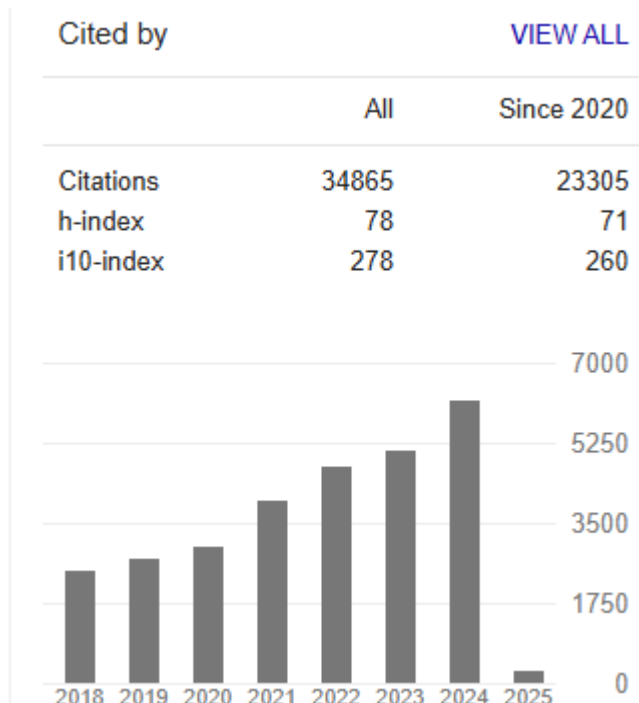


# Guichuan Xing

- Professor, Head of the Department of Physics and Chemistry
- Tel:+853-8822 4036
- Email: [gcxing@um.edu.mo](mailto:gcxing@um.edu.mo)
- Address: #N23-3008, Department of Physics and Chemistry, Institute of Applied Physics and Materials Engineering, University of Macau, Macao SAR



## • Work Experience

08/2021-Present Professor, University of Macau

08/2020-08/2021 Associate Professor, University of Macau

08/2016-08/2020 Assistant Professor, University of Macau

2009-2016 Research Fellow, Nanyang Technological University, Singapore

## • Education

2005-2011 Doctor, Department of Physics, National University of Singapore (Singapore)

2003-2005 Master, Institute of Advanced Materials, Fudan University (China)

1999-2003 Bachelor, Light sources & Illuminating Engineering, Fudan University, (China)

- **Awards & Honors**

2022, 2023 & 2024 Clarivate™ Highly Cited Researcher

2022 Macau Science and Technology Award 2022 (Second Prize)

2024 Excellence in Research – IAPME Academic Awards 2023/2024

2021 Excellence in Research – IAPME Academic Awards 2020/2021

2020 Excellence in Research – IAPME Academic Awards 2019/2020

2016 PVSEC-26 Young Scientist Award

2015 Thousand Talent Program for Young Outstanding Scientists

2015 Six talent peaks project in Jiangsu Province

- **Research Fields**

The interest of Xing’s group is focused on developing and applying ultrafast nonlinear spectroscopic techniques to probing, understanding and controlling the fundamental charge and energy carrier generation, transport and relaxation in novel optoelectronic systems for energy conversion/storage and light emission applications. Current Research Interests: Ultrafast nonlinear spectroscopy, Metal-halide perovskite solar cells and Metal-halide perovskite light emitting diodes and lasers.

- **Research Grants**

**Competitive Research Grants Achieved:** 10 Macao SAR government’s grants, 6 university’s grants and 3 NSFC grant with a total amount of ~18 million MOP (~2.25 million USD) since 2016 as the principle investigator.

**Non-Competitive Research Grants Achieved:** A total amount of ~6 million MOP from University of Macau for setting up the Lab.

### **Representative Publications**

1. Xuanchi Yu, Jia Guo\*, Yulin Mao, Chengwei Shan, Fengshou Tian, Bingheng Meng, Zhaojin Wang, Tianqi Zhang, Aung Ko Ko Kvaw, Shuming Chen, Xiaowei Sun, Kai Wang, Rui Chen\*, **Guichuan Xing\***, ” Enhancing the Performance of Perovskite Light-Emitting Diodes via Synergistic Effect of Defect Passivation and Dielectric Screening,” *Nano-Micro Letters* 16, 205 (2024).
2. Chunhu Zhao, Jia Guo, Jiahua Tao, Junhao Chu, Shaoqiang Chen\*, **Guichuan Xing\***, “Pulse-doubling perovskite nanowire lasers enabled by phonon-assisted multistep energy funneling,” *Light: Science & Applications* 13, 170 (2024).
3. Jin-Feng Liao, Zhipeng Zhang, Lei Zhou, Zikang Tang, **Guichuan Xing\***, “Achieving

