

KE LIN

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RESEARCH INTEREST

Nonlinear Optics, Photonic Crystal, Photonic Inverse Design

Novel topological states in optical system, like SSH/AAH model

non-Hermitian physics, band theory, exceptional point, non-Hermitian skin effect, etc.

EXPERIMENTAL SKILLS

Create lattice using optical induction based on a photorefractive SBN:61 crystal

Record the light intensity pattern using a charge-coupled device (CCD) at different facet of the crystal

EDUCATION

Massachusetts Institute of Technology (MIT), MA, USA

Spring 2023

Department of Physics

Major: Physics

Courses Selected: 8.292[J] Fluid Physics, 8.422 Atomic and Optical Physics II, 8.431[J] Nonlinear Optics

Shanghai Jiao Tong University (SJTU), Shanghai, China

Sep.2020-Jun.2024

School of Physics and Astronomy

Major: Physics (Zhiyuan Honor Program, **Top 10%**)

• GPA: 3.92/4.30 Average Score: 90.38/100 RANK: 3/31

Main course and scores

Atomic Physics: 98.6 (Best score in class)

Electromagnetics: 90 (Best score in class)

Quantum Mechanics: 90

Numerical Analysis and Programming: 95

Computational Physics: 98

Application of Calculation Software: 97

Mathematical Analyses (Honor) I/ II: 96/96

Methods in Mathematical Physics: 91

Research topic in Plasma Physics: 96.5

Research topic in Optical Physics: 96.5

AWARDS & HONORS

- Rongchang Scholarship of Science Innovation (Best 10 undergraduates in SJTU, CN\$30,000) 2022
- A-Level Scholarship, Shanghai Jiao Tong University (Top 1%) 2021&2022
- Hanyingjuhua Scholarship (Best 15 undergraduates in Zhiyuan Collage, CN\$15,000) 2022
- Merit Student, Shanghai Jiao Tong University 2021
- National Scholarship, China (CN\$8,000) 2021
- 1st Prize in China Undergraduate Physics academic Tournament (CUPT) 2021
- Meritorious winners in Mathematical Contest in Modeling (MCM) 2021
- Zhiyuan Honor Scholarship, Shanghai Jiao Tong University (CN\$15,000) 2020&2021&2022

RESEARCH EXPERIENCE

Study of the branch flow of the light (Sponsored by Zhiyuan Scholar Program, CN\$100,000)

Sept.2021-Now

Instructor: Professor Fangwei Ye (SJTU, Email: fwye@sjtu.edu.cn)

- Use Split-Step FFT method to simulate branch flow of light in both 2D&3D random potential field (weak disorder)
- Use the self-focusing effect to explain the influence of the non-linear effect on the characteristics of the branch flow
- Discover smartly self-routing phenomenon of soliton propagating in a weak disorder random potential

Nonlinear topological Thouless pumping in optical lattice

Jun.2022-Now

Instructor: Professor Fangwei Ye (SJTU, Email: fwye@sjtu.edu.cn)

- Mastered the theory of topological insulator and topological photonics
- Stimulate the wave packet transportation in Thouless pumping with different nonlinear amplitude
- Use MATLAB code calculating band structure for Thouless pumping in one and two dimensions.

Measuring forces with the optical trap

Sept.2020-Dec.2020

Instructor: Professor Dan Czajkowsky (SJTU, Email: dczaj@sjtu.edu.cn)

- Measure the laser's power-dependent force on water droplets
- Assemble the self-designed optical trap, use it to capture glass beads and control their motion
- Use optical trap to measure the twisting force that the bacterial motor (E. coli) generates

SELECTED COURSE PROJECT

Deflection of a Reflected Intense Vortex Laser Beam

Spring 2022

- Simulate reflection of vortex beam on a mirror
- Explain the influence of topological charge on Deflection of Reflection

Study of stopping power of alpha-clusters in warm dense plasma

Fall 2022

- Use Tianhe-2 supercomputer to simulate alpha-cluster propagation in warm dense plasma
- Explain the influence of alpha-clusters by the interference of wake field

CONFERENCES & SEMINARS

Summer School of Theoretical Physics, Peking University

Summer 2022

- Write a research review on topological matter and topological state (Nobel Prize 2016)
- Listen to all the lectures on the frontiers of theoretical physics, including cosmology, dark matter and dark energy, topological phase transition, quantum computing, string theory, etc.

ADDITIONS

- Programming Skills: C/C++, Python, MATLAB, Mathematica, COMSOL
- Presenting Tools: LaTeX, Markdown, Slidev on VSCode
- Leadership: President of the Student Union, Zhiyuan College, SJTU
- Volunteer in the 2021 Graduation Ceremony in School of Physics