Zhaohui Zhi

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EDUCATION

Beihang University, School of Physics, Beijing, China
BSc., Physics, Sep., 2020 - Present GPA: 3.72/4.0, major grades:**91.2**/100
Core courses grades: Quantum Mechanics 92; Advanced QM 95; Solid States Physics 94; Statistical Mechanics 92; Electrodynamics 95; Mathematical-Physical Methodology i/ ii(Group theory and Representation theory) 92/92; General Relativity 96

Technische Universität Dresden, Faculty of Physics, Dresden, Germany
Exchange program, Oct., 2023 - Present

RESEARCH INTERESTS

Non-equilibrium quantum many-body physics, Quantum information and dynamics, Strongly correlated systems and topological phase, Quantum simulation based on Rydberg atoms arrays and related Quantum many-body numerical computation.

PROFESSIONAL SKILLS

Programming Languages: Python, LaTeX, Julia, Bash, MATLAB, Mathematica, C
Numerical Skills: Exact Diagonalization(ED), Matrix Product States(MPS)
Advanced courses: Advanced Quantum Mechanics; General Relativity; QFT i.

BACHELOR THESIS

Quantum control phase transitions analysis through a control landscape based adiabatic tracing algorithm
10,2023 till present, MPI for the Physics of Complex Systems, Marin Bukov

- Investigated the control landscape existing in quantum control problem, detected the underlying phase transition, tried to classify different phases and survey the property of phase transition using the adiabatic tracing algorithm.
- Tried to promote control transition phenomenon from two qubits to many-body systems.

RESEARCH EXPERIENCE

Quantum many-body scar, floquet freezing and emergent conservations
07,2023 till 09,2023 City University of Hong Kong, Xiao Li

- Reproduced the PXP model, computed the overlap between $\mathbb{Z}_2$ state and eigenstates, level statistics for system up to $L = 32$ using ED with symmetry, built its Forward Scattering Approximation(FSA) state.
- Discovered scar points in the space of drive parameters for periodic driving Ising model, tried to devise a strong-drive Magnus expansion to explain the emergent conservations.

The double components Rydberg arrays for quantum simulation
Fall, 2022 till May, 2023 Beihang University, Jian Cui & Shoushu Gong
Two papers submitted to PRX Quantum and PRB

- Investigated a new quantum simulation platform, the two components Rydberg atoms arrays and develop a user-friendly Python package.
- Discovered a novel classical robust states, the collective $\mathbb{Z}_2$ state($\mathbb{Z}_2^{c_2}[Rb, Rb]$) exhibiting new symmetries and potential new Quantum Many-body Scar by ED.
- Plotted the 1D phase diagram of this system and use mean field approximation to explain the phases.
- Collaborated with an experimental group to propose a protocol to implement $\mathbb{Z}_2^{c_2}$ state and studying its QMBS behaviour.

Optimal control for CNOT gate
Spring, 2022 Beihang University, Jian Cui

- Implemented a two-qubit CNOT gate based on the Stimulated Raman Adiabatic Passage (STIRAP) process and Electromagnetically Induced Transparency (EIT) effect in Rydberg atoms.
- Optimized the laser waveform using d-CRAB algorithms, considering environmental noise to enhance the fidelity of the gate. Detailed notes can be found at `https://github.com/zzh-cycling/quantum_computation`.

CV Model transition and migration
Summer, 2021 HUAWEI Ascend

- Utilized CANN and ATC tools to transform the CSPDarkNet53 models
- Conducted model inference and migration, contributing to the Ascend open access community.

OTHERS

Teaching Assistant for Thermal Dynamics and Statistical Physics A: Collaborated with the professor to develop new lectures and slides for students, based on a newly issued book and various references such as Pathria and Kardar.

Academic activities: Organized seminars on Non-equilibrium Statistics and Solid States Physics. Participated in a Summer school organized by Peking University.

Interests: Cycling, Running, Hiking, Learning Math and Physics, Reading Poems and proses, Writing.

Honors & Awards: Merit Student of Beihang University, 2020-2021; Merit Student of Beihang University, 2022-2023