- Near-Unity Red Light Photoluminescence in Antimony Halide Crystals via Polyhedron Regulation,” *Angewandte Chemie International Edition* 63, e202404100 (2024).
4. Wang Li, Xiaozhi Bao, Annan Zhu, Hao Gu, Yulin Mao, Bingzhe Wang, Gang Wang, Jia Guo\*, Ying Li\*, **Guichuan Xing\***, “Internal Encapsulation Enables Efficient and Stable Perovskite Solar Cells,” *Advanced Functional Materials* doi.org/10.1002/adfm.202414004 (2024).
  5. Jin-Feng Liao, Zhipeng Zhang, Gang Wang, Lei Zhou, Ningbo Yi, Zikang Tang, **Guichuan Xing\***, “Oriented Growth of Highly Emissive Manganese Halide Microrods for Dual-Mode Low-Loss Optical Waveguides,” *Angewandte Chemie* e202419085 (2024).
  6. Hao Gu, Junmin Xia, Chao Liang\*, Yonghua Chen\*, Wei Huang\*, **Guichuan Xing\***, “Phase-pure two-dimensional layered perovskite thin films,” *Nature Reviews Materials* doi.org/10.1038/s41578-023-00560-2 (2023).
  7. Gang Wang, Tanghao Liu, Bingzhe Wang, Hao Gu, Qi Wei, Zhipeng Zhang, Jun He\*, Mingjie Li\*, **Guichuan Xing\***, “Hot-carrier tunable abnormal nonlinear absorption conversion in quasi-2D perovskite,” *Nature Communications* 13, 6935 (2022).
  8. Dejian Yu, Fei Cao, Jinfeng Liao, Bingzhe Wang, Chenliang Su\*, **Guichuan Xing\***, “Direct observation of photoinduced carrier blocking in mixed-dimensional 2D/3D perovskites and the origin,” *Nature Communications* 13, 6229 (2022).
  9. Zhipeng Zhang, Bingzhe Wang, Hai-Bing Zhao, Jin-Feng Liao, Zi-Chun Zhou, Tanghao Liu, Bingchen He, Qi Wei, Shi Chen, Hong-Yan Chen, Dai-Bin Kuang\*, Ying Li\*, **Guichuan Xing\***, “Self-assembled lead-free double perovskite-MXene heterostructure with efficient charge separation for photocatalytic CO<sub>2</sub> reduction,” *Applied Catalysis B: Environmental* 312, 121358 (2022).
  10. Guangbao Wu, Rui Liang, Mingzhe Ge, Guoxing Sun\*, Yuan Zhang\*, **Guichuan Xing\***, “Surface Passivation Using Two Dimensional Perovskites Towards Efficient and Stable Perovskite Solar Cells,” *Advanced Materials* 34, 2105635 (2022).
  11. Chao Liang, Hao Gu, Junmin Xia, Shiliang Mei, Peivuan Pang, Nan Zhang, Jia Guo, Ruxin Guo, Yonglong Shen, Shengchun Yang, Zhanhua Wei, Guosheng Shao, **Guichuan Xing\***, “Recent progress in perovskite-based reversible photon–electricity conversion devices,” *Advanced Functional Materials* 32, 2108926 (2022).
  12. Yulan Huang, Tanghao Liu\*, Bingzhe Wang, Jielei Li, Dongyang Li, Guoliang Wang, Qing Lian, Abbas Amini, Shi Chen, Chun Cheng\*, **Guichuan Xing\***, “Antisolvent engineering to optimize grain crystallinity and holt-blocking capability of perovskite films for high-performance photovoltaics,” *Advanced Materials* 33, 2102816 (2021).
  13. Yulan Huang, Tanghao Liu, Dongyang Li, Dandan Zhao, Abbas Amini, Chun Cheng\*, **Guichuan Xing\***, “Limitations and solutions for achieving high-performance perovskite tandem photovoltaics,” *Nano Energy* 106219 (2021).
  14. Qi Wei, Jun Yin, Osman M Bakr, Ze Wang, Chenhao Wang, Omar F Mohammed\*, Mingjie Li\*, **Guichuan Xing\***, *Angewandte Chemie International Edition* 60, 10957 (2021).
  15. Chao Liang, Hao Gu, Yingdong Xia, Zhuo Wang, Xiaotao Liu, Junmin Xia, Shouwei Zuo, Yue Hu, Xingyu Gao, Wei Hui, Lingfeng Chao, Tingting Niu, Min Fang, Hui Lu, Han Dong, Hui Yu, Shi Chen, Xueqin Ran, Lin Song, Bixin Li, Jing Zhang, Yong Peng, Guosheng Shao, Jianpu Wang, Yonghua Chen\*, **Guichuan Xing\***, Wei Huang\*, “Two-dimensional Ruddlesden–Popper layered perovskite solar cells based on phase-pure thin films,” *Nature Energy* 6, 38 (2021).
  16. Kaiyang Wang, **Guichuan Xing\***, Qinghai Song\*, Shumin Xiao\*, Micro- and Nanostructured Lead Halide Perovskites: From Materials to Integrations and Devices. *Advanced Materials*, 33, 2000306 (2021).
  17. Jia Guo, Tanghao Liu, Mingjie Li\*, Chao Liang, Kaiyang Wang, Guo Hong, Yuxin Tang, Guankui Long, Siu-Fung Yu, Tae-Woo Lee, Wei Huang, **Guichuan Xing\***, “Ultrashort laser pulse doubling by meta-halide perovskite multiple quantum wells,” *Nature Communications* 11, 3361 (2020).
  18. Shen Xu, Wu Wang, Hui Li, Jingvu Zhang, Runfeng Chen\*, Shuang Wang, Chao Zheng, **Guichuan Xing\***, Chunyuan Song, Wei Huang\*, “Design of highly efficient deep-blue organic afterglow through guest sensitization and matrices rigidification,” *Nature Communications* 11, 2451 (2020).
  19. Shaomin Peng, Qi Wei, Bingzhe Wang, Zhipeng Zhang, Hongcheng Yang, Guotao Pang,

