CONGJUN WU

Curriculum Vitae [as of October 21, 2018]

CONTACT INFORMATION

University of California, San Diego
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RESEARCH AREA

My research is on the study of **new states of matter** and their underlying organizing principles. My research topics include superconductivity, magnetism, orbital physics, topological states, quantum criticality, strongly correlated cold atom systems, and quantum Monte-Carlo simulations.

EDUCATION

- Ph. D. in Physics, Stanford University, Jun. 2002 - Sept. 2005.
  Advisor: Prof. Shou-Cheng Zhang.
- University of Illinois at Urbana-Champaign, May 2000 - May 2002.
  Advisor: Prof. Eduardo H. Fradkin.
- M.S. in Physics, Peking University, Beijing, China, Sept. 1997 - Jun. 2000.
  Advisor: Prof. Zhao-Bin Su.
- B.S. in Physics, Tsinghua University, Beijing, China, Sept. 1992 - Jul. 1997.

EMPLOYMENT

Jul. 2017-	Professor, Department of Physics, University of California, San Diego (UCSD)
Jul. 2011- Jun. 2017	Associate Professor, Department of Physics, UCSD.
Jul. 2007- Jun. 2011	Assistant Professor, Department of Physics, UCSD.
Aug. 2005- Jun. 2007	Postdoctoral Research Associate, Kavli Institute for Theoretical Physics, UCSB.

TOTAL CITATIONS: 4700 (Web of Knowledge), 6300 (Google Scholar)

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HONORS

- APS Fellowship, nominated by Division of Condensed Matter Physics, APS (2018).
- US Air Force Office of Scientific Research (AFOSR) Young Investigator Award, 2011.
- The most influential paper award from Chinese Physics Society 2013 for *Wu, Mondragon-Shem, and Zhou, Chin. Phys. Lett. 28, 086104 (2011).*
- "Outstanding Young Researcher Award" of Overseas Chinese Physics Association, 2008.
- Alfred P. Sloan Research Fellowship, 2008.

SCIENTIFIC DUTIES

- Serve in the Editorial Broad for *"Chinese Physics Letters"* since 2015.
- Serve in the Editorial Board for *"Scientific Report"* since 2011.

- Proposal Reviewer for U. S. National Science Foundation, Division of Materials Research and Division of Physics; U. S. Army Research Office; U.S. Air Force Office of Scientific Research; Research Grants Council of Hong Kong; the Foundation for Fundamental Research on Matter, the physics research council in the Netherlands.
- Referee for *Nature*; *Nature Physics*, *Physical Review Letters*, *Physical Review A*, and *Physical Review B*; *Nuclear Physics B*; *Physics Letters A*; *Europhysics Letters*.

WORKSHOP ORGANIZATION

- "Orbital Physics in Cold Atom Systems", Institute of Physics, Chinese Academy of Sciences, Beijing, Jan.5-6, 2013.
- "New States of Matter with Ultra Cold Atoms", Wuhan University, Dec 10 - 12, 2017.

REVIEW ARTICLES

- Review article on spin-3/2 cold atomic systems, Mod. Phys. Lett. B, **20**, 1707 (2006).
- Review article on unconventional Bose-Einstein Condensation, Mod. Phys. Lett. B, **23**, 1 (2009).
- Review article on synthetic spin-orbit coupling, J. Phys. B: At. Mol. Opt. Phys. **46**, 134001 (2013).
- Review article on electric and magnetic dipolar Fermi gases, J. Phys.: Condens. Matter **26**, 493203 (2014) .

Commentary Articles

- **Congjun Wu**, *"Exotic many-body physics with large-spin Fermi gases"*, Physics 3, 92 (2010).
- **Congjun Wu**, *"Mott made easy"*, Nature Physics 8, 784?85(2012).

