



ESI Highly Cited Papers in March 2023

1. **Passive technologies for future large-scale photonic integrated circuits on silicon: polarization handling, light non-reciprocity and loss reduction**
Daoxin Dai, Jared Bauters & John E Bowers
Light Sci Appl **1**, e1 (2012). DOI: 10.1038/lسا.2012.1
2. **Bismuth-doped optical fibers: a challenging active medium for near-IR lasers and optical amplifiers**
Evgeny M Dianov
Light Sci Appl **1**, e12 (2012). DOI: 10.1038/lسا.2012.12
3. **Surface plasmon resonance of layer-by-layer gold nanoparticles induced photoelectric current in environmentally-friendly plasmon-sensitized solar cell**
Yen-Hsun Su, Yuan-Feng Ke, Shi-Liang Cai & Qian-Yu Yao
Light Sci Appl **1**, e14 (2012). DOI: 10.1038/lسا.2012.14
4. **Highly efficient GaAs solar cells by limiting light emission angle**
Emily D Kosten, Jackson H Atwater, James Parsons, Albert Polman & Harry A Atwater
Light Sci Appl **2**, e45 (2013). DOI: 10.1038/lسا.2013.1
5. **Surface brightens up Si quantum dots: direct bandgap-like size-tunable emission**
Kateřina Dohnalová, Alexander N Poddubny, Alexei A Prokofiev, Wieteke DAM de Boer, Chinnaswamy P Umesh, Jos MJ Paulusse, Han Zuilhof & Tom Gregorkiewicz
Light Sci Appl **2**, e47 (2013). DOI: 10.1038/lسا.2013.3
6. **New yellow Ba_{0.93}Eu_{0.07}Al₂O₄ phosphor for warm-white light-emitting diodes through single-emitting-center conversion**
Xufan Li, John D Budai, Feng Liu, Jane Y Howe, Jiahua Zhang, Xiao-Jun Wang, Zhanjun Gu, Chengjun Sun, Richard S Meltzer & Zhengwei Pan
Light Sci Appl **2**, e50 (2013). DOI: 10.1038/lسا.2013.6
7. **Helicity dependent directional surface plasmon polariton excitation using a metasurface with interfacial phase discontinuity**
Lingling Huang, Xianzhong Chen, Benfeng Bai, Qiaofeng Tan, Guofan Jin, Thomas Zentgraf & Shuang Zhang
Light Sci Appl **2**, e70 (2013). DOI: 10.1038/lسا.2013.26
8. **Ultra-thin, planar, Babinet-inverted plasmonic metalenses**
Xingjie Ni, Satoshi Ishii, Alexander V Kildishev & Vladimir M Shalaev
Light Sci Appl **2**, e72 (2013). DOI: 10.1038/lسا.2013.28



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9. **Plasmonics for solid-state lighting: enhanced excitation and directional emission of highly efficient light sources**
Gabriel Lozano, Davy J Louwers, Said RK Rodríguez, Shunsuke Murai, Olaf TA Jansen, Marc A Verschuuren & Jaime Gómez Rivas
Light Sci Appl **2**, e66 (2013). DOI: 10.1038/lsci.2013.22
10. **A systematic study on efficiency enhancements in phosphorescent green, red and blue microcavity organic light emitting devices**
Chaoyu Xiang, Wonhoe Koo, Franky So, Hisahiro Sasabe & Junji Kido
Light Sci Appl **2**, e74 (2013). DOI: 10.1038/lsci.2013.30
11. **Exceeding the limit of plasmonic light trapping in textured screen-printed solar cells using Al nanoparticles and wrinkle-like graphene sheets**
Xi Chen, Baohua Jia, Yinan Zhang & Min Gu
Light Sci Appl **2**, e92 (2013). DOI: 10.1038/lsci.2013.48
12. **Functionalized polymer nanofibers: a versatile platform for manipulating light at the nanoscale**
Pan Wang, Yipei Wang & Limin Tong
Light Sci Appl **2**, e102 (2013). DOI: 10.1038/lsci.2013.58
13. **Handheld high-throughput plasmonic biosensor using computational on-chip imaging**
