

Intense Attosecond Pulse Research Team

Publications (Original Paper)

1. K. L. Ishikawa, Y. Kawazura, and K. Ueda, "Two-photon ionization of atoms by ultrashort laser pulses," *J. Mod. Opt.*, accepted.
2. F.J. Chen, S.H. Yin, Y. Wang, Y.F. Fan, Y.J. Zhu, H. Ohmori, K. Katahira, "Error Compensation in One-point Inclined-axis Nanogrinding Mode for Small Aspheric Mould", *Advanced Materials Research*, Vols. 97-101, 4206-4212(2010).
3. F.J. Chen, S.H. Yin, H. Ohmori, K. Katahira, "Surface Roughness Characteristics of Fine ELID Cross Grinding for Silicon Wafers", *Advanced Materials Research*, Vols. 97-101, 4106-4110 (2010).
4. M. Hatayama, H. Takenaka, E. M. Gullikson, A. Suda and K. Midorikawa, "Broadband EUV multilayer mirror for supercontinuum light at photon energies of 35-65 eV," *Appl. Opt.*, vol. 48, 5464-5466 (2009).
5. F. He, H. Sun, M. Huang, J. Xu, Y. Liao, Z. Zhou, Y. Cheng, Z. Xu, K. Sugioka, and K. Midorikawa. "Rapid fabrication of optical volume gratings in Foturan glass by femtosecond laser micromachining", *Appl. Phys. A97*, 853-857 (2009).
6. Y. Hanada, K. Sugioka, H. Kawano, I.S. Ishikawa, A. Miyawaki, and K. Midorikawa: "Nano-aquarium with microfluidic structures for dynamic analysis of *Cryptomonas* and *Phormidium* fabricated by femtosecond laser direct writing of photostructurable glass", *Appl. Surf. Sci.* 255, 9893-9897 (2009).
7. Y. Hanada, K. Sugioka, H. Kawano, T. Tsuchimoto, I. Miyamoto, A. Miyawaki, and K. Midorikawa: "Selective cell culture on UV transparent polymer by F2 laser surface modification", *Appl. Surf. Sci.* 255, 9885-9888 (2009).
8. S. Nakashima, K. Sugioka, and K. Midorikawa: "Fabrication of microchannels in single-crystal GaN by wet-chemical-assisted femtosecond laser ablation", *Appl. Surf. Sci.* 255, 9770-9774 (2009).
9. K. Katahira, H. Ohmori, "Nano level surface finishing technology of advanced ceramics - ELID (electrolytic in-process dressing)", *epitoanyag*, 61/4 , 108-111(2009).
10. Z. Zhou, J. Xu, F. He, Y. Liao, Y. Cheng, K. Sugioka, and K. Midorikawa, "Surface-enhanced Raman scattering substrate fabricated by femtosecond laser induced co-deposition of silver nanoparticles and fluorescent molecules", *Jpn. J. Appl. Phys.* 49, 022703 (2010).
11. M. Hatayama, H. Takenaka, E. M. Gullikson, A. Suda and K. Midorikawa, "High-transmittance free-standing EUV aluminum filter," *Jpn. J. Appl. Phys.*, vol. 48, pp. 122202/1-4 (2009).
12. H. Kasuga, H. Ohmori, T. Mishima, Y. Watanabe and W. Lin, "Investigation on Mirror Surface Grinding Characteristics of SiC Materials", *Journal of Ceramic Processing Research*, Vol.10, No.3, pp.351-354 (2009).
13. S. Nakashima, K. Sugioka, K. Midorikawa, "Improvement of resolution in nano-fabrication of GaN by wet-chemical-assisted femtosecond laser ablation", *J. Laser Micro/Nanoengineering*, 5, 21-24 (2010).
14. S. Nakashima, K. Sugioka, and K. Midorikawa, "Fabrication of micro- and nano-craters on the surface of GaN substrates by using wet-chemicals assisted femtosecond laser ablation", *J. Laser Micro/Nanoengineering*, 4, 75-78 (2009).
15. S. Beke, K. Sugioka, K. Midorikawa, Á. Péter, L. Nánai, and J. Bonse, "Characterization of the ablation of TeO₂ crystals in air with femtosecond laser pulses", *J. Phys. D : Appl. Phys.* 43, 025401 (2010).
16. H. Kasuga, H. Ohmori, W. Lin, Y. Watanabe, T. Mishima and T. Doi, "Efficient and smooth grinding characteristics of monocrystalline 4H-SiC wafer", *The Journal of Vacuum Science and Technology B*, Vol.27, No.3, pp.1578-1582 (2009).
17. H. Kasuga, H. Ohmori, W. Lin, Y. Watanabe, T. Mishima and T. Doi, "Efficient super-smooth finishing characteristics of sic materials through the use of fine-grinding", *Key Eng. Materials*, No.404, pp.137-141 (2009).
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20. Z. Zhou, J. Xu, Y. Liao, Y. Cheng, Z. Xu, K. Sugioka, and K. Midorikawa: "Fabrication of an integrated Raman sensor by selective surface metallization using a femtosecond laser oscillator", *Opt. Comm.* 282, 1370-1373 (2009).
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 29. K. L. Ishikawa, E. J. Takahashi, and K. Midorikawa: “Wavelength dependence of high-order harmonic generation with independently controlled ionization and ponderomotive energy”, *Phys. Rev. A* **80**, 011807(R) (2009).
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Books, Reviews