PHYSICS COLLOQUIA (11)

1. Department of Physics, **Simon Fraser University**, *"Novel orbital physics – Unconventional BEC and Curie-Weiss Metal states in optical lattices"*, Nov. 17, 2017
2. Department of Physics, **University of British Columbia**, *"Novel orbital physics – Unconventional BEC and Curie-Weiss Metal states in optical lattices"*, Nov. 16, 2017.
3. Department of Physics, **University of California, San Diego**, *"Novel orbital physics – Unconventional BEC and Curie-Weiss Metal states in optical lattices"*, Nov. 9, 2017.
4. Center for Nonlinear Studies, **Los Alamos National Lab**, Condensed Matter Science Colloquium, "*Novel orbital phases in optical lattices – unconventional BEC and itinerant ferromagnetism*", Dec. 14, 2016.
5. Department of Physics, **Huazhong University of Science & Technology**, Physics Colloquia, "*New progress on itinerant ferromagnetism and the Curie-Weiss Metal State*", Jun 23, 2016.
6. Department of Physics, **University of Texas at Dallas**, Physics Colloquia, "*Unconventional orbital phases with cold atoms* ", Sept, 2015.
7. Department of Physics, **Tulan University**, Physics Colloquia, "*Exact results on itinerant ferromagnetism*", Oct 22, 2014.
8. Department of Physics, **University of Houston**, Physics Colloquia, "*Unconventional metamagnetism and orbital ordering in transition metal oxides* ", March 27, 2012.
9. Institut fur Laserphysik, **University of Hamburg**, Germany, Unconventional Bose-Einstein condensation beyond the no-node paradigm", Jan. 31, 2012.
10. Department of Physics, **Washington State University**, Physics Colloquia, "*Orbital Phases of cold atoms: unconventional BEC, ferromagnetism, and unconventional Cooper pairing*", Nov. 17, 2009.
11. Department of Physics, **Washington University in St. Louis**, Physics Colloquia, "*Unconven-*

tional magnetism and dynamic generation of spin-orbit coupling", Jan. 17, 2007.

INVITED CONFERENCE TALKS (25)

12. **12th International Conference on Materials and Mechanisms of Superconductivity and High Temperature Superconductors**, "Spin-3/2 topological superconductivity beyond triplet pairing", Beijing, Aug 19-24, 2018, invited talk.
13. **AFOSR Program Review**, "*Quantum dynamics: Spact-time Crystal and Bethe String states"*, Arlington, Jun 18-22.
14. **2018 International Conference on Emergent Phenomena in Quantum Materials**, "*Progress on Itinerant Electrons: Cruie-Weiss metal and Spin-orbit ordering*", New York University in Shanghai, May 30 - Jun 1.
15. **"Quantum material workshop"**, Fudan University, "*Quantum dynamics: Spact-time Crystal and Bethe String states"*, Shanghai, April 20 -22, 2018.
16. **"Sign 2017, International workshop in the sign problem in QCD and beyond"**, "Fermion positivity and sign problem", University of Washington, Seattle, March 2017.
17. **The 2nd Condensed Matter Conference**, Chinese Physics Society, the symposium on many-body physics, "Quantum dynamics of the XXZ spin chain in a longitudinal magnetic field", Nanjing, July 2016.
18. **The first Condensed Matter Conference**, Chinese Physics Society, "Topological and strongly correlation physics in the p_x, p_y orbital bands in the honeycomb lattice – from solid states to optical lattices", Beijing, July 17, 2015.
19. **Topological and Strongly Correlated Phases in Cold Atoms**, "Topological and strongly correlation physics in the p_x, p_y orbital bands in the honeycomb lattice – from solid states to optical lattices", Princeton Center for Theoretical Sciences, April 30, 2015.
20. **The Topology and Mathematical Physics conference**, "Quaternion analyticity and 3D SU(2) Landau levels", Center of Mathematical Sciences and Applications, Harvard University, Sept 17, 2014.
21. **The Quantum Gas Conference**, "Novel Sp(2N)/SU(2N) quantum magnetism and Mott physics – large spin is different", Center of Advanced Study, Tsinghua University, Aug 26, 2014.
22. **The Chengdu Condensed Matter Conference** "Topological and strongly correlated physics in the p_x/p_y-orbital bands of the honeycomb lattice-from solid states to optical lattices", Chengdu, China, July 14, 2014.
23. **The 6th International Symposium on Cold Atom Physics**, "Quaternionic states of matter from synthetic gauge fields", Taiyuan, China, Jun 16, 2014.
24. **The 7th Cross-Strait and International Conference on Quantum Manipulation**, title TBA, Institute of Physics, Chinese Academy of Sciences, Beijing, June 28- 30, 2013.
25. **International workshop on Orbital Physics in Cold Atom Systems**, "Novel states of matter of ultra-cold atoms in high bands in optical lattices", Institute of Physics, Chinese Academy of Sciences, Beijing, Jan.5-6, 2013.
26. **2012 Energy, Materials and Nanotechnology (EMN) Meeting**, the parallel session of topological insulators, *"Isotropic Landau Levels of Relativistic and Non-Relativistic Fermions in 3D Flat Space"*, April 16-20, Orlando, Florida, 2012.
27. **The 26th International Conference on Low Temperature Physics**, the parallel session of quantum gases, *"Hidden symmetries and exotic quantum magnetism of large-spin alkali and alkaline-earth fermions"*, Aug 12, Beijing, 2011.
28. **Physics Driven by Spin-orbital Coupling in Transition Metal Compounds**, *"New developments of p-orbital physics – unconventional BEC and fermionic insulators"*, Institute of Physics, Chinese Academy of Sciences, Jun 20-22, Beijing, China, 2011.

