

# Curriculum Vitae

As of July 20, 2021

## Haiping Hu (胡海平)

Department of Physics and Astronomy,  
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**Gender:** Male

**Date of Birth:** 09/22/1989

**Place of Birth:** Anqing, Anhui Province, China

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## Employment

Sept. 2018 –Now

Postdoctoral Research Associate,  
Department of Physics & Astronomy, George Mason University,  
Supervisor: Erhai Zhao  
&  
Department of Physics & Astronomy, University of Pittsburgh,  
Supervisor: W. Vincent Liu

Sept. 2016 – Aug. 2018

Postdoctoral Research Associate,  
Department of Physics, University of Texas at Dallas  
Supervisor: Chuanwei Zhang

## Education History

**PhD in Physics**    September 2011 – July 2016, Institute of Physics, Chinese Academy of Sciences  
Advisor: Prof. Shu Chen  
Dissertation: Topological Quantum States in 1D Magnetic and Correlated Systems.

**BS in Physics**    September 2007 – July 2011, Special Class for the Gifted Young, University of  
Science and Technology of China

## Research Interests

- Quantum dynamics and non-equilibrium quantum matter, e.g., quench/Floquet/non-Hermitian dynamics, etc., dynamical phase transition,...)
- Synthetic topological quantum matter
- Strongly interacting systems in low dimension, many-body localization

## Professional Services

- Referee of Phys. Rev. Lett., Phys. Rev. X, Phys. Rev. Res., PRA, PRB, Sci. Rep., etc.
- Session Chair of APS March Meeting

## Awards during PhD Period

- Merit Student Award of the University of Chinese Academy of Sciences, 2016
- Merit Student Award of the University of Chinese Academy of Sciences, 2015
- Excellent Reporting Awards in 9th Workshop on Cold Atom Physics and Quantum Information for Young Researchers, 2015
- Institute Chief Award of the Institute of Physics, Chinese Academy of Sciences, 2014
- Merit Student Award of the University of Chinese Academy of Sciences, 2014
- National Scholarship, 2013
- Merit Student Award of the Graduate University of Chinese Academy of Sciences, 2012

## Publication List

Summary:

-Total 25 papers, including 6 in Physical Review Letters (5 as first author), 10 in Physical Review A/B, 2 in New Journal of Physics, and 1 in Scientific Reports.

(\* as corresponding author)

1. **HH\***, Erhai Zhao\*, and W. Vincent Liu\*, *Point-gap Weyl semimetal: dynamical current and boundary-skin modes*, [ArXiv: 2107.02135](https://arxiv.org/abs/2107.02135).
2. **HH** and Erhai Zhao, *Knots and Non-Hermitian Bloch Bands*, [Phys. Rev. Lett. \*\*126\*\*, 010401 \(2021\)](https://doi.org/10.1103/PhysRevLett.126.010401).
3. **HH**, Erhai Zhao and Indubala I. Satija, *Tuning the topology of p-wave superconductor in an analytically solvable two-band model*, [Phys. Rev. B \*\*102\*\*, 235156 \(2020\)](https://doi.org/10.1103/PhysRevB.102.235156).
4. Junpeng Hou, **HH**, and Chuanwei Zhang, *Topological phases in spin-1 Fermi gases with two-*