1. K. L. Ishikawa, “High-Harmonic Generation”, in *Advances in Solid-State Lasers*, pp. 439-464 (Intech, 2010).
2. K. Sugioka, Y. Hanada, and K. Midorikawa, “Three-dimensional femtosecond laser micromachining of photosensitive glass for biomicrochips”, *Laser & Photonics Review*, **4**(3), 386-400(2010).
3. K. Isobe, A. Suda, M. Tanaka, F. Kannari, H. Kawano, H. Mizuno, A. Miyawaki, and K. Midorikawa, “Multifarious two-photon fluorescence microscopy employing ultrabroadband femtosecond laser pulses,” *AIP Conference Proceedings*, vol. 1150, *Frontiers in Physics: 3rd International Meeting*, (Springer, Berlin, 2009) pp. 43-49.
4. K. Sugioka, “Ultrafast laser processing of glass down to the nano-scale”, *Laser –Surface Interactions for new materials production*, (Springer, Berlin, 2009) p. 279-293.
5. K. Isobe, A. Suda, M. Tanaka, F. Kannari, H. Kawano, H. Mizuno, A. Miyawaki, and K. Midorikawa, “Selective excitation in nonlinear microscopy by using an ultra-broadband pulse,” *Ultrafast Phenomena XVI*, (Springer, Berlin, 2009) pp. 1006-1008.
6. E. J. Takahashi and K. Midorikawa: “Coherent water-window x-ray generation by phase-matched high harmonics in neutral media”, *X-ray Lasers 2008, Proceedings of the 11th International Conference on X-Ray Lasers*, Springer, 299-306, (2009).
7. 杉岡幸次, “最新のマイクロ・ナノレーザー加工技術の動向”, *機会の研究* **62**, 301-308 (2010).
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9. 杉岡幸次, “超短パルスレーザーによる微細加工技術の進展”, *レーザー加工学会誌* **16**, 124-129 (2009).
10. 石川顕一「アト秒現象と高次高調波発生の理論」 in 「光科学研究の最前線 2」 ed. by 「光科学研究の最前線」編集委員会 (強光子場科学研究懇談会, 2009) .
11. 鍋川康夫、緑川克美: “高強度アト秒パルス列”, *化学と工業*, vol.62, No. 7, pp. 800-803 (2009).
12. 須田亮、神成文彦: “高強度レーザー利用のための時空間レーザーパルス制御技術”, *レーザー研究*, vol.37, 408-419 (2009).
13. 杉岡 幸次, 花田 修賢, 緑川 克美, “フェムト秒レーザーによるガラス内部加工とナノ水族館の実現”, *材料と科学*, **46**, 75-80 (2009).
14. 緑川克美: “高次高調波とアト秒科学”, *応用物理*, **78**(2), 107-117(2009).

