ZHIHAO JIANG

Doctor of Philosophy (PhD)
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AFFILIATION

Postdoctoral Research Associate *11/2021 - now*
Advisor: Professor André Schleife and Professor Axel Hoffmann
Department of Materials Science and Engineering
University of Illinois at Urbana-Champaign
Urbana, IL 61801, the United States

EDUCATION

University of Southern California
Los Angeles, California, the United States *08/2015 - 11/2021*
PhD in Physics (condensed matter theory)
Supervisor: Professor Stephan Haas
Thesis title: *Plasmonic Excitations in Quantum Materials: Topological Insulators and Metallic Monolayer on Dielectric Substrates*

University of Science and Technology of China
Hefei, Anhui, China *08/2010 - 05/2014*
BS in Physics
Supervisor: Professor Zengming Zhang
Thesis title: *Upconversion Luminescence of* $NaYF_4 : Yb, Er$ *Nanomaterials Doping Metal Ions (*Li^+, Al^{3+}*)*

RESEARCH INTEREST

- First-principles calculations based on the density functional theory (DFT) to study electronic, optical and magnetic properties of materials. Particularly, we consider effects of lattice temperature, doping and structural amorphousness on materials electronic structure and magnetic damping properties in a recent research work.
- Topological states of matter in condensed matter systems, including topology of electrons as well as other elementary excitations such as plasmons, phonons and magnons. Recently, I am investigating electron-phonon interactions in topplogical Weyl phonon materials, and exploring topological magnons in natural materials by first-principles calculations. My study covers both toy models using analytical method and real materials using first-principles calculations, for instance, DFT and wannierisation.

COMPUTATIONAL AND PROGRAMMING SKILLS

Computational Skills

- DFT calculations using Vienna Ab initio Simulation Package (VASP) and Quantum Espresso (QE)
- Phonon calculations based on DFPT using VASP or QE, with post-processing by Phonopy package
- Electon-phonon interaction simulations using EPW code
- Wannier interpolation and topological properties calculations using Wannier90 and WannierTools
- Molecular dynamics simulations using LAMMPS
- Magnetic interactions and magnon spectrum using TB2J, turboMagnon

- Real-space dielectric function and plasmons calculations using self-written python code

Programming Skills

- Familiar with Python programming and usage of Jupyter notebook

PROFESSIONAL ACTIVITIES

IQUIST Young Researchers Seminar Committee, UIUC *08/2023 - now*
I am a member of IQUIST (Illinois Quantum Information Science and Technology) Young Researchers Seminar Committee, a committee led by students and post-docs. Our works include inviting speakers, organizing seminar talks, and keeping a record of all seminar talks including video and slides.

TEACHING EXPERIENCE

Teaching Assistant, University of Southern California *08/2015 - 11/2021*
PHYS-151 Fundamentals of Physics I: Mechanics and Thermodynamics
PHYS-438B Quantum Mechanics
Responsibilities: Instructing labs, holding office hours, grading homework and exams

PRESENTATIONS AND PUBLICATIONS

Presentations

1. Zhihao Jiang, Dipanjan Chaudhuri, Peter Abbamonte, and André Schleife. "Topological Phonons in RhSi." APS March Meeting, Minneapolis, Mar 2024. (I made the presentation and André Schleife presented the work as a replacement for me)
2. Zhihao Jiang, Axel Hoffmann and André Schleife. "Electronic density of states of body-centered-cubic Fe under phonon excitations, boron doping and amorphization." APS March Meeting, Las Vegas, Mar 2023.
3. Zhihao Jiang, and André Schleife. "Materials Optimization for Low-Damping Magnons in Hybrid-Magnon Quantum Devices." Illinois Quantum Information Science and Technology (IQUIST) Young Researchers Seminar, Urbana-Champaign, Nov 2022.
4. Zhihao Jiang, and Stephan Haas. "Single-Electron Spectra and Plasmonic Excitations in Chern Insulators." APS March Meeting, Chicago, Mar 2022.
5. Zhihao Jiang, Henning Schloemer, and Stephan Haas. "Control of Plasmons in Topological Systems." APS March Meeting (virtual), Mar 2021.
6. Zhihao Jiang, Stephan Haas, and Malte Roesner. "Novel Plasmonic Waveguides from Coulomb Engineered Two-Dimensional Materials." APS March Meeting, Denver, Mar 2020.
7. Zhihao Jiang, Roelof Groenewald, Malte Roesner, and Stephan Haas. "Localized Plasmons in One Dimensional Topological Systems." APS March Meeting, Boston, Mar 2019.