Arif E Cetin, Ahmet F Coskun, Betty C Galarreta, Min Huang, David Herman, Aydogan Ozcan & Hatice Altug
Light Sci Appl **3**, e122 (2014). DOI: 10.1038/lsci.2014.3
14. **A visible light-driven plasmonic photocatalyst**
Francesca Pincella, Katsuhiro Isozaki & Kazushi Miki
Light Sci Appl **3**, e133 (2014). DOI: 10.1038/lsci.2014.14
15. **Healthy, natural, efficient and tunable lighting: four-package white LEDs for optimizing the circadian effect, color quality and vision performance**
Ji Hye Oh, Su Ji Yang & Young Rag Do
Light Sci Appl **3**, e141 (2014). DOI: 10.1038/lsci.2014.22
16. **Ultrafast lasers-reliable tools for advanced materials processing**
Koji Sugioka & Ya Cheng
Light Sci Appl **3**, e149 (2014). DOI: 10.1038/lsci.2014.30
17. **Metallic nanostructures for light trapping in energy-harvesting devices**
Chuan Fei Guo, Tianyi Sun, Feng Cao, Qian Liu & Zhifeng Ren
Light Sci Appl **3**, e161 (2014). DOI: 10.1038/lsci.2014.42
18. **Adaptive optical microscopy: the ongoing quest for a perfect image**
Martin J Booth
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19. Generating optical orbital angular momentum at visible wavelengths using a plasmonic metasurface
Ebrahim Karimi, Sebastian A Schulz, Israel De Leon, Hammam Qassim, Jeremy Upham & Robert W Boyd
Light Sci Appl **3**, e167 (2014). DOI: 10.1038/lsa.2014.48
20. Optical storage arrays: a perspective for future big data storage
Min Gu, Xiangping Li & Yaoyu Cao
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21. Light scattering and surface plasmons on small spherical particles
Xiaofeng Fan, Weitao Zheng & David J Singh
Light Sci Appl **3**, e179 (2014). DOI: 10.1038/lsa.2014.60
22. Design and fabrication of broadband ultralow reflectivity black Si surfaces by laser micro/nanoprocessing
Jing Yang, Fangfang Luo, Tsung Sheng Kao, Xiong Li, Ghim Wei Ho, Jinghua Teng, Xiangang Luo & Minghui Hong
Light Sci Appl **3**, e185 (2014). DOI: 10.1038/lsa.2014.66
23. Coding metamaterials, digital metamaterials and programmable metamaterials
Tie Jun Cui, Mei Qing Qi, Xiang Wan, Jie Zhao & Qiang Cheng
Light Sci Appl **3**, e218 (2014). DOI: 10.1038/lsa.2014.99
24. Fundamentals of phase-only liquid crystal on silicon (LCOS) devices
Zichen Zhang, Zheng You & Daping Chu
Light Sci Appl **3**, e213 (2014). DOI: 10.1038/lsa.2014.94
25. Observation of efficient population of the red-emitting state from the green state by non-multiphonon relaxation in the Er³⁺-Yb³⁺ system
Jiahua Zhang, Zhendong Hao, Jing Li, Xia Zhang, Yongshi Luo & Guohui Pan
Light Sci Appl **4**, e239 (2015). DOI: 10.1038/lsa.2015.12
26. Massive individual orbital angular momentum channels for multiplexing enabled by Dammann gratings
Ting Lei, Meng Zhang, Yuru Li, Ping Jia, Gordon Ning Liu, Xiaogeng Xu, Zhaojun Li, Changjun Min, Jiao Lin, Changyuan Yu, Hanben Niu & Xiaocong Yuan
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27. Advances in InGaAs/InP single-photon detector systems for quantum communication
Jun Zhang, Mark A Itzler, Hugo Zbinden & Jian-Wei Pan
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28. **Giant photonic spin Hall effect in momentum space in a structured metamaterial with spatially varying birefringence**
