Huang Jiayi

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Educational Background

- South China Normal University(211 project) 2018-2022

Bachelor of Science in Physic

- South China Normal University(211 project) 2022-2025

Master of Science in Atomic and Molecular Physics in June, 2025

GPA: 3.52/4.0 (ranked 2/17)

Honors & Prize

1. First Prize of Physics Department Academic Scholarship
2. Second Prize of Physics Department Academic Scholarship
3. Second Prize of Contemporary Undergraduate Mathematical Contest in Modeling in Guangdong province

Research Projects

- **Shortcuts of adiabatic non-Abelian braiding**

Research Focus: Investigated non-Abelian braiding in a three-fold degenerate subspace of a seven-level quantum system. In this program, I developed a theory of shortcut-to-adiabaticity to non-Abelian braiding and try to develop a method to achieve the theory in ^{87}Rb system.

Key contribution:

1. Based on the two-tripods structure, I get the shape of three ground states and achieve to the STA elements.
2. Using the MATLAB to simulate the mathematical results.
3. Try to get a method to achieve the STA experimentally.

- **the experiment of Higher-Order Topology base on the BHZ configuration**

Research Focus: Re-derived theoretical frameworks for chiral-symmetric higher-order topological phases (HOTPs) and implemented corresponding experimental protocols on a four-level ^{87}Rb atomic system.

Key Contributions:

1. Using the MATLAB to simulate the theory of higher-order topology.
2. Validating the theory of higher-order topology on BHZ system by ^{87}Rb experimentally.

Publications

1. Hongzhi Liu, **Jiayi Huang(contribute equally)**, Zhiwei Han, Jiahao Liang, Ziyuan Chen, Zhaoxin Fu, Zerui He, Yue Ming, Qingxian Lv, and Yanxiong Du, "Non-Abelian braiding in three-fold degenerate subspace and the acceleration," J. Opt. Soc. Am. B **41** (10), 2366-2372 (2024).
2. Zi-Yuan Chen, Jia-Hao Liang, Zhao-Xin Fu, Hong-Zhi Liu, Ze-Rui He, Meng Wang, Zhi-Wei Han, **Jia-Yi Huang,** Qing-Xian Lv, and Yan-Xiong Du, "Single-pulse two-qubit gates for Rydberg atoms with noncyclic geometric control," Physical Review A **109** (4), 042621 (2024).
3. Ze-Rui He, Zhao-Xin Fu, Jia-Hao Liang, Zi-Yuan Chen, Hong-Zhi Liu, **Jia-Yi Huang,** Yue Ming, Zhi-Wei Han, Qing-Xian Lv, Yan-Xiong Du, and Hui Yan, "Distant two-qubit gates in atomic array with Rydberg interaction using geometric quantum control," Quantum Frontiers **3** (1), 25 (2024).
4. Zhi-Wei Han, Jia-Hao Liang, Zhao-Xin Fu, Hong-Zhi Liu, Zi-Yuan Chen, Meng Wang, Ze-Rui He, **Jia-Yi Huang,** Qing-Xian Lv, Kai-Yu Liao, and Yan-Xiong Du, "Detecting a topological transition of quantum braiding in a threefold-degenerate eigensubspace," Physical Review A **109** (2), 022431 (2024).

Conferences Attended

1. The 3rd National Conference on Optical Quantum Science and Technology
2. The 11th International Workshop on Solid-State Quantum Computing
3. The 6th International Workshop on Rydberg Atoms and Molecules

Programming

Language: CET-4, CET-6

Skills: Proficient in Office(Excel, Word, PowerPoint), Latex, MATLAB

Interests: Volunteering(40 hours), Sports