Curriculum Vitae

PERSONAL INFO

Name: **Zhentao Wang**
Email: wan00351@umn.edu

EDUCATION

Doctor of Philosophy
Department of Physics and Astronomy, Rice University
Advisor: Andriy H. Nevidomskyy
Aug 2010 - May 2016

Bachelor of Science
School of the Gifted Young, University of Science and Technology of China
Sep 2006 - Jul 2010

RESEARCH POSITIONS

Tenure-track Assistant Professor, Zhejiang University	*Oct 2022 -*
Post-Doctoral Research Associate, University of Minnesota	*Aug 2020 - Present*
Post-Doctoral Research Associate, The University of Tennessee	*Jul 2016 - Jul 2020*
CNLS Summer Student, Los Alamos National Laboratory	*May 2015 - Aug 2015*
CNLS Summer Student, Los Alamos National Laboratory	*Aug 2014 - Oct 2014*
PHD Student, Rice University	*Sep 2010 - May 2016*

RESEARCH INTERESTS

- Quantum magnetism
- Topological excitations and topological spin textures
- Unconventional superconductivity
- Quantum many-body theory and computation

PUBLICATIONS [1–21]

[1] H. Zhang, Z. Wang, D. Dahlbom, K. Barros, and C. D. Batista, *CP^2 Skyrmions and Skyrmion Crystals in Realistic Quantum Magnets*, ArXiv:2203.15248 [Cond-Mat] (2022).

[2] Z. Wang and C. D. Batista, *Skyrmion Crystals in the Triangular Kondo Lattice Model*, arXiv:2111.13976.

[3] C. Naya, D. Schubring, M. Shifman, and Z. Wang, *Skyrmions and Hopfions in 3D Frustrated Magnets*, ArXiv:2111.06385 [Cond-Mat, Physics:Hep-Th] (2021).

[4] A. Najev, S. Hameed, D. Gautreau, Z. Wang, J. Joe, M. Požek, T. Birol, R. M. Fernandes, M. Greven, and D. Pelc, *Uniaxial Strain Control of Bulk Ferromagnetism in Rare-Earth Titanates*, Phys. Rev. Lett. **128**, 167201 (2022).

[5] Z. Wang, D. Gautreau, T. Birol, and R. M. Fernandes, *Strain-Tunable Metamagnetic Critical Endpoint in Mott Insulating Rare-Earth Titanates*, Phys. Rev. B **105**, 144404 (2022).

[6] Z. Wang, Y. Su, S.-Z. Lin, and C. D. Batista, *Meron, Skyrmion, and Vortex Crystals in Centrosymmetric Tetragonal Magnets*, Phys. Rev. B **103**, 104408 (2021).

[7] Z. Wang and C. D. Batista, *Resistivity Minimum in Diluted Metallic Magnets*, Phys. Rev. B **101**, 184432 (2020).

[8] Z. Wang, Y. Su, S.-Z. Lin, and C. D. Batista, *Skyrmion Crystal from RKKY Interaction Mediated by 2D Electron Gas*, Phys. Rev. Lett. **124**, 207201 (2020).

[9] L. Hao et al., *Anomalous Magnetoresistance Due to Longitudinal Spin Fluctuations in a Jeff = 1/2 Mott Semiconductor*, Nat. Commun. **10**, 1 (2019).

[10] S.-S. Zhang, Z. Wang, G. B. Halász, and C. D. Batista, *Vison Crystals in an Extended Kitaev Model on the Honeycomb Lattice*, Phys. Rev. Lett. **123**, 057201 (2019).

[11] L. S. Wu et al., *Tomonaga–Luttinger Liquid Behavior and Spinon Confinement in $YbAlO_3$*, Nat. Commun. **10**, 698 (2019).

[12] C. D. Batista, M. Shifman, Z. Wang, and S.-S. Zhang, *Principal Chiral Model in Correlated Electron Systems*, Phys. Rev. Lett. **121**, 227201 (2018).

[13] Z. Wang and C. D. Batista, *Dynamics and Instabilities of the Shastry-Sutherland Model*, Phys. Rev. Lett. **120**, 247201 (2018).

[14] G.-W. Chern, K. Barros, Z. Wang, H. Suwa, and C. D. Batista, *Semiclassical Dynamics of Spin Density Waves*, Phys. Rev. B **97**, 035120 (2018).

[15] Z. Wang, G.-W. Chern, C. D. Batista, and K. Barros, *Gradient-Based Stochastic Estimation of the Density Matrix*, J. Chem. Phys. **148**, 094107 (2018).

[16] Z. Wang, A. E. Feiguin, W. Zhu, O. A. Starykh, A. V. Chubukov, and C. D. Batista, *Chiral Liquid Phase of Simple Quantum Magnets*, Phys. Rev. B **96**, 184409 (2017).

[17] Z. Wang, K. Barros, G.-W. Chern, D. L. Maslov, and C. D. Batista, *Resistivity Minimum in Highly Frustrated Itinerant Magnets*, Phys. Rev. Lett. **117**, 206601 (2016).

[18] Z. Wang, W.-J. Hu, and A. H. Nevidomskyy, *Spin Ferroquadrupolar Order in the Nematic Phase of FeSe*, Phys. Rev. Lett. **116**, 247203 (2016).

[19] Z. Wang, Y. Kamiya, A. H. Nevidomskyy, and C. D. Batista, *Three-Dimensional Crystallization of Vortex Strings in Frustrated Quantum Magnets*, Phys. Rev. Lett. **115**, 107201 (2015).