Invited Talk

1. K. Midorikawa: "Infrared two-color multicycle laser field synthesis for generating an intense attosecond pulse", International symposium on Generation and Application of Carrier Envelope Phase Locked Pulses and Attosecond Pulses, Tokyo, Japan, Mar.(2010).
2. K. Sugioka, Y. Hanada, H. Kawano, I. S. Ishikawa, A. Miyawaki, and K. Midorikawa, "Nanoaquarium fabricated by femtosecond laser 3D micromachining: Investigation on Phormidium assemblage", 4th Pacific Int. Conf. on Appl. of Lasers and Opt. (PICALO 2010), Wuhan, China, March (2010).
3. Y. Cheng, Z. Xu, K. Sugioka, and K. Midorikawa, "Integration of electronics and photonics in active material by femtosecond laser for functional microdevice fabrication", SPIE Int. Symp. on Laser-Based Micro- and Nano-Packaging and Assembly IV San Francisco, USA, Jan. (2010).
4. K. L. Ishikawa, "Attosecond chemistry", 4th Symposium Japanese-French Frontiers of Science (JFFoS), Futuroscope Poitiers - ENSMA, France, Jan.(2010).
5. S. Nakashima, K. Sugioka, and K. Midorikawa, "Micro and nanofabrication of GaN by wet-chemical-assisted femtosecond laser ablation", ASME 2009 2nd Micro/Nanoscale Heat & Mass Transfer International Conference, Shanghai, China, Dec. (2009).
6. K. Sugioka, "Ultrafast laser micro and nano processing", 10th Int. Conf. on Laser Ablation (COLA 2009), Singapore, Nov. (2009). (Tutorial)
7. H. Ohmori, K. Katahira, "ELID Grinding of Hard Materials and Surface Modification for Molds and Biomaterials based on ELID", International Molded Optics Conference, Bremen, Germany, Nov.(2009).
8. H. Ohmori, H. Kasuga, W. Lin, Y. Hachisu, K. Katahira, et.al. "Development of ELID-Grinding Applications Producing Various Critical Components : High Quality and Efficient Grinding of Next Generation Semiconductor, Micro-grinding, Optical Grinding, and Dies and Molds Finishing", 2nd International Conference on Ultra-Precision and ELID Grinding, Aachen Germany, Nov. (2009).
9. K. Sugioka, Y. Hanada, and K. Midorikawa, "Nanoaquarium - femtosecond laser micromachining and application to dynamic observation of microorganisms", 4th Int. Symp. on Non-equilibrium Processes, Plasma, Combustion, and Atmospheric Phenomena (NEPCAP 2009), Oct., Sochi, Russia (2009). (Keynote)
10. E. J. Takahashi: "Generation of coherent sub-keV x-ray and isolated attosecond pulses by using an infrared ultrashort pulse", ISUILS8, Elounda Bay Palace, Crete, Greece, Oct.(2009).
11. H. Ohmori, Y. Uehara, T. Naruse, K. Maekawa, Y. Hachisu, K. Katahira, et.al. "Current Status of R and D Activities on Microfabrication in RIKEN Group for Critical Component Development", 3rd MIRAI Forum (on Micro-Fabrication and Green Technology), Incheon Korea, Oct. (2009).
12. Y. Hanada, K. Sugioka, H. Kawano, I. Ishikawa A. Miyawaki, M. Iida, H. Takai and K. Modrikawa, "Nano-aquarium integrated with functional microcomponents in photostructurable glass by femtosecond laser microprocessing for microorganism analysis", Advanced Laser Technologies (ALT) 2009, Antalya, Turkey, Spet.-Oct. (2009).
13. Akira Suda, Samuel Bohman, Tsuneto Kanai, Shigeru Yamaguchi, and Katsumi Midorikawa, "Generation of TW, 2-cycle pulses focusable to relativistic intensities," SILAP 2009, Utah, USA, Sept. (2009).
14. K. Midorikawa, E. J. Takahashi, and Y. Nabekawa: "Generation of water-window x-ray and attosecond harmonics by IR parametric source", The 8th Pacific Rim Conference on Lasers and Electro-Optics (CLEO/Pacific Rim 2009), Shanghai, China, Aug.-Sept. (2009).
15. K. Sugioka, " Ultrafast laser micro and nano processing – The state of the art and future perspective", The 8th Pacific Rim Conference on Lasers and Electro-Optics (CLEO/Pacific Rim 2009), Shanghai, China, Aug.-Sept. (2009). (Tutorial)
16. K. Midorikawa: "Generation of water-window high harmonics and attosecond pulses by an IR parametric source", 4th Asia Summer School and Symposium on Laser-Plasma Acceleration and Radiation, Hsinchu, Tiwan, Aug.(2009).
17. E. J. Takahashi and K. Midorikawa: "Water window high harmonic x-ray lasers", SPIE 2009 Optics + Photonics, California, USA, Aug. (2009)
18. K. Midorikawa: "High harmonics and attosecond pulse generation", 4th Asian Summer School and Symposium on Laser-Plasma Acceleration and Radiation, Hsinchu, Taiwan, Aug.(2009).
19. K. Midorikawa: "Generation of sub-keV harmonics and isolated attosecond pulse by an IR-OPA source", 2nd International Conference on Attosecond Physics, Kansas, USA, July-Aug.(2009).
20. K. Sugioka, Y. Hanada, and K. Midorikawa, "Dynamic observation of microorganisms using Nanoaquariums fabricated by femtosecond laser", 18th Int. Workshop on Laser Physics (LPHYS 2009), Barcelona, Spain, July (2009).
21. K. Sugioka, Y. Hanada, and K. Midorikawa, "Fabrication of 3D Optofluidics by Femtosecond Laser", 1st Canada-Japan CLAN Workshop, Tokyo, Japan, July (2009).

