Curriculum Vitae

Ning-Jing Yang

Personal information

- **Full name:** Ning-Jing Yang
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- **Career stage:** PhD student, 2nd year

Education

- **Ph. D. in Condensed Matter Physics** (2023–2027), Fujian Normal University, China
  Supervisor: Prof. Jian-Min Zhang
- **M. Sc. in Condensed Matter Physics** (2020–2023), Kunming University, China
  Master thesis supervisor: Prof. Guojun Jin (Nanjing University) and Prof. Hai Yang (Kunming University)
- **B. Sc. in Physics** (2015–2019), Xiangtan University, China

Research Overview

My research centers on topological phase transitions and Hall effects, with a focus on higher-order topological phenomena in 2D systems driven by multiple degrees of freedom during my Ph.D. research. I also have strong interests in topological superconductivity, ferroelectricity, and ferromagnetism, as well as interdisciplinary applications involving machine learning.

Technical Skills

- Computational Methods: First-principles calculations, Tight-binding model.
- Computational Tools: VASP, Quantum ESPRESSO, ATK, Wannier90, Wanniertools.
- Programming Languages: Matlab, Python.

Selected Publications

7. *Sliding ferroelectrics induced hybrid-order topological phase transitions*,
Ning-Jing Yang and Jian-Min Zhang*, Xiao-Ping Li, Zeying Zhang, Zhi-Ming Yu, Zhigao Huang, Yugui Yao,
Physical Review Letters 134, 256602 (2025)

- Spin–layer locking in bilayer antiferromagnetic systems.
- Sliding ferroelectricity leads to layer- (spin-) dependent asynchronous topological evolution.
- Layer-resolved anomalous Nernst signals distinguishing topological phases.

6. *Orbital Hall effect characterizing higher-order topological phase transition in monolayers of ferromagnetic materials*,
Ning-Jing Yang, Jun-Hao Li, Zhigao Huang, Jian-Min Zhang*
Physical Review B 111, 235435 (2025)

- Revealing orbitronics features at valleys in monolayer ferromagnetic materials.
- Orbital valley Hall effect marking a higher-order topological phase transition.

5. *Higher-order topological phase diagram revealed by anomalous Nernst effect in a Janus ScClI monolayer*,
Ning-Jing Yang and Jian-Min Zhang*
Physical Review B 109, 035423 (2024)

- Verifying the higher-order topological properties of Janus-ScClI.
- Characterizing higher-order topological phase transitions via anomalous Nernst conductivity.

4. *Hybrid-order topological phase and transition in 1H transition metal compounds*,
Ning-Jing Yang, Zhigao Huang, Jian-Min Zhang*
Applied Physics Letters 125, 263102 (2024)

- The orbital degree of freedom exhibits distinct topological characteristics at different energy levels near the Fermi level.
- Spin Hall signatures of the phase transition and systematic calculations on MX_2 material systems.

3. *Second-order topological insulators in Kekulé-patterned hexagonal biphenylene networks*,
Ning-Jing Yang, Hai Yang, Zhigao Huang, Jian-Min Zhang*
Applied Physics Letters 126, 033101 (2025)

- Second-order topological material designed via Kekulé lattice: hexagonal biphenylene network (h-BPN).
- h-BPN can exhibit tunable second-order topology with alternating parity.

2. *Topological phases, local magnetic moments, and spin polarization triggered by C_{558}-line defects in armchair graphene nanoribbons*,
Ning-Jing Yang, Wen-Ti Guo, Hai Yang, Zhigao Huang, Jian-Min Zhang*
Physical Chemistry Chemical Physics 26, 17075 (2024)

- Threefold topology in graphene induced by line defects.
- Line-defect-induced local magnetic moments and spin filtering in nanoribbons.

1. *Novel magnetic topological insulator $FeBi_2Te_4$ with controllable topological quantum phase*,
Wen-Ti Guo, **Ning-Jing Yang**, Zhigao Huang, Jian-Min Zhang*
Journal of Materials Chemistry C 11, 12307 (2023)