

Introduction

Dr. Zhi-Yuan Zhou leads a sub-group at Prof. Bao-Sen Shi's group, he has long been engaged in quantum optics and nonlinear optics. His main researches are focused on light field manipulation with both linear and nonlinear optical methods, the light field ranges from classical laser sources to quantum photon sources. The main research results include: systematic study of frequency conversion of light-carrying orbital angular momentum; high quality photon sources preparation with various materials and their applications in studying of fundamental principle of quantum optics, quantum metrology and imaging. He published more than 70 papers in various journals include: Physics Review Letters, Light: Science & Applications, Nature Communications, Science Advances and Science Bulletin.

Current Research Interests

1. Generation, manipulation and detection of mid-infrared light fields
2. Preparing and applications of high dimensional quantum states
3. High precision optical metrology with special light fields

Education:

1.2010~2015 PHD, Department of Optics and Optical engineering, University of Science and Technology of China, Supervisor: Prof. Bao-Sen Shi

2.2006~2010 Bachelor, Department of Optical information science and technology, Anhui University.

Work Experiences:

2019~now, Associate Professor, School of Physics, University of Science and Technology of China.

2017~2019, Associate Researcher, School of Physics, University of Science and Technology of China.

2015~2017, Postdoctoral Researcher, School of Physics, University of Science and Technology of China.

Research Programs:

1. 2017~2019, Frequency conversion of orbital angular momentum entangled light sources. National Natural Science Foundation of China.

2. 2021~2023, Generation, manipulation and detection of photonics states in the mid-infrared band. National Natural Science Foundation of China.

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Selected Publications

1. Shaul Mukamel, *et al.*, Roadmap on quantum light spectroscopy. J. Phys. B: At. Mol. Opt. Phys. 53 (2020) 072002. (Chaper 13: **Zhi-Yuan Zhou**, and Bao-Sen Shi, Characterizing optical properties of chiral materials with twisted photonic states).
2. Junxiao Zhou, Shikai Liu, Haoliang Qian, Yinhai Li, Hailu Luo†, Shuangchun Wen, **Zhiyuan Zhou**†, Guangcan Guo, Baosen Shi, Zhaowei Liu. Metasurface enabled quantum edge detection. Science Advances 6, eabc4358(2020).
3. Chen Yang, Shi-Long Liu, **Zhi-Yuan Zhou***, Yan Li, Yin-Hai Li, Shi-Kai Liu, Zhao-Huai Xu, Guang-Can Guo, and Bao-Sen Shi. Extra-cavity-enhanced difference-frequency generation at 1.63 μm . J. Opt. Soc. Am B 37, 1367(2020).
4. Shi-Kai Liu, Yin-Hai Li, Shi-Long Liu, **Zhi-Yuan Zhou***, Yan Li, Chen Yang, Guang-Can Guo, and Bao-Sen Shi. Real-time quantum edge enhanced imaging. Optics Express 28, 35415(2020).
5. Zhao-Huai Xu, Yin-Hai Li, **Zhi-Yuan Zhou***, Shi-Long Liu, Yan Li, Shi-Kai Liu, Chen Yang, Guang-Can Guo, and Bao-Sen Shi. High-quality versatile photonic sources for multiple quantum optical experiments. Optics Express 28, 5077(2020).
6. Shilong Liu , Yingwen Zhang , Chen Yang, Shikai Liu, Zheng Ge, Yinhai Li, Yan Li, **Zhiyuan Zhou***, Guangcan Guo, and Baosen Shi. Increasing two-photon entangled dimensions by shaping input-beam profiles. Physics Review A 101, 052324 (2020).
7. Shi-Long Liu, Chen Yang, Zhaohuai Xu, Shikai Liu, Yan Li, Yinhai Li, **Zhiyuan Zhou***, Guang-Can Guo, and Bao-sen Shi. High-dimensional quantum frequency converter. Physical Review A 101, 012339 (2020).
8. Chen Yang, Shi-Long Liu, **Zhi-Yuan Zhou***, Yan Li, Yin-Hai Li, Shi-Kai Liu, Zhao-Huai Xu, Guang-Can Guo, Bao-Sen Shi. Frequency up-conversion of an infrared image via a flat-top pump beam. Optics Communications 460 (2020) 125143.
9. Yin-Hai Li, **Zhi-Yuan Zhou***, Shi-Long Liu, Yan Li, Shi-Kai Liu, Chen Yang, Shuang Wang, Zhi-Han Zhu, Wei Gao, Guang-Can Guo, And Bao-Sen Shi. Compact sub-GHz bandwidth single-mode time-energy entangled photon source for high-speed quantum networks. OSA Continuum 4, 608(2021).
10. Zheng Ge, **Zhi-Yuan Zhou***, Yan Li, Chen Yang, Shi-Kai Liu, and Bao-Sen Shi. Fourth-harmonic generation of orbital angular momentum light with cascaded quasi-phase matching crystals. Optics Letters. 46, 158(2021).
11. **Zhi-Yuan Zhou**, Shi-Long Liu, Yan Li, Dong-Sheng Ding, Wei Zhang, Shuai Shi, Ming-Xin Dong, Bao-Sen Shi, Guang-Can Guo, Orbital Angular Momentum-Entanglement Frequency Transducer, Phys. Rev. Lett. 117, 103601(2016).
12. **Zhi-Yuan Zhou**, Shi-Kai Liu, Shi-Long Liu, Yin-Hai Li, Yan Li, Chen Yang, Zhao-Huai Xu, Guang-Can Guo, and Bao-Sen Shi, Revealing the Behavior of Photons in a Birefringent Interferometer. Phys. Rev. Lett. 120, 263601(2018).
13. **Zhi-Yuan Zhou**, Yan Li, Dong-Sheng Ding, Wei Zhang, Shuai Shi, Bao-Sen Shi*, Guang-Can Guo, Orbital angular momentum photonic quantum interface, Light: Sci. & Appl. 5, e16019 (2016).