[20] Z. Wang and A. H. Nevidomskyy, *Orbital Nematic Order and Interplay with Magnetism in the Two-Orbital Hubbard Model*, J. Phys.: Condens. Matter **27**, 225602 (2015).

[21] R. Yu, Z. Wang, P. Goswami, A. H. Nevidomskyy, Q. Si, and E. Abrahams, *Spin Dynamics of a J_1-J_2-K Model for the Paramagnetic Phase of Iron Pnictides*, Phys. Rev. B **86**, 085148 (2012).

TALKS

- "Tomonaga-Luttinger Liquid Behavior and Spinon Confinement in $YbAlO_3$", Invited talk, 29TH Rare Earth Research Conference (RERC29), Philadelphia, Jun 2022
- "Magnetic and transport properties of rare-earth compounds dominated by RKKY interactions", Hefei Institutes of Physical Science, Chinese Academy of Sciences, Hefei, Jan 2022
- "Strain-tunable metamagnetic critical end-point in Mott insulating rare-earth titanates", Invited talk, Workshop "Quantum Materials: New insights from neutron scattering", University of Minnesota, Minneapolis, MN, Jun 2021
- "Skyrmion crystals in centrosymmetric itinerant magnets", Renmin University of China, Beijing, May 2021
- "Square skyrmion, meron, and vortex crystals in centrosymmetric tetragonal magnets", Invited talk, APS March Meeting, Virtual, Mar 2021
- "Towards realistic modelling of heavy fermion systems", Workshop "20 years of the 115's: past, present, and future", Los Alamos National Laboratory, Los Alamos, NM, Nov 2020
- "Magnetic and transport properties of rare-earth compounds dominated by RKKY interactions", 2020 Tsung-Dao Lee Institute & School of Physics and Astronomy International Youth Forum for Physics, Shanghai, Aug 2020
- "Magnetic and transport properties of rare-earth compounds dominated by RKKY interactions", University of Tennessee, Knoxville, TN, Sep 2020
- "Magnetic and transport properties of rare-earth compounds dominated by RKKY interactions", University of Minnesota, Minneapolis, MN, Aug 2020
- "Magnetic and transport properties of rare-earth compounds dominated by RKKY interactions", 2020 Tsung-Dao Lee Institute & School of Physics and Astronomy International Youth Forum for Physics (invited), Shanghai Jiao Tong University, Shanghai, Aug 2020
- "Magnetic and transport properties of rare-earth compounds dominated by RKKY interactions", Los Alamos National Laboratory, Los Alamos, NM, Dec 2019
- "Beyond Baby Skyrmions: principle chiral model in non-collinear magnets", APS March Meeting, Boston, MA, Mar 2019
- "Beyond Baby Skyrmions: principle chiral model in non-collinear magnets", Los Alamos National Laboratory, Los Alamos, NM, Feb 2019
- "Beyond Baby Skyrmions: principle chiral model in non-collinear magnets", Southern University of Science and Technology, Shenzhen, Dec 2018
- "Beyond Baby Skyrmions: principle chiral model in non-collinear magnets", Tsung-Dao Lee Institute, Shanghai Jiao Tong University, Shanghai, Dec 2018
- "Beyond Baby Skyrmions: principle chiral model in non-collinear magnets", Westlake Institute of Advanced Study, Hangzhou, Zhejiang, Dec 2018
- "Dynamical responses and instabilities of the Shastry-Sutherland model", APS March Meeting, Los Angeles, CA, Mar 2018
- "Resistivity minimum in highly frustrated itinerant magnets", Workshop "Simulation of interacting quantum many-body systems", USTC, Heifei, Anhui, May 2017
- "Chiral Phase near Quantum Critical Point", APS March Meeting, New Orleans, LA, Mar 2017
- "Non-Kondo Mechanism of Resistivity Minimum in Frustrated Itinerant Magnets", APS March Meeting, Baltimore, MD, Mar 2016
- "Quadrupolar Spin Orders in FeSe", APS March Meeting, Baltimore, MD, Mar 2016
- "Crystallization of magnetic vortex-strings in frustrated quantum magnets", APS March Meeting, San Antonio, TX, Mar 2015

• "Orbital nematic order and its interplay with magnetism in iron based superconductors", APS March Meeting, Denver, CO, Mar 2014
• "Spin dynamics of a J1-J2-K model for the paramagnetic phase of iron pnictides", APS March Meeting, Boston, MA, Mar 2012

OPENSOURCE SOFTWARES

Qbasis: an exact diagonalization C++ library for any quantum lattice model.
https://github.com/wztzjhn/quantum_basis

Fastkpm: Linear scaling method (kernel polynomial expansion) for tight-binding electron systems with spatial, chemical and spin disorders. Written in C++ with CUDA library. In collaboration with Kipton Barros.
https://github.com/kbarros/FastKPM
https://github.com/kbarros/Kondo

FELLOWSHIPS AND AWARDS

• H. A. Wilson Research Award, Rice University	*2016*
• Henry F. and Margaret Dunlap Fellowship, Rice University	*2015*
• Outstanding Undergraduate Research Program Scholarship, USTC	*2009*
• Outstanding Student Scholarship, USTC	*2008*
• Outstanding Student Scholarship, USTC	*2007*
• Outstanding Student Scholarship, USTC	*2006*