Publications

1. Zhihao Jiang, and André Schleife. "Influence of temperature, doping, and amorphization on the electronic structure and magnetic damping of iron." arXiv:2401.08076 (2024). (under review)
2. Zhihao Jiang, Dipanjan Chaudhuri, Peter Abbamonte, and André Schleife. "Topological phonons in RhSi." (manuscript in preparation)
3. Jiangchao, Qian, Yi Li, Zhihao Jiang, Robert Busch, Hsu-Chih Ni, Tzu-Hsiang Lo, Axel Hoffmann, Andre Schleife, and Jian-Min Zuo. "Unraveling the origin of antiferromagnetic coupling at YIG/permalloy interface." arXiv:2402.14553 (2024).

4. Zhihao Jiang, Jinho Lim, Yi Li, Wolfgang Pfaff, Tzu-Hsiang Lo, Jiangchao Qian, André Schleife, Jian-Min Zuo, Valentine Novosad, and Axel Hoffmann. "Integrating magnons for quantum information." Applied Physics Letters **123**, 130501 (2023).

5. Zachary W. Riedel, Zhihao Jiang, Maxim Avdeev, André Schleife, and Daniel P. Shoemaker. "Zero-field magnetic structure and metamagnetic phase transitions of the cobalt chain compound Li_2CoCl_4." Physical Review Materials **7**, 104405 (2023).

6. Yuling Guan, Stephan Haas, Henning Schlömer, and Zhihao Jiang. "Plasmons in Z_2 topological insulators." Physical Review B **107**, 155414 (2023).

7. Y. Li, J.-C. Qian, Z.-H. Jiang, T.-H. Lo, D. Ding, T. Draher, T. Polakovic, W. Pfaff, A. Schleife, J.-M. Zuo, W.-K. Kwok, V. Novosad, and A. Hoffmann. "Hybrid-Magnon Quantum Devices: Strategies and Approaches." In 2022 International Electron Devices Meeting (IEDM), pp. 14-6. IEEE (2022).

8. Zhihao Jiang, Stephan Haas and Malte Rösner. "Plasmonic Waveguides from Coulomb-Engineered Two-Dimensional Metals." 2D Materials **8**, 035037 (2021).

9. Yuling Guan, Zhihao Jiang and Stephan Haas. "Effect of Local Perturbations on Plasmons in Topological Insulators." Phys. Rev. B **104**, 125425 (2021).

10. Zhihao Jiang, Henning Schlömer and Stephan Haas. "Control of Plasmons in Doped Topological Insulators via Basis Atoms." Phys. Rev. B **104**, 045135 (2021).

11. Henning Schlömer, Zhihao Jiang and Stephan Haas. "Plasmons in Two-Dimensional Topological Insulators." Phys. Rev. B **103**, 115116 (2021).

12. Boxiang Song, Zhihao Jiang (co-first author), Zerui Liu, Yunxiang Wang, Fanxin Liu, Stephen B. Cronin, Hao Yang et al. "Probing the Mechanisms of Strong Fluorescence Enhancement in Plasmonic Nanogaps with Sub-nanometer Precision." ACS Nano **14**, 14769-14778 (2020).

13. Zhihao Jiang, Malte Rösner, Roelof E. Groenewald, and Stephan Haas. "Localized plasmons in topological insulators." Phys. Rev. B **101**, 045106 (2020).

14. Yangsen Ye, Zhihao Jiang, Qizheng Wang, Zishu Zhu, Xiao Wang, Zhilei Sui, Rucheng Dai, Zhongping Wang, Zengming Zhang, and Zejun Ding. "Upconversion luminescence of $NaYF_4$: Yb, Er nanocrystals with high uniformity." Journal of Rare Earths **32**, 802-805 (2014)