14. Lan-Tian Feng, Ming Zhang, **Zhi-Yuan Zhou**, Ming Li, Xiao Xiong, Le Yu, Bao-Sen Shi, Guo-Ping Guo, Dao-Xin Dai, Xi-Feng Ren, Guang-Can Guo, On chip coherent conversion of photonic quantum entanglement between different degrees of freedom, *Nat. Commun.* 7, 11985(2016).
15. Meng-Jun Hu, **Zhi-Yuan Zhou**, Xiao-Min Hu, Chuan-Feng Li, Guang-Can Guo, and Yong-Sheng Zhang, Observation of non-locality sharing among three observers with one entangled pair via optimal weak measurement. *NPJ: Quantum Information* 4, 63(2018).
16. Shi-Kai Liu, Chen Yang, Shi-Long Liu, **Zhi-Yuan Zhou***, Yan Li, Yin-Hai Li, Zhao-Huai Xu, Guang-Can Guo, and Bao-Sen Shi, Up-conversion imaging processing with field-of-view and edge enhancement. *Phys. Rev. Appl.* 11, 044013 (2019).
17. Yin-Hai Li, **Zhi-Yuan Zhou***, Lan-Tian Feng, Wen-Tan Fang, Shi-Long Liu, Shi-Kai Liu, Kai Wang, Xi-Feng Ren, Dong-Sheng Ding, Li-Xin Xu, Bao-Sen Shi, On-Chip Multiplexed Multiple Entanglement Sources in a Single Silicon Nanowire, *Phys. Rev. Appl.* 7, 064005(2017).
18. **Zhi-Yuan Zhou**, Shi-Long Liu, Shi-Kai Liu, Yin-Hai Li, Dong-Sheng Ding, Guang-Can Guo, Bao-Sen Shi, Superresolving Phase Measurement with Short-Wavelength NOON States by Quantum Frequency Up-Conversion, *Phys. Rev. Appl.* 7, 064025(2017).
19. Yan Li, **Zhi-Yuan Zhou***, Dong-Sheng Ding, Bao-Sen Shi, CW-pumped telecom band polarization entangled photon pair generation in a Sagnac interferometer, *Optics Express* 23, 28792~28800(2015).
20. **Zhi-Yuan Zhou**, Dong-Sheng Ding, Yun-Kun Jiang, Yan Li, Shuai Shi, Xi-Shi Wang, Bao-Sen Shi, Orbital angular momentum light frequency conversion and interference with quasi-phase matching crystals, *Optics Express* 22, 20298~20310(2014).
21. **Zhi-Yuan Zhou**, Zhi-Han Zhu, Shi-Long Liu, Yin-Hai Li, Shuai Shi, Dong-Sheng Ding, Li-Xiang Chen, Wei Gao, Guang-Can Guo, Bao-Sen Shi, Quantum twisted double-slits experiments: confirming wavefunctions' physical reality, *Sci. Bull.* 62, 1185~1192(2017).
22. **Zhi-Yuan Zhou**, Yan Li, Dong-Sheng Ding, Wei Zhang, Shuai Shi, Bao-Sen Shi,

