CV of Yin-Chen He

Personal Information

Address: Perimeter Institute for Theoretical Physics
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Employment History

6/2018–present, Faculty (tenure track), Perimeter Institute, Waterloo,Canada
9/2016–5/2018, Gordon and Betty Moore fellow (postdoc), Harvard University, Cambridge, USA
7/2014–8/2016, Postdoc fellow, Max-Planck-Institute, Dresden, Germany

Education

9/2011–7/2014, Doctor of Physics, Fudan University, Shanghai, China
9/2008–7/2011, Master of Science in Physics, Fudan University, Shanghai, China
9/2004–7/2008, Bachelor of Science in Physics, Fudan University, Shanghai, China

Recognitions

Gordon and Betty Moore Foundation postdoctoral fellowship at Harvard, 2016-2019
Outstanding Doctoral dissertation of Shanghai, 2014

Research interest

Research Area: Condensed matter theory, High energy theory, Quantum information
Research interest: Conformal Field Theory, Spin Liquid, Quantum Criticality, Topological Phases, Tensor Network States

Letters of reference (available upon request)

Ashvin Vishwanath, Harvard University, avishwanath@g.harvard.edu
Frank Pollmann, Technische Universität München, frank.pollmann@tum.de
Senthil Todadri, Massachusetts Institute of Technology (MIT), stodadri@gmail.com
Subir Sachdev, Harvard University, sachdev@g.harvard.edu

Research highlights

All my publications can be found here on arXiv.

Fuzzy sphere regularization

- Liangdong Hu, Yin-Chen He, W. Zhu, *Solving Conformal Defects in 3D Conformal Field Theory using Fuzzy Sphere Regularization*, arXiv:2308.01903
- Zheng Zhou, Liangdong Hu, W. Zhu, Yin-Chen He, *The SO(5) Deconfined Phase Transition under the Fuzzy Sphere Microscope: Approximate Conformal Symmetry, Pseudo-Criticality, and Operator Spectrum*, arXiv:2306.16435

- Chao Han, Liangdong Hu, W. Zhu, Yin-Chen He, *Conformal four-point correlators of the 3D Ising transition via the quantum fuzzy sphere* , arXiv:2306.04681
- Liangdong Hu, Yin-Chen He, W. Zhu, *Operator Product Expansion Coefficients of the 3D Ising Criticality via Quantum Fuzzy Sphere*, Phys. Rev. Lett. 131, 031601 (2023) (Editor's Suggestion)
- Wei Zhu, Chao Han, Emilie Huffman, Johannes S. Hofmann, Yin-Chen He, *Uncovering conformal symmetry in the 3D Ising transition: State-operator correspondence from a quantum fuzzy sphere regularization*, Phys. Rev. X 13, 021009 (2023). See a commentary on Journal Club for Condensed Matter Physics.

Conformal bootstrap

- Yin-Chen He, Junchen Rong, Ning Su, Alessandro Vichi, *Non-Abelian currents bootstrap*, arXiv:2302.11585.
- Yin-Chen He, Junchen Rong, Ning Su, *A roadmap for bootstrapping critical gauge theories: decoupling operators of conformal field theories in $d > 2$ dimensions*, SciPost Phys. 11, 111 (2021)
- Yin-Chen He, Junchen Rong, Ning Su, *Non-Wilson-Fisher kinks of $O(n)$ numerical bootstrap: from the deconfined phase transition to a putative new family of CFTs*, SciPost Phys. 10, 115 (2021).

Quantum criticality

- Liujun Zou, Yin-Chen He, Chong Wang, *Stiefel liquids: possible non-Lagrangian quantum criticality from intertwined orders*, Phys. Rev. X 11, 031043 (2021). See a news report on Nature Physics.
- Liujun Zou, Yin-Chen He, *Field-induced QCD_3-Chern-Simons quantum criticalities in Kitaev materials*, Phys. Rev. Research 2, 013072 (2020).
- Jong Yeon Lee, Chong Wang, Michael P. Zaletel, Ashvin Vishwanath, and Yin-Chen He, *Emergent Multi-flavor QED3 at the Plateau Transition between Fractional Chern Insulators: Applications to graphene heterostructures*, Phys. Rev. X 8, 031015 (2018).

