” The 6th Shanghai-Tokyo Advanced Research Workshop on Ultrafast Intense Laser Science, Hangzhou, China, May (2015).
18. K. Sugioka, J. Xu, F. Sima, D. Wu, and K. Midorikawa, “Hybrid femtosecond subtractive and additive 3D manufacturing for biochip fabrication”, Conf. on Lasers and Electro-Optics (CLEO 2015), San Jose, USA, May (2015).
19. K. Sugioka, S. Wu, and K. Midorikawa, “Hybrid subtractive and additive micromanufacturing using femtosecond laser for fabrication of true 3D biochips”, SPIE/SIOM Pacific Rim Laser

Damage Conference 2015 (PLD 2015), Shanghai, China, May (2015).

20. J. Xu, K. Midorikawa, and K. Sugioka, "Flexible manipulation of biological cells in microscale space using electrofluidics fabricated by femtosecond laser", The 6th Shanghai-Tokyo Advanced Research Symposium on Ultrafast Intense Laser Science (STAR6), Hangzhou, China, May (2015).
21. 神田夏輝、アマニ・イランル、今銚友洋、住吉哲実、鍋川康夫、五神真、緑川克美、「共振器内高次高調波発生のための Yb:YAG 薄ディスクモードロックレーザー」次世代レーザー技術と EUV・軟 X 線光源に関する研究会、山形、1 月 24 日 (2016).
22. 緑川克美、「アト秒科学の進展」、山中龍彦追悼記念講演会、大阪、1 月 22 日 (2016).
23. 磯部圭佑、緑川克美、「深部超解像イメージングのための多光子蛍光顕微鏡」第 88 回日本生化学会大会 合同大会、神戸、12 月 (2015).
24. 杉岡幸次, F. Sima, J. Xu, D. Wu, 緑川 克美, "除去/付加複合フェムト秒レーザー 3 次元加工技術とバイオチップ作製への応用", サイエンスアゴラ 2015 「ヨーロッパタイトステージ」、東京、11 月 (2015).
25. 緑川克美: "短波長・短パルスレーザーがもたらすレーザー加工の革新", NEDO 次世代レーザー技術シンポジウム、国立研究開発法人 新エネルギー・産業技術総合開発機構、東京、11 月 18 日 (2015).
26. 杉岡幸次, "超短パルスレーザー加工の基礎と応用: 精密微細加工、ナノ加工、3 次元加工、高品位接合、産業応用", 日本テクノセンターセミナー、10 月、東京 (2015).
27. 杉岡幸次, "レーザー加工分野の最新動向", 平成 27 年光産業技術振興協会光産業動向セミナー、横浜、10 月 (2015).
28. 磯部圭佑, 緑川克美, 「生体試料の深部イメージングを可能にする新しい非線形光学顕微鏡 "SPOMNOM"」第 36 回日本レーザー医学会総会, 宇都宮, 10 月 (2015).
29. 磯部圭佑, 緑川克美, 「深部イメージング技術の分解能向上」第 67 回日本細胞生物学会大会 レーザー顕微鏡研究会共催企画シンポジウム, 東京, 7 月 (2015).

(4) 会議、シンポジウム、セミナー主催 / Meeting, Symposiums and Seminars

1. SPIE Photonics West LASE 2016, San Francisco, USA, 13 -18 Feb. (2016).

2. 7th Int. Congress on Laser Advanced Materials Processing (LAMP2015), Kitakyushu, Japan, 26-29 May (2015).
3. 第27回先端光量子科学アライアンスセミナー：2015年10月16日、研究交流棟3階会議室

**(5) 特許出願 / Patent Applications**

1. 杉岡幸次：“レーザービーム整形装置および除去加工装置”、特願2015-、2016年2月10日。
2. 緑川克美、小林徹：“パラジウム同位体の偶奇分離イオン化法と装置”、特願2015-246175、2015年12月17日。
3. 高橋栄治、Yuxi Fu、緑川克美：“レーザー装置及びこれに使用可能な装置”、特願2015-125244、2015年6月23日。

**(6) 特筆すべき事項・トピックス（雑誌表紙などの掲載記事） / Topics**

1. 理研プレスリリース：“1000兆分の1秒の時間遅延を観測”、2015年9月1日。
2. 理研プレスリリース：“アト秒領域の著高速分子内電子状態を直接観測”、2015年9月26日。
3. フジサンケイビジネスアイ：“1000兆分の1秒の時間遅延を観測”、2015年10月22日。
4. RIKEN Research: “Attosecond glimpses into electron stripping”, December 18, 2015.