Zheng-Hao Liu, PhD candidate

zhliu13@mail.ustc.edu.cn ericaphysx@gmail.com
http://home.ustc.edu.cn/~zhliu13
+86-15056928657

Education

2017 – **Ph.D. student, University of Science and Technology of China**
CAS Key Laboratory of Quantum information.
Doctoral advisor: Prof. Jin-Shi Xu.

2016 **Exchange student, University of Michigan**, Ann Arbor, MI, USA.
College of Literature, Science and the Arts. Project advisor: Prof. Hui Deng.

2013 – 2017 **B.Sc., University of Science and Technology of China**, Hefei, China.
Yan Ji-Ci Talent Program in Physics, School of Physics. GPA:3.76/4.3.

Research Expertise

My research orientations are foundations of quantum theory and quantum simulation. I am adept at the experimental investigation of quantum physics based on photonic architecture. My main research achievements include the observation of two quantum Cheshire cats remotely exchanging their grins [*Nature Communications* **11**, 3006 (2020), research highlighted by *CAS Physics* (cover story), *Scientific American* (Chinese version) and *Xinhua Press*], the experimental test of GHZ-type paradoxes that manifest in indivisible systems [under review] or can verify graph states [under review], and the photonic simulation of topological contextuality and braiding statistics of parafermions [*arXiv: 2011.05008*]. According to Google Scholar, I have a total citation number of 63 and an h-index of 4.

Selected Publications

Journal Articles

1. **Liu**, **Z.-H.**, Liang, X.-B., Sun, K., Li, Q., Meng, Y., Yang, M., Li, B., Chen, J.-L., Xu, J.-S., Li, C.-F., & Guo, G.-C. (2021). Photonic simulation of parafermionic berry-phase statistics and contextuality. *Physical Review Letters*, *126*(14), 1405XX. https://doi.org/10.1103/PhysRevLett.126.1405XX

2. **Liu**, **Z.-H.**, Pan, W.-W., Xu, X.-Y., Yang, M., Zhou, J., Luo, Z.-Y., Sun, K., Chen, J.-L., Xu, J.-S., Li, C.-F., & Guo, G.-C. (2020). Experimental exchange of grins between quantum cheshire cats. *Nature Communications*, *11*, 3006. https://doi.org/10.1038/s41467-020-16761-0

3. **Liu**, **Z.-H.**, Zhou, J., Meng, H.-X., Yang, M., Li, Q., Meng, Y., Su, H.-Y., Chen, J.-L., Sun, K., Xu, J.-S., Li, C.-F., & Guo, G.-C. (2021). Experimental test of the Greenberger–Horne–Zeilinger-type paradoxes in and beyond graph states. *npj Quantum Information*, *7*(1), 71. https://doi.org/10.1038/s41534-021-00397-z

4. **Liu**, **Z.-H.**, Meng, H.-X., Xu, Z.-P., Zhou, J., Ye, S., Li, Q., Sun, K., Su, H.-Y., Cabello, A., Chen, J.-L. et al. (2019). Experimental observation of quantum contextuality beyond Bell nonlocality. *Physical Review A*, *100*(4), 042118. https://doi.org/10.1103/PhysRevA.100.042118

5. Yang, M., **Liu**, **Z.-H.**, Cheng, Z.-D., Xu, J.-S., Li, C.-F., & Guo, G.-C. (2019). Deep hybrid scattering image learning [co-first author]. *Journal of Physics D: Applied Physics*, *52*(11), 115105. https://doi.org/10.1088/1361-6463/aafa3c

6. Wang, J.-F., **Liu**, **Z.-H.**, Yan, F.-F., Li, Q., Yang, X.-G., Guo, L., Zhou, X., Huang, W., Xu, J.-S., Li, C.-F., & Guo, G.-C. (2020). Experimental optical properties of single nitrogen vacancy centers in silicon carbide at room temperature. *ACS Photonics*, *7*(7), 1611–1616. https://doi.org/10.1021/acsphotonics.0c00218

7. Wang, J.-F., Yan, F.-F., Li, Q., **Liu**, **Z.-H.**, Liu, H., Guo, G.-P., Guo, L.-P., Zhou, X., Cui, J.-M., Wang, J., Zhou, Z.-Q., Xu, X.-Y., Xu, J.-S., Li, C.-F., & Guo, G.-C. (2020). Coherent control of nitrogen-vacancy center spins in silicon carbide at room temperature. *Physical Review Letters*, *124*(22), 223601. https://doi.org/10.1103/PhysRevLett.124.223601

8. Yang, M., Xiao, Y., Liao, Y.-W., **Liu**, **Z.-H.**, Xu, X.-Y., Xu, J.-S., Li, C.-F., & Guo, G.-C. (2020). Zonal reconstruction of photonic wavefunction via momentum weak measurement. *Laser & Photonics Reviews*, *14*(5), 1900251. https://doi.org/10.1002/lpor.201900251

Preprints

1. **Liu**, **Z.-H.**, Sun, K., Pachos, J. K., Yang, M., Meng, Y., Liao, Y.-W., Li, Q., Wang, J.-F., Luo, Z.-Y., He, Y.-F., Ding, G.-R., Xu, J.-S., Han, Y.-J., Li, C.-F., & Guo, G.-C. (2020). *Photonic simulation of parafermionic berry-phase statistics and contextuality* [under review in *PRX Quantum*]. https://arxiv.org/abs/2011.05008

2. Sun, K., **Liu**, **Z.-H.**, Wang, Y., Hao, Z.-Y., Xu, X.-Y., Xu, J.-S., Li, C.-F., Guo, G.-C., Castellini, A., Lami, L., Winter, A., Adesso, G., Compagno, G., & Lo Franco, R. (2021). *Experimental quantum phase discrimination enhanced by controllable indistinguishability-based coherence* [co-first author, under review in *Physical Review X*]. https://arxiv.org/abs/2103.14802

Skills

Languages	Strong, comprehensive competencies for Chinese and English. Certified proficiency in Japanese (JLPT N2, Dec. 2020).
Coding	Mathematica, LaTeX, C++, Python, PHP, …
Web Dev	HTML, CSS, MySQL,
Misc.	Skilled LaTeX typesetting and publishing, Adobe Illustrator drawing, …

Miscellaneous

Awards

2020 **PFUNT best oral report award**, first prize, at Nanjing University.

CASC scholarship, first prize (¥10k), at University of Science and Technology of China.

2017 **Distinguished student award** at University of Science and Technology of China.

Community Service

2020 **Refereeing** for *Annalen der Physik*.

2019 **Assistant secretary** in *Quantum Optics Science and Technology Conference* at Chuzhou.

Miscellaneous (continued)

- **Volunteer** in *Chinese Optical Society Conference* at Hefei.

References

Available upon Request