Quantum Spin liquid

- Xue-Yang Song, Yin-Chen He, Ashvin Vishwanath, Chong Wang, *From spinon band topology to the symmetry quantum numbers of monopoles in Dirac spin liquids*, Phys. Rev. X 10, 011033 (2020).
- Shijie Hu, W Zhu, Sebastian Eggert, Yin-Chen He, *Dirac Spin Liquid on the Spin-$1/2$ Triangular Heisenberg Antiferromagnet*, Phys. Rev. Lett. 123, 207203 (2019), (Editor's suggestion).
- Xue-Yang Song, Chong Wang, Ashvin Vishwanath, Yin-Chen He, *Unifying description of competing orders in two-dimensional quantum magnets*, Nature Communications 10, 1-12 (2019), (Editor's suggestion). See a commentary on Nature reviews physics.

- Yin-Chen He, Michael P. Zaletel, Masaki Oshikawa, and Frank Pollmann, *Signatures of Dirac cones in a DMRG study of the Kagome Heisenberg model*, Phys. Rev. X 7, 031020 (2017), see a commentary on Journal Club for Condensed Matter Physics.
- Yin-Chen He, Subhro Bhattacharjee, Frank Pollmann, and R. Moessner, *Kagome chiral spin liquid as a gauged U(1) symmetry protected topological phase*, Phys. Rev. Lett. **115**, 267209 (2015).
- Yin-Chen He, Subhro Bhattacharjee, R. Moessner, and Frank Pollmann, *Bosonic Integer Quantum Hall effect in an interacting lattice model*, Phys. Rev. Lett. **115**, 116803 (2015).
- Yin-Chen He and Yan Chen, *Distinct spin liquids and their transitions in spin-1/2 XXZ kagome antiferromagnets*, Phys. Rev. Lett. **114**, 037201 (2015).
- Yin-Chen He, D. N. Sheng, and Yan Chen, *Chiral spin liquid in a frustrated anisotropic kagome Heisenberg model*, Phys. Rev. Lett. **112**, 137202 (2014).

Services

Editorial Activities

Referee for *Physical Review X, Physical Review Letters, Physical Review B, Physical Review A, Physical Review Research, SciPost, Nature Physics, Nature Communication*

Conference Organizations

- *Fuzzy sphere meets bootstrap*, Stony Brook University, 2023, New York, US
- *A mini-course on numerical bootstrap*, Perimeter Institute, 2023, Waterloo, Canada
- *Online School on Ultra Quantum Matter*, Perimeter Institute, 2020, Waterloo, Canada
- *Quantum Matter: Emergence and Entanglement 3*, Perimeter Institute, 2019, Waterloo, Canada

Teaching experience

Mini-courses

- *"Fuzzy sphere regularization of 3D CFTs"*, Bootstrap 2023, July, Sao Paulo, Brazil
- *"Introduction to the quantum Hall effect"*, 2023 Perimeter-SAIFR Journeys into Theoretical Physics, 2023 July, Sao Paulo, Brazil
- *"Radial quantization of CFTs"*, Perimeter Scholar International (PSI) winter school, 2023 February, Waterloo, Ontario, Canada

Presentations

Invited conference talks

1. *Simons Ultra Quantum Matter Collaboration Annual Meeting*, New York, US, Jan. 2024
2. *Highly Frustrated Magnetism 2024*, Chenai, India, Jan. 2024