29. **Future and Prospect of Topological Insulator**, "*Topological orbital states with cold atoms"*, Institute of Physics, Chinese Academy of Sciences, July 5 to July 10, Beijing and Weihai, China, 2010.
30. **Exotic Insulating Phases of Matter**, The Johns Hopkins University, "*Topological orbital states with cold atoms"*, Jan. 14-16, 2010.
31. **Canadian Institute for Advanced Research, Cold Atoms Meeting**, Halifax, Canada "*Novel orbital physics with fermions in optical lattices*, August 12-16, 2009.
32. **American Physical Society March Meeting 2009**, Pittsburgh, PA, "*Novel orbital physics with fermions in optical lattices*, Mar. 20, 2009.
33. **New Directions in Low-Dimensional Electron Systems (Conference)**, Kavli Institute for Theoretical Physics, University of California, Santa Barbara, Feb 23, 2009.
34. **The 39th Winter Colloquium on the PHYSICS OF QUANTUM ELECTRONICS**, "*Novel orbital physics with fermions in optical lattices*. Jan. 8, 2009.
35. **Academic conference for the 80-year anniversary of Institute of Physics, Chinese Academy of Sciences**, Beijing, "*Novel Orbital Physics with Cold Atoms in Optical Lattices"*, Jun. 20, 2008.
36. Department of Physics, University of Maryland, **Condensed Matter Theory Center Symposium**, "*Pomeranchuk instability and dynamic generation of spin-orbit coupling*", Nov. 8, 2006.

INVITED CONDENSED MATTER SEMINAR TALKS (76)

