Jifei Huang

Phone: (+1) 3239747952| **Email:** jifei.huang@wisc.edu

EDUCATION

Department of Physics, University of Wisconsin-Madison June 2024–Present

- *PhD Candidate*
  - Advisor: Dr. Tiancheng Song

Department of Physics, National University of Singapore (NUS) Aug. 2021–Jan. 2024

- *Master of Science in Physics*
  - Thesis title: Microwave Resonances of Ultrathin Chiral Multilayers and Nanostructures
  - Advisor: Dr. Anjan Soumyanarayanan

School of Physics, Huazhong University of Science and Technology (HUST) Sept. 2017–June 2021

- *Bachelor of Science in Physics*
  - Overall GPA: 3.94/4.00 (Top 10%)
  - Advisor: Dr. Shun Wang

RESEARCH EXPERIENCES

Department of Physics, University of Wisconsin-Madison | Advisor: Dr. Tiancheng Song June 2024–Present

- Fabricated van der waals heterostructures and moire superlattices
- Conducted low temperature optical and electrical study of two-dimensional magnetic materials.

Department of Physics, National University of Singapore | Advisor: Dr. Anjan Soumyanarayanan

- **Instrumentation work.** Aug. 2021–Aug. 2022
  - Built a VNA-FMR spectrometer setup allowing capture of subtle microwave absorptions raised from chiral spin textures.
  - Automated a k-resolved Brillouin light scattering setup to measure DMI strength with a tenfold increase in precision.
- **Hysteretic resonances of chiral spin textures in multilayer films.** Aug. 2021–Dec. 2023
  - Conducted microwave absorption spectroscopy revealing the resonances originating from chiral spin textures.
  - Proposed a toy model based on systematically micromagnetic simulations to predict resonance frequency from spin texture images.
  - Proposed a field sweeping recipe to realize desired magnon bands.
- **All-Electrical Skyrmionic Bits in a Chiral Magnetic Tunnel Junction.** Aug. 2022–Aug. 2023
  - Performed micromagnetic simulations to reveal the mechanism of asymmetrical field-induced skyrmion nucleation.
  - Performed geodesic nudged elastic band calculations to reveal a field-like voltage effect in skyrmion nucleation.
  - Constructed a tight relationship between magnetic texture images and transport measurements by extracting the diameters of magnetic skyrmions from microscopy data using costumed scripts.

MOE Key Laboratory of Fundamental Physical Quantities Measurement & Hubei Key Laboratory of Gravitation and Quantum Physics, HUST | Advisor: Dr. Shun Wang. June. 2019– June. 2021

- Conducted a phase-field finite elements simulation of Au-Pt alloy quenching to study the segregations of each component.
- Calculated density of states from the Raman emission of CdSe quantum dots under ionic liquid gating.
- Estimated the error in time-of-swing gravitational constant measurement.

CONFERENCES

International Conference on Materials for Advanced Technologies (ICMAT 2023) **2023**

Contributed a talk about our work on hysteretic resonances in chiral multilayers.

IEEE Around-the-Clock Around-the-Globe Magnetics (AtC-AtG 2022) **2022**

Presented a poster about our work on hysteretic resonances in chiral multilayers.

MANUSCRIPTS AND PUBLICATIONS

Hysteretic Resonances of Chiral Spin Textures in Multilayer Films

TS Suraj*, **Jifei Huang*,** Xiaoye Chen, Hui Ru Tan, Abhijit Ghosh, Jing Zhou, Tan Hang Khume, Anjan Soumyanarayanan

Manuscript in preparation (Experimental work)

All-Electrical Skyrmionic Magnetic Tunnel Junction

Shaohai Chen*, Pin Ho*, James Lourembam*, Alexander KJ Toh, **Jifei Huang**, Xiaoye Chen, Hang Khume Tan, Sherry KL Yap, Royston JJ Lim, Hui Ru Tan, TS Suraj, Yeow Teck Toh, Idayu Lim, Jing Zhou, Hong Jing Chung, Sze Ter Lim, Anjan Soumyanarayanan

Nature 627, 522 (2024).

Chiral Interlayer Exchange Coupling for Asymmetric Domain Wall Propagation in Field-Free Magnetization Switching

Jing Zhou, Lisen Huang, Hong Jing Chung, **Jifei Huang**, TS Suraj, Dennis Jing Xiong Lin, Jinjun Qiu, Shaohai Chen, Sherry Lee Koon Yap, Yeow Teck Toh, Siu Kit Ng, Hang Khume Tan, Anjan Soumyanarayanan, Sze Ter Lim

ACS Nano 17 (2023)

SELECTED SKILLS

Programming Skills: Python (Scipy, Scikit-image, Pyvisa, PyQt), Julia, C/C++/C#, Fortran, Labview; Latex.

Laboratory Skills: Magnetic resonance spectroscopy (in gigahertz), Magnetometry, Magnetic textures imaging.

AWARDS

Chinese Undergraduate Physics Experiment Competition | ranked 1st place out of 56 universities. 2019