- Kai Wang\*, **Guichuan Xing\***, Xiaowei Sun, Zikang Tang\*, “Suppressing Strong Exciton–Phonon Coupling in Blue Perovskite Nanoplatelet Solids by Binary Systems,” *Angewandte Chemie International Edition*, 59, 22156 (2020).
20. Yulan Huang, Tanghao Liu, Chao Liang, Junmin Xia, Dongyang Li, Haichao Zhang, Abbas Amini, **Guichuan Xing\***, Chun Cheng\*, Towards the Simplest Structure of High-Performance Perovskite Solar Cells. *Advanced Functional Materials* 30, 2000863 (2020).
  21. Peivuan Pang, Guangrong Jin, Chao Liang, Bingzhe Wang, Wei Xiang, Dengliang Zhang, Jingwei Xu, Wei Hong, Zewen Xiao, Lei Wang, **Guichuan Xing\***, Jiangshan Chen\*, Dongge Ma\*, “Rearranging Low-Dimensional Phase Distribution of Quasi-2D Perovskites for Efficient Sky-Blue Perovskite Light-Emitting Diodes,” *ACS Nano* 14, 11420 (2020).
  22. Ze Wang, Qi Wei, Xiaodong Liu\*, Li Liu, Xinvu Tang, Jia Guo, Shengqiang Ren, **Guichuan Xing\***, Dewei Zhao\*, Yonghao Zheng\*, “Spacer Cation Tuning Enables Vertically Oriented and Graded Quasi-2D Perovskites for Efficient Solar Cells,” *Advanced Functional Materials*, 5, 2008404 (2020).
  23. Bin Du, Qi Wei, Yongqing Cai, Tanghao Liu, Bo Wu, Ying Li, Yonghua Chen, Yingdong Xia\*, **Guichuan Xing\***, Wei Huang\*, Crystal face dependent charge carrier extraction in TiO<sub>2</sub>/Perovskite heterojunctions, *Nano Energy* 67, 104227 (2019).
  24. Yin Liang, Qiuyu Shang, Qi Wei, Liyun Zhao, Zhen Liu, Jia Shi, Yangguang Zhong, Jie Chen, Yan Gao, Meili Li, Xinfeng Liu, **Guichuan Xing\***, and Qing Zhang\*, Lasing from Mechanically Exfoliated 2D Homologous Ruddlesden-Popper Perovskite Engineered by Inorganic Layer Thickness. *Advanced Materials* 31, 1903030 (2019).
  25. Pengwei Li, Chao Liang, Xiaolong Liu, Fengyu Li, Yiqiang Zhang, Xiaotao Liu, Hao Gu, Xiaotian Hu, **Guichuan Xing\***, Xutang Tao and Yanlin Song\*, Low-Dimensional Perovskites with Diammonium and Monoammonium Alternant Cations for High-Performance Photovoltaics. *Advanced Materials* 31, 1901966 (2019).
  26. Chao Liang, Dandan Zhao, Pengwei Li, Bo Wu, Hao Gu, Jiacheng Zhang, Teck Wee Goh, Shi Chen, Yonghua Chen, Zhendong Sha\*, Guosheng Shao, Tze Chien Sum\* and **Guichuan Xing\***, Simultaneously boost diffusion length and stability of perovskite for high performance solar cells. *Nano Energy* 59, 721-729 (2019).
  27. Shaomin Peng, Sisi Wang, Dandan Zhao, Xiaojun Li, Chao Liang, Junmin Xia, Tianqi Zhang, **Guichuan Xing\***, Zikang Tang\*, Pure Bromide-Based Perovskite Nanoplatelets for Blue Light-Emitting Diodes. *Small Methods* 3, 1900196 (2019).