37. Department of Physics, **University of Buffalo**, SUNY, "*Quantum Dynamics – Space-time group and Bethe String states"*, Sept 18, 2018.
38. **Institute of Physics**, Chinese Academy of Sciences, "*Topological superconductivity with spin-$\frac{3}{2}$ half-Heusler semi-metal beyond triplet pairing"*, Sept. 7, 2018.
39. **Wuhan Institute of Physics and Mathematics**, Chinese Academy of Sciences, "*Quantum Dynamics – Space-time group and Bethe String states"*, Sept. 7, 2018.
40. **Chern Institute of Mathematics**, Nanka University, "*Quantum Dynamics – Space-time group and Bethe String states"*, Aug 12, 2018.
41. **Department of Physics**, Tsinghua University, "*Large gap 2D topological insuator"*, Aug 15, 2018.
42. **Center for Advanced Studies**, Tsinghua University, "*Quantum Dynamics -Space-time crystal and Bethe String states*", Aug 9, 2018.
43. Center for Quantum Materials, **Peking University**, "*Quantum Dynamics - Space-time Crystal and Bethe String States"*, Aug 2,2018.
44. Department of Physics, **Shanghai University of Technology**, "*Quantum Dynamics - Space-time Crystal and Bethe String States"*, July 17, 2018.
45. Department of Physics, **Huazhong University of Science & Technology**, "*Quantum Dynamics -Space-time crystal and Bethe String states*", July 3, 2018.
46. Department of Physics, **Zhejiang University**, "*New development of itinerant electrons: Curie-Weiss metal and spin-orbit ordering*", June 7, 2018.
47. Department of Physics, Shanghai Jiaotong University, "*Topological superconductivity with spin-$\frac{3}{2}$ half-Heusler semi-metal beyond triplet pairing"*, June 4, 2018.
48. Center for Quantum Materials, **Peking University**, "*Topological superconductivity with spin-$\frac{3}{2}$ half-Heusler semi-metal beyond triplet pairing"*, Dec 21, 2017.
49. Department of Physics, **East China Normal University**, "*Novel orbital physics – unconventional BEC and Curie-Weiss Metal states in optical lattices*", Dec 15, 2017.
50. Department of Physics, **Fudan University**, "*Enhance topological gap in 2D materials to the scale of atomic spin-orbit coupling*", Dec 14, 2017.

51. Department of Physics, **Fudan University**, "*Unconventional magnetism and spontaneous spin-orbit ordering*, July 2017.
52. Department of Physics, **Beijing Normal University**, "*Unconventional magnetism and spontaneous spin-orbit ordering*, July, 2017.
53. **"Majorana flatband, magnetic domains, and Septet superconductivity"**, Majorana workshop, Shanghai Jiaotong University, Jun 2017.
54. Department of Physics, **Johns Hopkins University**, "*Unconventional magnetism and spontaneous spin-orbit ordering*, March 29, 2017.
55. Condensed Matter Theory Center, **University of Maryland**, "*Orbital phases in optical lattices and solids: unconventional BEC and large gap topological states*, March 28, 2017.
56. Department of Physics, **University of California, San Diego**, "*Unconventional magnetism and spontaneous spin-orbit ordering*, Jan, 2017.
57. Department of Physics, **Purdue University**, "*Unconventional orbital phases with cold atoms* ", March 03, 2016.
58. Department of Physics, **University of British Columbia**, "Novel Sp(2N)/SU(2N) quantum magnetism and Mott physics - large spins are different", Nov 16, 2015.
59. Department of Physics, **University of Washington**, "Topological and strong correlation physics in the px/py-orbital bands of the honeycomb lattice from solid states to optical lattices" April 1, 2015.
60. **INT workshop, University of Washington**, "Novel Sp(2N)/SU(2N) quantum magnetism and Mott physics - large spins are different", March 25, 2015.
61. **Institute of theoretical atomic, molecular and optical physics, Harvard**, "Topological and strongly correlation physics in the p_x, p_y orbital bands in the honeycomb lattice – from solid states to optical lattices" Nov 21, 2014.
62. Department of physics, **MIT**, "Topological and strongly correlation physics in the p_x, p_y orbital bands in the honeycomb lattice – from solid states to optical lattices", Nov 19, 2014.
63. Department of Physics, **Penn. State University**, "Topological and strongly correlation physics in the p_x/p_y orbital bands in the honeycomb lattice – from solid states to optical lattices", Nov. 4, 2014, scheduled.
64. Department of Physics, **Boston College**, "Novel Sp(2N)/SU(2N) quantum magnetism and Mott physics – large spin is different", Oct. 15, 2014.
65. Department of Physics, **Harvard University**, "Quaternionic analytic Landau level in 3D", Oct 17, 2013.
66. Workshop for celebration Prof. Shou-cheng Zhang's 50 birthday, "Quaternionic BEC and Landau levels", March 23-25, 2013.
67. KITP workshop "Frustrated Magnetism and quantum spin liquids" "Power-law Correlated 2D SU(6) Quantum Paramagnets", Sept. 18, 2012.
68. Workshop on "Topological insulators and superconductors", "Unconventional magnetism in transition metal oxides", July, 2012.
69. Department of Physics, **UCSD**, "Quantum Monte-Carlo simulation of novel 2D quantum magnetism with power-law correlations", Nov 21, 2012.
70. Department of Physics, **The Florida State University**, "Isotropic Landau Levels of Relativistic and Non-Relativistic Fermions in 3D Flat Space", September 14, 2012.
71. Department of Physics, **University of British Columbia**, Canada, *"Isotropic Landau Levels of Relativistic and Non-Relativistic Fermions in 3D Flat Space"*, March 20, 2012.
72. Department of Physics, **University of California, Irvine**, "*Unconventional metamagnetism and orbital ordering in transition metal oxides* ", Feb 8, 2012.
73. Department of Physics, **Tsinghua University**, *"Unconventional Bose-Einstein condensation be-*