22. K. Midorikawa: "Generation of intense high harmonics and its application to attosecond nonlinear optics", 3rd Asian Workshop on Generation and Applications of Coherent XUV and X-ray Radiation, Wuhan, China, June(2009).
23. K. Midorikawa: "Recent progress on xuv and attosecond science at RIKEN", 2nd International Conference on Ultraintense Laser Interaction Science, Frascati, Italy, May(2009).
24. K. Midorikawa: "Water window X-ray generation by phase matched high harmonics with neutral media", Ultra-Fast Dynamic Imaging of Matter II (UDIM09), Naples, Italy, Apr.-May(2009).
25. K. L. Ishikawa: "Wavelength-dependence of high-harmonic generation", Ultra-Fast Dynamic Imaging of Matter II (UDIM09), Naples, Italy, Apr.-May 3 (2009).
26. 緑川 克美: "テラヘルツ光の応用展開へ向けて", 第 57 回応用物理学関係連合講演会、平塚、3 月 (2010).
27. 緑川 克美: "高次高調波とアト秒科学", 第 4 回光材料・応用技術研究会、東京、3 月 (2010).
28. 杉岡 幸次, 中嶋 聖介, 緑川 克美, "化学溶液支援フェムト秒レーザーアブレーションによる GaN へのマイクロ/ナノ構造形成", レーザー学会学術講演会第 30 回年次大会、2 月, 東京 (2010).
29. 高橋栄治, 緑川克美:"高次高調波を用いたコヒーレントな "水の窓" X 線の発生", レーザー学会学術講演会第 30 回年次大会, 大阪、2 月、2010.
30. 緑川 克美: "エクストリームフォトニクス: 光科学の新たな地平を拓く", 第 20 回サイテックサロン、東京、7 月(2009).
31. 須田亮,"中空ファイバー中での非線形光学", 第 3 回先端光量子科学アライアンスセミナー、和光、2009 年 7 月.
32. 緑川 克美: "レーザー物理の最前線: エクストリームフォトニクス", レーザー-EXPO2009「レーザー学会招待講演会」, 横浜、4 月(2009).

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2. 1st Canada-Japan CLAN Workshop, Tokyo, Japan, July (2009).
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4. RIKEN International Symposium on Attosecond Science, Wako, Japan, Apr.(2009).