- dimensional spin-orbit coupling,*  
[Phys. Rev. A \*\*101\*\*, 053613 \(2020\).](#)
5. **HH**, Chao Yang, and Erhai Zhao, *Quench dynamics of Hopf insulators,*  
[Phys. Rev. B \*\*101\*\*, 155131 \(2020\).](#)
  6. **HH** and Erhai Zhao, *Topological Invariant for Quantum Quench Dynamics from Unitary Evolution,*  
[Phys. Rev. Lett. \*\*124\*\*, 160402 \(2020\), \*Editors' Suggestion\*.](#)
  7. **HH\***, Biao Huang, Erhai Zhao, and W. Vincent Liu, *Dynamical Singularities of Floquet Higher-Order Topological Insulators,*  
[Phys. Rev. Lett. \*\*124\*\*, 057001 \(2020\).](#)
  8. **HH**, Indubala Satija, and Erhai Zhao, *Chiral and counter-propagating Majorana fermion in a p-wave superconductor,*  
[New J. Phys. \*\*21\*\*, 123014 \(2019\).](#)
  9. **HH**, Shu Chen, Tian-Sheng Zeng, and Chuanwei Zhang, *Topological Mott insulator with bosonic edge modes in one-dimensional fermionic superlattices,*  
[Phys. Rev. A \*\*100\*\*, 023616 \(2019\).](#)
  10. Yucheng Wang, **HH**, and Shu Chen, *Effect of incommensurate potential on nodal-link semimetals,*  
[Phys. Rev. B \*\*98\*\*, 205410 \(2018\).](#)
  11. **HH**, Fan Zhang, and Chuanwei Zhang, *Majorana Doublets, Flat Bands, and Dirac Nodes in s-Wave Superfluids,*  
[Phys. Rev. Lett. \*\*121\*\*, 185302 \(2018\).](#)
  12. **HH** and Chuanwei Zhang, *Spin-1 topological monopoles in parameter space of ultracold atoms,*  
[Phys. Rev. A \*\*98\*\*, 013627 \(2018\).](#)
  13. **HH**, Junpeng Hou, Fan Zhang, and Chuanwei Zhang, *Topological Triply Degenerate Points Induced by Spin-Tensor-Momentum Couplings,*  
[Phys. Rev. Lett. \*\*120\*\*, 240401 \(2018\).](#)
  14. Junpeng Hou, **HH**, Kuei Sun, and Chuanwei Zhang, *Superfluid quasicrystal in a Bose-Einstein condensate,* [Discovery of a new phase Superfluid quasicrystal, See related news in [Newsweek](#), [Sciencedaily](#), [Phys.org](#)]  
[Phys. Rev. Lett. \*\*120\*\*, 060407 \(2018\).](#)
  15. Lei Pan, Yanxia Liu, **HH**, Yunbo Zhang, and Shu Chen, *Exact ordering of energy levels for one-dimensional interacting Fermi gases with  $SU(N)$  symmetry,*

[Phys. Rev. B \*\*96\*\*, 075149 \(2017\).](#)

16. **HH**, Lei Pan, and Shu Chen, *Strongly interacting one-dimensional quantum gas mixtures with weak  $p$ -wave interactions*,  
[Phys. Rev. A \*\*93\*\*, 033636 \(2016\).](#)
17. **HH**, Huaiming Guo, and Shu Chen, *Fractional topological states in quantum spin chains with periodical modulation*,  
[Phys. Rev. B \*\*93\*\*, 155133 \(2016\).](#)
18. **HH**, Liming Guan, and Shu Chen, *Strongly interacting Bose-Fermi mixtures in one dimension*,  
[New J. Phys. \*\*18\*\*, 025009 \(2016\).](#)
19. Yucheng Wang, **HH**, and Shu Chen, *Many-body ground state localization and coexistence of localized and extended states in an interacting quasiperiodic system*,  
[Eur. Phys. J. B \*\*89\*\*, 77 \(2016\).](#)
20. Lijun Yang, Lijun Lang, Rong Lv, and **HH\***, *Spin-orbit coupled  $s$ -wave superconductor in one dimensional optical lattice*,  
[Commun. Theor. Phys. \*\*63\*\*, 445\(2015\).](#)
21. **HH**, Chen Cheng, Honggang Luo, and Shu Chen, *Topological incommensurate magnetization plateaus in quasi-periodic quantum spin chains*,  
[Scientific Reports \*\*5\*\*, 8433\(2015\).](#)
22. **HH**, Chen Cheng, Zhihao Xu, Honggang Luo, and Shu Chen, *Topological nature of magnetization plateaus in periodically modulated quantum spin chains*,  
[Phys. Rev. B \*\*90\*\*, 035150 \(2014\).](#)
23. Xing Chen, **HH**, Yuzhu Jiang, and Shu Chen, *Ferromagnetic to antiferromagnetic transition of one-dimensional spinor Bose gases with spin-orbit coupling*,  
[Eur. Phys. J. D \*\*67\*\*, 166 \(2013\).](#)

#### *Preprint*

24. **HH**, Chen Cheng, Yucheng Wang, Honggang Luo, and Shu Chen, *Phase diagram and topological superfluid state of spin-orbit coupled Fermi gas with attractive interactions in a one-dimensional optical lattice*,  
[arXiv:1511.01762](#)
25. **HH** and Shu Chen, *Mapping trapped atomic gas with spin-orbit coupling to quantum Rabi-like model*,  
[ArXiv:1302.5933](#)