Optical vortex beam based optical fan for high-precision optical measurements and optical switching, *Optics Letters* 39, 5098~5101(2014).

23. **Zhi-Yuan Zhou**, Yan Li, Dong-Sheng Ding, Yun-Kun Jiang, Wei Zhang, Shuai Shi, Bao-Sen Shi, Guang-Can Guo, Generation of light with controllable spatial patterns via the sum frequency in quasi-phase matching crystals, *Sci. Rep.* 4, 5650(2014).

24. **Zhi-Yuan Zhou**, Yun-Kuan Jiang, Dong-Sheng Ding; Bao-Sen Shi, Guang-Can Guo, Actively switchable nondegenerate polarization-entangled photon-pair distribution in dense wave-division multiplexing, *Phys. Rev. A* 87, 045806(2013).

25. **Zhi-Yuan Zhou**, Dong-Sheng Ding, Xu-Bo Zou, Bao-Sen Shi, Guang-Can Guo, Characterizing dispersion and absorption parameters of metamaterial using entangled photons, *Phys. Rev. A*, 85, 023841(2012).

26. Shi-Long Liu, Qiang Zhou, Shi-Kai Liu, Yan Li, Yin-Hai Li, **Zhi-Yuan Zhou***, Guang-Can Guo, Bao-Sen Shi. Classical analogy of a cat state using vortex light. *Commun. Phys.* 2, 75(2019).

27. Chen Yang, **Zhi-Yuan Zhou***, Yan Li, Yin-Hai Li, Shi-Long Liu, Shi-Kai Liu, Zhao-Huai Xu, Guang-Can Guo, Bao-Sen Shi, Nonlinear frequency conversion and manipulation of vector beams in a Sagnac loop. *Opt. Lett.* 44, 219(2019).

28. Shi-long Liu, Qiang Zhou, **Zhi-Yuan Zhou***, Shi-kai Liu, Yan Li, Yin-hai Li, Chen Yang, Zhao-huai Xu, Guang-can Guo, and Bao-Sen Shi. Multiplexing heralded single photons in orbital-angular-momentum space. *Phys. Rev. A* 100, 013833 (2019).

29. Shi-Long Liu, Shi-Kai Liu, Chen Yang, Zhao-Huai Xu, Yin-Hai Li, Yan Li, **Zhi-Yuan Zhou***, Guang-Can Guo, Bao-Sen Shi. Classical simulation of high-dimensional entanglement by non-separable angular–radial modes. *Opt. Express* 27, 18363(2019).

30. Yan Li, **Zhi-Yuan Zhou***, Shi-Long Liu, Shi-Kai Liu, Chen Yang, Zhao-Huai Xu, Yin-Hai Li, and Bao-Sen Shi. Frequency doubling of twisted light independent of the integer topological charge. *OSA Continuum.* 2, 470(2019).

31. Shilong Liu, **Zhiyuan Zhou***, Shikai Liu, Yin Hai Li, Yan Li, Chen Yang, Zhaohuai Xu, Zhaodi Liu, Guangcan Guo, and Baosen Shi. Coherent manipulation of a three-dimensional maximally entangled state. *Phys. Rev. A* 98, 062316 (2018).

32. Yin-Hai Li, Wen-Tan Fang, **Zhi-Yuan Zhou***, Shi-Long Liu, Shi-Kai Liu, Zhao-Huai Xu, Chen Yang, Yan Li, Li-Xin Xu, Guang-Can Guo, and Bao-Sen Shi. Quantum

frequency conversion for multiplexed entangled states generated from micro-ring silicon chip. *Opt. Express* 26, 28429(2018).