Xiaohui Ling, Xinxing Zhou, Xunong Yi, Weixing Shu, Yachao Liu, Shizhen Chen, Hailu Luo, Shuangchun Wen & Dianyuan Fan
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29. **Nanoplasmonic waveguides: towards applications in integrated nanophotonic circuits**
Yurui Fang & Mengtao Sun
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30. **Optical tuning of exciton and trion emissions in monolayer phosphorene**
Jiong Yang, Renjing Xu, Jiajie Pei, Ye Win Myint, Fan Wang, Zhu Wang, Shuang Zhang, Zongfu Yu & Yuerui Lu
Light Sci Appl **4**, e312 (2015). DOI: 10.1038/lsci.2015.85
31. **Broadband diffusion of terahertz waves by multi-bit coding metasurfaces**
Li-Hua Gao, Qiang Cheng, Jing Yang, Shao-Jie Ma, Jie Zhao, Shuo Liu, Hai-Bing Chen, Qiong He, Wei-Xiang Jiang, Hui-Feng Ma, Qi-Ye Wen, Lan-Ju Liang, Biao-Bing Jin, Wei-Wei Liu, Lei Zhou, Jian-Quan Yao, Pei-Heng Wu & Tie-Jun Cui
Light Sci Appl **4**, e324 (2015). DOI: 10.1038/lsci.2015.97
32. **Plasmon-driven reaction controlled by the number of graphene layers and localized surface plasmon distribution during optical excitation**
Zhi-gao Dai, Xiang-heng Xiao, Wei Wu, Yu-peng Zhang, Lei Liao, Shi-shang Guo, Jian-jian Ying, Chong-xin Shan, Meng-tao Sun & Chang-zhong Jiang
Light Sci Appl **4**, e342 (2015). DOI: 10.1038/lsci.2015.115
33. **On-chip light sources for silicon photonics**
Zhiping Zhou, Bing Yin & Jurgen Michel
Light Sci Appl **4**, e358 (2015). DOI: 10.1038/lsci.2015.131
34. **Tailoring color emissions from N-doped graphene quantum dots for bioimaging applications**
Dan Qu, Min Zheng, Jing Li, Zhigang Xie & Zaicheng Sun
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35. **Photoexcitation dynamics in solution-processed formamidinium lead iodide perovskite thin films for solar cell applications**
Hong-Hua Fang, Feng Wang, Sampson Adjokatse, Ni Zhao, Jacky Even & Maria Antonietta Loi
Light Sci Appl **5**, e16056 (2016). DOI: 10.1038/lsci.2016.56
36. **High-efficiency surface plasmon meta-couplers: concept and microwave-regime realizations**
Wujiong Sun, Qiong He, Shulin Sun & Lei Zhou
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37. **Anisotropic coding metamaterials and their powerful manipulation of differently polarized terahertz waves**
Shuo Liu, Tie Jun Cui, Quan Xu, Di Bao, Liangliang Du, Xiang Wan, Wen Xuan Tang, Chunmei Ouyang, Xiao Yang Zhou, Hao Yuan, Hui Feng Ma, Wei Xiang Jiang, Jiaguang Han, Weili Zhang & Qiang Cheng
Light Sci Appl **5**, e16076 (2016). DOI: 10.1038/lsci.2016.76
38. **Energy transfer in plasmonic photocatalytic composites**
Xiang-Chao Ma, Ying Dai, Lin Yu & Bai-Biao Huang
Light Sci Appl **5**, e16017 (2016). DOI: 10.1038/lsci.2016.17
39. **A single Eu²⁺-activated high-color-rendering oxychloride white-light phosphor for white-light-emitting diodes**
Peng-Peng Dai, Cong Li, Xin-Tong Zhang, Jun Xu, Xi Chen, Xiu-Li Wang, Yan Jia, Xiaojun Wang & Yi-Chun Liu
Light Sci Appl **5**, e16024 (2016). DOI: 10.1038/lsci.2016.24
40. **Supra-(carbon nanodots) with a strong visible to near-infrared absorption band and efficient photothermal conversion**
Di Li, Dong Han, Song-Nan Qu, Lei Liu, Peng-Tao Jing, Ding Zhou, Wen-Yu Ji, Xiao-Yun Wang, Tong-Fei Zhang & De-Zhen Shen
Light Sci Appl **5**, e16120 (2016). DOI: 10.1038/lsci.2016.120