yond the no-node paradigm", Aug 23, 2011.

74. Department of Physics, **University of Science and Technology of China**, "*Unconventional metamagnetic transition and orbital ordering in transition metal oxides*", July 29, 2010.
75. Key Lab of Quantum Information **University of Science and Technology of China**, "*Unconventional Bose-Einstein condensations beyond the no-node paradigm*", July 25, 2010.
76. Center for quantum information, **Tsinghua University**, *"Unconventional Bose-Einstein condensation beyond the no-node paradigm"*, July 19, 2011.
77. Department of Physics, **Wuhan University**, *"Unconventional metamagnetism and orbital ordering in transition metal oxides"*, July 5, 2011.
78. Department of Physics, **Wuhan University**, *"Novel p-orbital physics in optical lattices - unconventional BECs, exotic band and Mott insulators of fermions"*, July 4, 2011.
79. Center of Advanced Study, **Tsinghua University**, *"Novel orbital physics in the p-band"*, Jun. 28, 2011.
80. **Aspen physics workshop** "Few and many-body physics of cold quantum gases near resonances", Jun 16, 2011, *"Hidden symplectic symmetry in large spin ultra-cold fermion systems"*.
81. Department of Physics, **University of Texas, Austin**. March 3, 2011, '*Unconventional metamagnetic transition in the t_{2g} orbital system of $Sr_3Ru_2O_7$*.
82. Department of Physics, **Rice University**, "*Novel orbital physics with cold atoms – Unconventional BEC, Ferromagnetism, and f-wave Cooper pairing states*", Nov. 2, 2010.
83. **Institute of Physics, Chinese Academy of Sciences**, "*Unconventional metamagnetic transition in the t_{2g} orbital system of $Sr_3Ru_2O_7$*", Aug 17, 2010.
84. **Quantum simulation workshop**, Key Lab of Quantum Information University of Science and Technology of China, "*Unconventional metamagnetic transition in the t_{2g} orbital system of $Sr_3Ru_2O_7$*", July 30, 2010.
85. **Quantum simulation workshop**, Key Lab of Quantum Information University of Science and Technology of China, *"Hidden symmetries and quantum phases in large spin cold atom systems"*, July 29, 2010.
86. **Quantum simulation workshop**, Key Lab of Quantum Information University of Science and Technology of China, "*Novel orbital physics in cold atom optical lattices*", July 26, 2010.
87. Department of Physics, **University of California, Santa Crutz**, "*Unconventional metamagnetic transition in the t_{2g} orbital system of $Sr_3Ru_2O_7$*", May 21, 2010.
88. Kavli Institute for Theoretical Physics, **University of California, Santa Barbara**, "*Novel orbital physics with cold atoms – Unconventional BEC, Cooper pairing, and frustration"*, Jul. 29, 2009.
89. Department of Physics, **University of California, San Diego** , condensed matter seminar, "*Novel Orbital Physics with Cold atoms in Optical lattices*" , May 27, 2009.
90. Department of Physics, **California Institute of Technology**, condensed matter seminar, "*Novel Orbital Physics with Cold atoms in Optical lattices*" , Nov 21, 2008.
91. Department of Physics, **University of California, Riverside**, condensed matter seminar, "*Novel Orbital Physics with Cold atoms in optical lattices*", Oct. 29, 2008.
92. Department of Physics, **University of California, Los Angels**, condensed matter seminar, "*Novel Orbital Physics with Cold atoms in Optical lattices*" , Oct 22, 2008.
93. Department of Physics, **Stanford University**, condensed matter seminar, "Novel orbital Physics with Cold atoms in Optical Lattices", Oct. 16, 2008.
94. Department of Physics, **University of Michigan**, condensed matter seminar, "*Orbital Physics with Cold atom optical lattices*", Sept. 16, 2008.
95. Department of Physics, **University of California, Davis**, condensed matter seminar, "*Novel Orbital Physics with Cold Atoms in Optical Lattices*", April 17, 2008.
96. Department of Physics, **University of Toronto**, condensed matter seminar, "*Novel features of*