## Conferences, Workshops, and Talks

- 2021 SR AMP and QIS Program Reviews, *Aug. 17-Aug. 19, 2021*, Zoom Online
- KITP program: Interacting Topological Matter: Atomic, Molecular and Optical Systems, Pitt-Shanghai-Xi'an quantum mini-Workshop, *Jun. 1-Aug. 13, 2021*, Zoom Online
- 2020 Pitt-Shanghai-Xi'an quantum mini-Workshop, *Dec. 19, 2020*, Shanghai, China  
(**Talk: Dynamical Topology in Nonequilibrium Systems**)
- Online International Workshop on "Recent Development on Multipole Moments in Quantum Systems", *May 10-11, 2020*.
- APS March Meeting 2020, *March 2-6, 2020*, Denver, Colorado  
(**Talk: Topological Invariants for Quantum Quench Dynamics & Poster: Higher-order Topological Phases in Dynamical Optical Lattices**)
- 2019 Anyon Bridge MURI review meeting, *Sep. 3, 2019*, UCSB, Santa Barbara, California  
(**Poster: Higher-order Topological phases in Dynamical Optical Lattices**)
- 2019 AFOSR QIS-AMP Program Reviews, *June 18-20, 2018*, Arlington, Virginia  
(**Poster: Higher-order Topological phases in Dynamical Optical Lattices**)
- 50-th Annual meeting of APS DAMOP, *May 26-May 31, 2019*, Milwaukee, Wisconsin.
- Universal Themes of Bose-Einstein Condensation (UBEC), *April 1-5, 2019*, Pittsburgh, Pennsylvania  
(**Poster: Chiral to helical Majorana fermion transition in a p-wave superconductor**)
- 2018 Anyon Bridge MURI review meeting, *Oct. 11, 2018*, Caltech, Los Angeles, California
- 2018 AFOSR QIS-AMP Program Reviews, *June 18-20, 2018*, Arlington, Virginia  
(**Poster 1: Majorana Kramers Pairs in s-wave Superfluids; Poster 2: A Novel Topological Mott Insulator in 1D Superlattice**)
- 49-th Annual meeting of APS DAMOP, *May 28-June 1, 2018*, Ft. Lauderdale, Florida  
(**Talk: Majorana Doublets, Flat Bands, and Dirac Nodes in s-Wave Superfluids**)
- APS March meeting 2018, *March 5-9, 2018*, Los Angeles, California  
(**Talk: Triply-degenerate points: Classification and topological properties**)

- APS 2017 Texas Section Fall Meeting, *Oct. 20-21, 2017*, University of Texas at Dallas  
(**Talk: Topological triply-degenerate points induced by spin-tensor-momentum couplings**)
- ARO Atomic Physics Program review, *June 12-16, 2017*, Cocoa Beach, Florida.
- 48-th Annual meeting of APS DAMOP, *June 5-9, 2017*, Sacramento, California  
(**Talk: Topological spin-charge separation in 1D superlattices**)
- 10-th Workshop on Cold Atom Physics and Quantum Information for Young Researchers.  
*July 16-23, 2016*, Wuhan, China.
- IAS Program and Croucher Conference on Topological Phases in Condensed Matter and Cold Atomic Systems. *Dec. 11-19, 2015*, Hong Kong.
- 9-th Workshop on Cold Atom Physics and Quantum Information for Young Researchers. *Aug. 3-7, 2015*, Changchun, China  
(**Talk: Topological superfluid state in 1D SOC Fermi gases**).
- ICAM-China Summer School: The Frontier in Condensed Matter Physics. *July 18-26, 2015*, Beijing, China.
- 1st Conference on Condensed Matter Physics. *July 15-17, 2015*, Beijing, China.
- International Workshop on Unconventional Phenomena in Low-Dimensional Correlated Systems. *June 6-8, 2015*, Beijing, China.
- 8-th Workshop on Cold Atom Physics and Quantum Information for Young Researchers. *Aug. 7-11, 2014*, Hangzhou, China.
- The 3rd Super-PIRE REIMEI Workshop on Frontiers of Condensed Matter Physics (FCMP). *March 17-21, 2014*, Beijing, China.
- 7-th Workshop on Cold Atom Physics and Quantum Information for Young Researchers. *July 27-31, 2013*, Huangshan, China.
- 4-th Workshop on Topological Quantum States and Phase Transitions. *July 28, 2013*, Jinhua, China.
- Conference on Few-body Physics in Cold Atomic Gases. *April 11-14, 2013*, Beijing, China.

- 6-th Workshop on Cold Atom Physics and Quantum Information for Young Researchers. *Aug. 14-18, 2012, Jinhua, China.*
- Summer School on Condensed Matter Physics. *July 12-Aug. 2, 2012, Shanghai, China.*