41. **Ultrafast laser processing of materials: from science to industry**
Mangirdas Malinauskas, Albertas Žukauskas, Satoshi Hasegawa, Yoshio Hayasaki, Vygantas Mizeikis, Ričardas Buvildas & Saulius Juodkazis
Light Sci Appl **5**, e16133 (2016). DOI: 10.1038/lsci.2016.133
42. **Experimental quantum secure direct communication with single photons**
Jian-Yong Hu, Bo Yu, Ming-Yong Jing, Lian-Tuan Xiao, Suo-Tang Jia, Guo-Qing Qin & Gui-Lu Long
Light Sci Appl **5**, e16144 (2016). DOI: 10.1038/lsci.2016.144
43. **Ca_{1-x}Li_xAl_{1-x}Si_{1+x}N₃:Eu²⁺ solid solutions as broadband, color-tunable and thermally robust red phosphors for superior color rendition white light-emitting diodes**
Le Wang, Rong-Jun Xie, Yuanqiang Li, Xiaojun Wang, Chong-Geng Ma, Dong Luo, Takashi Takeda, Yi-Ting Tsai, Ru-Shi Liu & Naoto Hirosaki
Light Sci Appl **5**, e16155 (2016). DOI: 10.1038/lsci.2016.155
44. **Information entropy of coding metasurface**
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45. Control over emissivity of zero-static-power thermal emitters based on phase-changing material GST
Kai-Kai Du, Qiang Li, Yan-Biao Lyu, Ji-Chao Ding, Yue Lu, Zhi-Yuan Cheng & Min Qiu
Light Sci Appl **6**, e16194 (2017). DOI: 10.1038/lsta.2016.194
46. Quantification of light-enhanced ionic transport in lead iodide perovskite thin films and its solar cell applications
Yi-Cheng Zhao, Wen-Ke Zhou, Xu Zhou, Kai-Hui Liu, Da-Peng Yu & Qing Zhao
Light Sci Appl **6**, e16243 (2017). DOI: 10.1038/lsta.2016.243
47. Parametric down-conversion photon-pair source on a nanophotonic chip
Xiang Guo, Chang-ling Zou, Carsten Schuck, Hojoong Jung, Risheng Cheng & Hong X Tang
Light Sci Appl **6**, e16249 (2017). DOI: 10.1038/lsta.2016.249
48. Generation of wavelength-independent subwavelength Bessel beams using metasurfaces
Wei Ting Chen, Mohammadreza Khorasaninejad, Alexander Y. Zhu, Jaewon Oh, Robert C. Devlin, Aun Zaidi & Federico Capasso
Light Sci Appl **6**, e16259 (2017). DOI: 10.1038/lsta.2016.259
49. Three-dimensional chiral microstructures fabricated by structured optical vortices in isotropic material
Jincheng Ni, Chaowei Wang, Chenchu Zhang, Yanlei Hu, Liang Yang, Zhaoxin Lao, Bing Xu, Jiawen Li, Dong Wu & Jiaru Chu
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50. Ultrasensitive broadband phototransistors based on perovskite/organic-semiconductor vertical heterojunctions
Chao Xie, Peng You, Zhike Liu, Li Li & Feng Yan
Light Sci Appl **6**, e17023 (2017). DOI: 10.1038/lsta.2017.23
51. Multifunctional interleaved geometric-phase dielectric metasurfaces
Elhanan Maguid, Igor Yulevich, Michael Yannai, Vladimir Kleiner, Mark L Brongersma & Erez Hasman
Light Sci Appl **6**, e17027 (2017). DOI: 10.1038/lsta.2017.27
52. Optical manipulation from the microscale to the nanoscale: fundamentals, advances and prospects
Dongliang Gao, Weiqiang Ding, Manuel Nieto-Vesperinas, Xumin Ding, Mahdy Rahman, Tianhang Zhang, ChweeTeck Lim & Cheng-Wei Qiu
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Hai-Wei Chen, Rui-Dong Zhu, Juan He, Wei Duan, Wei Hu, Yan-Qing Lu, Ming-Chun Li, Seok-Lyul Lee, Ya-Jie Dong & Shin-Tson Wu
Light Sci Appl **6**, e17043 (2017). DOI: 10.1038/lsci.2017.43
54. **Beam switching and bifocal zoom lensing using active plasmonic metasurfaces**