orbital physics of cold bosons and fermions in optical lattices", Nov. 19, 2007.

97. Department of Physics, **University of California, Irvine**, condensed matter seminar, "*Novel features of orbital physics of cold bosons and fermions in optical lattices*", Nov. 14, 2007.
98. Microsoft station-Q, **University of California, Santa Barbara**, "*Novel features of orbital physics of cold bosons and fermions in optical lattices*", Oct. 23, 2007.
99. Kavli Institute for Theoretical Physics, **University of California, Santa Barbara**, "*Unconventional magnetism: electron liquid crystal states and dynamic generation of spin-orbit coupling*", May 16, 2007.
100. Institute of Physics, **Chinese Academy of Sciences**, Beijing, Condensed Matter Seminar, "*Unconventional magnetism: electron liquid crystal states and dynamic generation of spin-orbit coupling*", Mar. 11, 2007.
101. Center of Advanced Studies,**Tsinghua University**, Beijing, Condensed Matter Seminar, "*Unconventional magnetism: electron liquid crystal states and dynamic generation of spin-orbit coupling*", Mar. 7, 2007.
102. Department of Physics, **University of Hong Kong**, Condensed Matter Seminar, "*Unconventional magnetism and dynamic generation of spin-orbit coupling*", Feb. 28, 2007.
103. Department of Physics, **University of Michigan**, Condensed Matter Seminar, "*Unconventional magnetism and dynamic generation of spin-orbit coupling*", Feb. 20, 2007.
104. Department of Physics, **University of Illinois at Urbana-Champaign**, Condensed Matter Seminar, "*Unconventional magnetism: electron liquid crystal states and dynamic generation of spin-orbit coupling*", Feb. 15, 2007.
105. Department of Physics, **University of Maryland**, Joint Quantum Institute seminar, "*Exploring new states of matter in the p-orbital bands of optical lattices*", Feb. 05, 2007.
106. Kavli Institute for Theoretical Physics, **University of California, Santa Barbara**, ''*Exploring new states of matter in the p-orbital bands of optical lattices*", Feb. 01, 2007.
107. Department of Physics, **Pennsylvania State University, Condensed Matter Seminar**, "*Unconventional magnetism and dynamic generation of spin-orbit coupling*", Jan. 24, 2007.
108. Department of Physics, **University of California, San Diego**, Condensed Matter Seminar, "*Pomeranchuk instability and dynamic generation of spin-orbit coupling*", Nov. 15, 2006.
109. Department of Physics, **Ohio State University**, Cold Atom Physics Seminar, "*Quantum phases of spin-3/2 fermions*", May 09, 2006.
110. Department of Physics, **University of Michigan**, FOCUS (Frontiers in Optical Coherent and Ultrafast Science) Seminar, "*Hidden symmetry and novel phases in spin-3/2 cold atomic systems*", Apr. 06, 2006.
111. Department of Physics, **Princeton University**, Condensed Matter Seminar, "*Hidden symmetry and novel phases in spin-3/2 cold atomic systems*", Jan. 23, 2006.
112. Department of Physics, **University of Illinois at Urbana-Champaign**, Condensed Matter Seminar, "*Hidden symmetry and novel phases in spin-3/2 cold atomic systems*", Dec. 08, 2005.