33. Wen-Tan Fang, Yin-Hai Li, **Zhi-Yuan Zhou***, Li-Xin Xu, Guang-Can Guo, and Bao-Sen Shi. On-chip generation of time-and wavelength-division multiplexed multiple time-bin entanglement. *Opt. Express* 26, 12912 (2018).

34. Shilong Liu, Zhenhai Han, Shikai Liu, **Zhiyuan Zhou***, BaoSen Shi, Efficient 525 nm laser generation in single or double resonant cavity, *Opt. Commun.* 410, 215~221(2018).

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37. Zhen-Hai Han, Shi-Long Liu, Shi-Kai Liu, Dong-Sheng Ding, **Zhi-Yuan Zhou***, Efficient frequency doubling at 776 nm in a ring cavity *Opt. Commun.* 396, 146~149(2017).

38. Yan Li, **Zhi-Yuan Zhou***, Dong-Sheng Ding, Wei Zhang, Shuai Shi, Bao-Sen Shi, Guang-Can Guo, Non-destructive splitter of twisted light based on modes splitting in a ring cavity, *Optics Express* 24, 2166~2173(2016).

39. Yin-Hai Li#, **Zhi-Yuan Zhou#**, Zhao-Huai Xu, Li-Xin Xu, Bao-Sen Shi, Guang-Can Guo, Multiplexed entangled photon-pair sources for all-fiber quantum networks, *Phys. Rev. A* 94, 043810(2016).

40. Hua Chen#, **Zhi-Yuan Zhou#** Alaa Jabbar Jumaah Zangana, Zhen-Qiang Yin, Juan Wu, Yun-Guang Han, Shuang Wang, Hong-Wei Li, De-Yong He, Shelan Khasro Tawfeeq, Bao-Sen Shi; Guang-Can Guo, Wei Chen, Zheng-Fu Han, Experimental demonstration on the deterministic quantum key distribution based on entangled photons, *Sci. Rep.* 6, 20962(2016).

41. Yan Li, **Zhi-Yuan Zhou***, Dong-Sheng Ding, Bao-Sen Shi, Dynamic mode evolution and phase transition of twisted light in nonlinear process, *J. Mod. Opt.* 63, 2271~2278(2016).

42. **Zhi-Yuan Zhou**, Yan Li, Dong-Sheng Ding, Wei Zhang, Shuai Shi, Bao-Sen Shi, Guang-Can Guo, Tunable cavity-enhanced photon pairs source in Hermite-Gaussian mode, *AIP Advances* 6, 025114(2016).
43. Yan L, **Zhi-Yuan Zhou**, Dong-Sheng Ding, Bao-Sen Shi, Sum frequency generation with two orbital angular momentum carrying laser beams, *J. Opt. Soc. Am. B* 32, 407~411(2015).
44. **Zhi-Yuan Zhou**, Yan Li, Dong-Sheng Ding, Wei Zhang, Shuai Shi, Bao-Sen Shi, Classical to quantum optical network link for orbital angular momentum-carrying light, *Opt. Express* 23, 18435~18444(2015).
45. **Zhi-Yuan Zhou**, Yan Li, Dong-Sehng Ding, Wei Zhang, Shuai Shi, Bao-Sen Shi, Guang-Can Guo, Highly efficient second harmonic generation of a light carrying orbital angular momentum in an external cavity, *Optics Express* 22, 23673~23678(2014).
46. Yan Li, **Zhi-Yuan Zhou**, Dong-Sehng Ding, Bao-Sen Shi, Low-power-pumped high-efficiency frequency doubling at 397.5 nm in a ring cavity, *Chin. Opt. Lett.* 12, 111901(2014).
47. **Zhi-Yuan Zhou**, Dong-Sheng Ding, Yan Li, Fu-Yuan Wang, Bao-Sen Shi, Cavity-enhanced bright photon pairs at telecom wavelengths with a triple-resonance configuration, *J. Opt. Soc. Am. B* 31, 128~134(2013).
48. **Zhi-Yuan Zhou**, Yun-Kun Jiang, Dong-Sheng Ding, Bao-Sen Shi, An ultra-broadband continuously-tunable polarization entangled photon-pair source covering the C+L telecom bands based on a single type-II PPKTP crystal, *J. of Mod. Opt.* 60, 720~725(2013).
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