Xinghui Yin, Tobias Steinle, Lingling Huang, Thomas Taubner, Matthias Wuttig, Thomas Zentgraf & Harald Giessen
Light Sci Appl **6**, e17016 (2017). DOI: 10.1038/lsci.2017.16
55. **Plasmonic nano-printing: large-area nanoscale energy deposition for efficient surface texturing**
Lei Wang, Qi-Dai Chen, Xiao-Wen Cao, Ričardas Buividas, Xuwen Wang, Saulius Juodkazis & Hong-Bo Sun
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56. **Tomographic flow cytometry by digital holography**
Francesco Merola, Pasquale Memmolo, Lisa Miccio, Roberto Savoia, Martina Mugnano, Angelo Fontana, Giuliana D'Ippolito, Angela Sardo, Achille Iolascon, Antonella Gambale & Pietro Ferraro
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57. **Electrons dynamics control by shaping femtosecond laser pulses in micro/nanofabrication: modeling, method, measurement and application**
Lan Jiang, An-Dong Wang, Bo Li, Tian-Hong Cui & Yong-Feng Lu
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58. **Phase recovery and holographic image reconstruction using deep learning in neural networks**
Yair Rivenson, Yibo Zhang, Harun Günaydin, Da Teng & Aydogan Ozcan
Light Sci Appl **7**, 17141 (2018). DOI: 10.1038/lsci.2017.141
59. **Giant intrinsic chiro-optical activity in planar dielectric nanostructures**
Alexander Y Zhu, Wei Ting Chen, Aun Zaidi, Yao-Wei Huang, Mohammadreza Khorasaninejad, Vyshakh Sanjeev, Cheng-Wei Qiu & Federico Capasso
Light Sci Appl **7**, 17158 (2018). DOI: 10.1038/lsci.2017.158
60. **Twisted photons: new quantum perspectives in high dimensions**
Manuel Erhard, Robert Fickler, Mario Krenn & Anton Zeilinger
Light Sci Appl **7**, 17146 (2018). DOI: 10.1038/lsci.2017.146
61. **Liquid crystal display and organic light-emitting diode display: present status and future perspectives**
Hai-Wei Chen, Jiun-Haw Lee, Bo-Yen Lin, Stanley Chen & Shin-Tson Wu
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62. **Boron nitride nanoresonators for phonon-enhanced molecular vibrational spectroscopy at the strong coupling limit**
Marta Autore, Peining Li, Irene Dolado, Francisco J Alfaro-Mozaz, Ruben Esteban, Ainhoa Atxabal, Fèlix Casanova, Luis E Hueso, Pablo Alonso-González, Javier Aizpurua, Alexey Y Nikitin, Saül Vélez & Rainer Hillenbrand
Light Sci Appl **7**, 17172 (2018). DOI: 10.1038/lsci.2017.172
63. **Quenching of the red Mn⁴⁺ luminescence in Mn⁴⁺-doped fluoride LED phosphors**
Tim Senden, Relinde J.A. van Dijk-Moes & Andries Meijerink
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64. **Gold-patched graphene nano-stripes for high-responsivity and ultrafast photodetection from the visible to infrared regime**
Semih Cakmakyapan, Ping Keng Lu, Aryan Navabi & Mona Jarrahi
Light Sci Appl **7**, 20 (2018). DOI: 10.1038/s41377-018-0020-2
65. **Thermal camouflage based on the phase-changing material GST**
Yurui Qu, Qiang Li, Lu Cai, Meiyang Pan, Pintu Ghosh, Kaikai Du & Min Qiu
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66. **Reflective chiral meta-holography: multiplexing holograms for circularly polarized waves**
Qiu Wang, Eric Plum, Quanlong Yang, Xueqian Zhang, Quan Xu, Yuehong Xu, Jiaguang Han & Weili Zhang