CONGJUN WU'S PUBLICATIONS AND PREPRINTS

Review Articles

1. Yi Li, **Congjun Wu**, *"Unconventional symmetries of Fermi liquid and Cooper pairing properties with electric and magnetic dipolar fermions"*, J. Phys.: Condens. Matter 26 493203 (2014) .
2. Xiangfa Zhou, Yi Li, Zi Cai, **Congjun Wu**, *"Unconventional states of bosons with synthetic spin-orbit coupling"*, J. Phys. B: At. Mol. Opt. Phys. 46 134001 (2013).
3. **Congjun Wu**, *"Unconventional Bose-Einstein Condensations Beyond the 'No-node' Theorem"*, Mod. Phys. Lett.**23**, 1 (2009).
4. **Congjun Wu**, *"Hidden symmetry and quantum phases in spin 3/2 cold atomic systems*", Mod. Phys. Lett. B **20**, 1707 (2006).

Commentary Articles

5. **Congjun Wu**, *"Exotic many-body physics with large-spin Fermi gases"*, Physics 3, 92 (2010).
6. **Congjun Wu**, *"Mott made easy"*, Nature Physics 8, 78485(2012).

Book Chapter

7. Wenjun Zheng, Jiangping Hu, and **Congjun Wu**, *"Dynamic stripes, RVB spin liquid and high Tc superconductivity - a game of two players"*. Chapter 10 in *"Models and methods of high-Tc superconductivity: Some frontal aspects V2, 2003"*, Nova Science Publishers, Inc.

Research Articles

1. Itinerant and unconventional magnetism

8. Yuanping Chen, Shenglong Xu, Yuee Xie, Chengyong Zhong, **Congjun Wu**, S. B. Zhang "Ferromagnetism and Wigner crystallization in Kagome graphene and its relatives", Phys. Rev. B **98**, 035135 (2018).
9. Guang Yang, Shenglong Xu, Wei Zhang, Tianxing Ma, **Congjun Wu** *"Room temperature magnetism on the zigzag edges of phosphorene nanoribbons"*, Phys. Rev. B **94**, 075106 (2016).
10. Shenglong Xu, Yi Li, **Congjun Wu**, *"Thermodynamic properties of a 2D itinerant ferromagnet - a sign-problem free quantum Monte Carlo study"*, Phys. Rev. X 5, 021032, (2015) .
11. Yi Li, E. H. Lieb, **Congjun Wu**, *"Exact Results on Itinerant Ferromagnetism in Multi-orbital Systems on Square and Cubic Lattices"*, Phys. Rev. Lett. 112, 217201 (2014) .
12. Wei-Cheng Lee, **Congjun Wu**, *"Microscopic Theory of the Thermodynamic Properties of $Sr_3Ru_2O_7$"*, Chin. Phys. Lett. 33, 037201 (2016).
13. Wei-Cheng Lee, D. P. Arovas, **Congjun Wu**, *"Quasiparticle Interference in the Unconventional Metamagnetic Compound $Sr_3Ru_2O_7$"*, Phys. Rev. B **81**, 184403 (2010).
14. Wei-cheng Lee, **Congjun Wu**, *"Spectroscopic Imaging Scanning Tunneling Microscopy as a Probe to Orbital Ordering"*, Phys. Rev. Lett. 103, 176101 (2009).
15. Wei-cheng Lee, and **Congjun Wu**, *"Theory of unconventional metamagnetic electron states in orbital band systems"*, Phys. Rev. B 80, 104438 (2009).
16. **Congjun Wu**, Kai Sun, Eduardo Fradkin, and Shou-Cheng Zhang *"Fermi liquid instabilities in the spin channel"*, Phys. Rev. B **75**, 115103 (2007).
17. **Congjun Wu** and Shou-Cheng Zhang, *"Dynamic generation of spin-orbit coupling"*, Phys. Rev. Lett. **93**, 36403 (2004).