  28. Pengwei Li, Yiqiang Zhang, Chao Liang, **Guichuan Xing\***, Xiaolong Liu, Fengyu Li, Xiaotao Liu, Xiaotian Hu, Guosheng Shao and Yanlin Song\*, Phase Pure 2D Perovskite for High-Performance 2D-3D Heterostructured Perovskite Solar Cells. *Advanced Materials* 30, 1805323 (2018).
  29. Qi Wei, Mingjie Li, Zhipeng Zhang, Jia Guo, **Guichuan Xing\***, Tze Chien Sum\* and Wei Huang\*, Efficient recycling of trapped energies for dual-emission in Mn-doped perovskite nanocrystals. *Nano Energy* 51, 704-710 (2018).
  30. **Guichuan Xing\***, Bo Wu, Xiangyang Wu, Mingjie Li, Bin Du, Qi Wei, Jia Guo, Edwin K. L. Yeow, Tze Chien Sum\*, Wei Huang\*, “Transcending the Slow Bimolecular Recombination in Lead-Halide Perovskites for Electroluminescence,” *Nature Communications* 8, 14558 (2017).
  31. **Guichuan Xing\***, Mulmudi Hemant Kumar, Wee Kiang Chong, Xinfeng Liu, Yao Cai, Hong Ding, Mark Asta, Michael Grätzel, Subodh Mhaisalkar, Nripan Mathews\* and Tze Chien Sum\*, Solution-Processed Tin-Based Perovskite for Near-Infrared Lasing. *Advanced Materials* 28, 8191-8196 (2016).
  32. **Guichuan Xing\***, Nripan Mathews\*, Swee Sien Lim, Natalia Yantara, Xinfeng Liu, Dharani Sabba, Michael Grätzel, Subodh Mhaisalkar, Tze Chien Sum\*, “Low-temperature solution-processed wavelength-tunable perovskites for lasing,” *Nature Materials* 13, 476 (2014).
  33. **Guichuan Xing\***, Nripan Mathews\*, Shuangyong Sun, Swee Sien Lim, Yeng Ming Lam, Michael Grätzel, Subodh Mhaisalkar, Tze Chien Sum\*, “Long-range balanced electron- and hole-transport lengths in organic-inorganic CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub>,” *Science* 342, 344-347 (2013).
  34. **Guichuan Xing\***, Yile Liao, Xiangyang Wu, Sabyasachi Chakraborty, Xinfeng Liu, Edwin KL Yeow, Yinthal Chan\* and Tze Chien Sum\*, Ultralow-threshold two-photon

- pumped amplified spontaneous emission and lasing from seeded CdSe/CdS nanorod heterostructures. *Acs Nano* 6, 10835-10844 (2012).
35. **Guichuan Xing**, Hongchen Guo, Xinhai Zhang, Tze Chien Sum, Cheng Hon Alfred Huan, "The physics of ultrafast saturable absorption in graphene," *Optics Express* 18, 4564 (2010).

Full Publication List:

[https://scholar.google.com.sg/citations?hl=en&user=DcxL9\\_wAAAAJ&view\\_op=list\\_works&sortby=pubdate](https://scholar.google.com.sg/citations?hl=en&user=DcxL9_wAAAAJ&view_op=list_works&sortby=pubdate)

Home Page: <https://iapme.um.edu.mo/people/academic-staff/xing-guichuan/>