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67. **Strategies for reducing speckle noise in digital holography**
Vittorio Bianco, Pasquale Memmolo, Marco Leo, Silvio Montresor, Cosimo Distante, Melania Paturzo, Pascal Picart, Bahram Javidi & Pietro Ferraro
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68. **All-optical active THz metasurfaces for ultrafast polarization switching and dynamic beam splitting**
Longqing Cong, Yogesh Kumar Srivastava, Huifang Zhang, Xueqian Zhang, Jiaguang Han & Ranjan Singh
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69. **Looking at sound: optoacoustics with all-optical ultrasound detection**
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70. **Hybrid graphene metasurfaces for high-speed mid-infrared light modulation and single-pixel imaging**
Beibei Zeng, Zhiqin Huang, Akhilesh Singh, Yu Yao, Abul K. Azad, Aditya D. Mohite, Antoinette J. Taylor, David R. Smith & Hou-Tong Chen
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71. **Plasmonic nanostructure design and characterization via Deep Learning**
Itzik Malkiel, Michael Mrejen, Achiya Nagler, Uri Arieli, Lior Wolf & Haim Suchowski
Light Sci Appl **7**, 60 (2018). DOI: 10.1038/s41377-018-0060-7
72. **Multimode optical fiber transmission with a deep learning network**
Babak Rahmani, Damien Loterie, Georgia Konstantinou, Demetri Psaltis & Christophe Moser
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73. **Broadband achromatic dielectric metalenses**
Sajan Shrestha, Adam C. Overvig, Ming Lu, Aaron Stein & Nanfang Yu
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74. **In vivo theranostics with near-infrared-emitting carbon dots-highly efficient photothermal therapy based on passive targeting after intravenous administration**
Xin Bao, Ye Yuan, Jingqin Chen, Bohan Zhang, Di Li, Ding Zhou, Pengtao Jing, Guiying Xu, Yingli Wang, Kateřina Holá, Dezhen Shen, Changfeng Wu, Liang Song, Chengbo Liu, Radek Zbořil & Songnan Qu
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76. **High-fidelity multimode fibre-based endoscopy for deep brain in vivo imaging**
Sergey Turtaev, Ivo T. Leite, Tristan Altwegg-Boussac, Janelle M. P. Pakan, Nathalie L. Rochefort & Tomáš Čížmár
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77. **Multichannel vectorial holographic display and encryption**
Ruizhe Zhao, Basudeb Sain, Qunshuo Wei, Chengchun Tang, Xiaowei Li, Thomas Weiss, Lingling Huang, Yongtian Wang & Thomas Zentgraf
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78. **Interference-assisted kaleidoscopic meta-plexer for arbitrary spin-wavefront manipulation**
He-Xiu Xu, Guangwei Hu, Ying Li, Lei Han, Jianlin Zhao, Yunming Sun, Fang Yuan, Guang-Ming Wang, Zhi Hao Jiang, Xiaohui Ling, Tie Jun Cui & Cheng-Wei Qiu
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79. [Direct observation of ultrafast plasmonic hot electron transfer in the strong coupling regime](#)
Hangyong Shan, Ying Yu, Xingli Wang, Yang Luo, Shuai Zu, Bowen Du, Tianyang Han, Bowen Li, Yu Li, Jiarui Wu, Feng Lin, Kebin Shi, Beng Kang Tay, Zheng Liu, Xing Zhu & Zheyu Fang
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80. [Real-time high-resolution mid-infrared optical coherence tomography](#)