3. *A New Spin on Quantum Magnets*, KITP, US, Sep. 2023
4. *Quantum Universe in a Crystal: Symmetry and Topology across the Correlation Spectrum*, KITP, US, Apr. 2023.
5. *A Quantum Many-Body Handshake: Theory and Simulation meet Experiment*, Weizmann Institute, Israel, Dec. 2022.
6. *Bootstrapping nature*, GGI Florence, Italy, Oct. 2022.
7. *Simons Ultra Quantum Matter collaboration*, Caltech, US, Sep. 2022.
8. *Frustrated Metals and Insulators (virtual)*, ICTS Bengaluru, India, Sep. 2022.
9. *Conformal field theory and quantum many-body physics*, CRM Montreal, Canada, Aug 2022.
10. *Gauge fields and criticalities*, Perimeter Institute, Canada, May 2022.
11. *Bootstrap 2021* (virtual), Simons bootstrap collaboration, July 2021.
12. *NCTS international summer school and workshop on emergent quantum many-body phenomena* (virtual), Taiwan, July 2021.
13. *Recent Advances on Theories of Quantum Matters* (virtual), Tsinghua, Beijing, China, January 2021.
14. *Quantum Spin Liquid*, Aspen, CO, US, June 2019.
15. *Topology and Frustration in Quantum Materials*, Tsinghua, Beijing, China, June 2019.
16. *Quantum Matter: Emergence and Entanglement 3*, Perimeter Institute, Waterloo, ON, Canada, April 2019.
17. *New Approaches to Strongly Correlated Quantum Systems*, Aspen, CO, US, February 2019.
18. *Workshop on Quantum Matter: Interactions, Topology, and Quantum Chaos*, Urbana-Champions, IL, US, November 2018.
19. *Field Theory Dualities and Strongly Correlated Matter*, Aspen, CO, US, March 2018.
20. *Topological States and Phase transitions in strongly correlated systems*, IOP, Beijing, China, July 2017.
21. *Theory of Correlated Topological Materials*, ISSP, Tokyo, Japan, February 2017.
22. *Topological Quantum Matter*, KITP, Santa Barbara, US, October 2016.
23. *International summer school: Computational approaches for quantum many body system*, IOP, Beijing, China, August 2016
24. *From Quantum Field theory to Numerical Methods*, Nordita, Stockholm, Sweden, May 2016
25. *DPG meeting, Invited talk*, Rengensburg, Germany, March 2016
26. *Tensor Network States: Algorithms and Applications 2016*, Okazaki, Japan, January 2016
27. *Korrelationstage 2015*, Dresden, Germany, September 2015

28. *Topological Phases in Condensed Matter and Cold Atom Systems*, Cargese, France, September 2015

Seminars

1. 12/2023 Stanford, San Francisco, US.
2. 11/2023 MIT, Cambridge, US.
3. 11/2023 Harvard, Cambridge, US.
4. 11/2023 University of Montreal (virtual), Canada.
5. 11/2023 McGill University (virtual), Montreal, Canada.
6. 10/2023 Westlake University, Hangzhou, China.
7. 08/2023 Ultra Quantum Matter (virtual)
8. 02/2023 UC Santa Barbara (virtual), US.
9. 11/2022 UC San Diego (virtual), US.
10. 11/2022 The Technical University of Munich, Germany.
11. 03/2022 Max Planck Institute for the Physics of Complex Systems (virtual), Germany.
12. 03/2022 IHES (virtual), Paris.
13. 10/2021 Perimeter Institute (virtual), Canada.
14. 02/2021 University of Florida (virtual), US.
15. 10/2020 Harvard CMSA (virtual), Cambridge, US
16. 06/2020 Simons Collaboration on The Nonperturbative Bootstrap (virtual)
17. 05/2020 Harvard (virtual), Cambridge, US
18. 12/2019 Westlake University, Zhejiang, China
19. 10/2019 University of Waterloo, Waterloo, Canada
20. 10/2019 University of Alberta, Alberta, Canada
21. 01/2019 Chongqing University, Chongqing, China
22. 12/2018 Zhejiang University, Zhejiang, China
23. 12/2018 Nanjing University, Nanjing, China
24. 12/2018 Fudan University, Shanghai, China
25. 05/2018 Harvard, Cambridge, MA, US
26. 10/2017 University of Montreal, Montreal, Quebec, Canada
27. 09/2017 University of Toronto, Toronto, Ontario, Canada
28. 05/2017 Perimeter institute, Waterloo, Canada
29. 03/2017 Oxford University, Oxford, UK
30. 11/2016 MIT, Cambridge, US

31. 08/2016 Institute of Advanced Study, Tsinghua University, Beijing, China
32. 07/2016 Fudan University, Shanghai, China
33. 06/2016 University of Cologne, Cologne, Germany
34. 06/2016 University of Kaiserslautern, Kaiserslautern, Germany
35. 04/2016 Perimeter Institue, Waterloo, Canada
36. 01/2016 Institute for Solid State Physics, University of Tokyo, Tokyo, Japan
37. 01/2016 Riken, Tokyo, Japan
38. 11/2015 University of Colorado Boulder, Boulder, US
39. 11/2015 Caltech, Los Angeles, US
40. 11/2015 Station Q, Santa Babara, US
41. 11/2015 Stanford, San Francisco , US
42. 11/2015 Berkeley, San Francisco, US
43. 11/2015 Harvard, Cambridge, US
44. 11/2015 MIT, Cambridge, US
45. 03/2015 Riken, Tokyo, Japan
46. 03/2015 Institute for Solid State Physics, University of Tokyo, Tokyo, Japan
47. 07/2014 Max Planck Institute, Dresden, Germany