Niels M. Israelsen, Christian R. Petersen, Ajanta Barh, Deepak Jain, Mikkel Jensen, Günther Hanneschläger, Peter Tidemand-Lichtenberg, Christian Pedersen, Adrian Podoleanu & Ole Bang
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81. [New strategy for designing orangish-redemitting phosphor via oxygen-vacancy-induced electronic localization](#)
Yi Wei, Gongcheng Xing, Kang Liu, Guogang Li, Peipei Dang, Sisi Liang, Min Liu, Ziyong Cheng, Dayong Jin & Jun Lin
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82. [Implementation and security analysis of practical quantum secure direct communication](#)
Ruoyang Qi, Zhen Sun, Zaisheng Lin, Penghao Niu, Wentao Hao, Liyuan Song, Qin Huang, Jiancun Gao, Liuguo Yin & Gui-Lu Long
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83. [PhaseStain: the digital staining of label-free quantitative phase microscopy images using deep learning](#)
Yair Rivenson, Tairan Liu, Zhensong Wei, Yibo Zhang, Kevin de Haan & Aydogan Ozcan
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84. [Optical orbital-angular-momentum-multiplexed data transmission under high scattering](#)
Lei Gong, Qian Zhao, Hao Zhang, Xin-Yao Hu, Kun Huang, Jia-Miao Yang & Yin-Mei Li
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85. [Emerging ultra-narrow-band cyan-emitting phosphor for white LEDs with enhanced color rendition](#)
Ming Zhao, Hongxu Liao, Maxim S. Molokeev, Yayun Zhou, Qinyuan Zhang, Quanlin Liu & Zhiguo Xia
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86. [Artificial neural networks enabled by nanophotonics](#)
Qiming Zhang, Haoyi Yu, Martina Barbiero, Baokai Wang & Min Gu
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87. [3D Janus plasmonic helical nanoapertures for polarization-encrypted data storage](#)
Yang Chen, Xiaodong Yang & Jie Gao
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88. **High-efficiency, large-area, topology-optimized metasurfaces**
Thaibao Phan, David Sell, Evan W. Wang, Sage Doshay, Kofi Edee, Jianji Yang & Jonathan A. Fan
Light Sci Appl **8**, 48 (2019). DOI: 10.1038/s41377-019-0159-5
89. **A broadband achromatic metalens array for integral imaging in the visible**
Zhi-Bin Fan, Hao-Yang Qiu, Han-Le Zhang, Xiao-Ning Pang, Li-Dan Zhou, Lin Liu, Hui Ren, Qiong-Hua Wang & Jian-Wen Dong
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90. **Deep learning in holography and coherent imaging**
Yair Rivenson, Yichen Wu & Aydogan Ozcan
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91. **Single-photon avalanche diode imagers in biophotonics: review and outlook**
Claudio Bruschini, Harald Homulle, Ivan Michel Antolovic, Samuel Burri & Edoardo Charbon
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92. **3D-Integrated metasurfaces for full-colour holography**
Yueqiang Hu, Xuhao Luo, Yiqin Chen, Qing Liu, Xin Li, Yasi Wang, Na Liu & Huigao Duan
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93. **Optical vortices 30 years on: OAM manipulation from topological charge to multiple singularities**
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Dongjie Liu, Guogang Li, Peipei Dang, Qianqian Zhang, Yi Wei, Lei Qiu, Maxim S. Molokeev, Hongzhou Lian, Mengmeng Shang & Jun Lin
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