2. Novel quantum magnetism of high symmetries

18. Zhichao Zhou, **Congjun Wu**, Yu Wang " Mott transition in the square-lattice SU(4) fermionic

Hubbard model with a π-flux gauge field", Phys. Rev. B **97**, 195122 (2018).

19. Shenglong Xu, Julio Barreiro, Yu Wang, **Congjun Wu**, "Interaction Effects with Varying N in SU(N)Symmetric Fermion Lattice Systems", Phys. Rev. Lett. **121**, 167205 (2018).
20. Zhichao Zhou, Da Wang, **Congjun Wu**, Yu Wang *"Finite-temperature valence-bond-solid transitions and thermodynamic properties of interacting SU(2N) Dirac fermions"*, Phys. Rev. B **95**, 085128 (2017).
21. Zhichao Zhou, Da Wang, Zi Yang Meng, Yu Wang, **Congjun Wu**, *"Mott insulating states and quantum phase transitions of correlated SU(2N) Dirac fermions"*, Phys. Rev. B **93**, 245157 (2016).
22. Zhichao Zhou, Zi Cai, **Congjun Wu**, Yu Wang, *"Quantum Monte Carlo simulation of thermodynamic properties of SU(2N) ultracold fermions in optical lattices"*, Phys. Rev. B 90, 235139 (2014) .
23. Da Wang, Yi Li, Zi Cai, **Congjun Wu**, *"Competing orders in the 2D half-filled SU(2N) Hubbard model through the pinning field quantum Monte-Carlo simulations"*, Phys. Rev. Lett. 112, 156403 (2014).
24. Zi Cai, Hsiang-hsuan Hung, Lei Wang, **Congjun Wu**, *"Quantum magnetic properties of the SU(2N) Hubbard model in the square lattice: a quantum Monte Carlo study"*, Phys. Rev. B 88, 125108 (2013)
25. Zi Cai, Hsiang-hsuan Hung, Lei Wang, Dong Zheng, **Congjun Wu**, *"Pomeranchuk cooling of the SU(2N) ultra-cold fermions in optical lattices"*, Phys. Rev. Lett. 110, 220401 (2013).
26. Hsiang-hsuan Hung, Yupeng Wang, **Congjun Wu**, *"Quantum magnetism of ultra-cold fermion systems with the symplectic symmetry"*, Phys. Rev. B **84**, 054406 (2011).
27. **Congjun Wu**, Jiangping Hu and Shou-Cheng Zhang, *"Quintet pairing and non-Abelian vortex string in spin-3/2 cold atomic systems"*, Int. J. Mod. Phys. B **24**, 311 (2010).
28. **Congjun Wu**, Daniel Arovas, and Hsiang-Hsuan Hung *"A Γ-matrix generalization of the Kitaev model"*, Phys. Rev. B 79, 134427 (2009).
29. Cenke Xu, and **Congjun Wu** , *"Resonating plaquette phases in large spin cold atom systems"*, Phys. Rev. B **77**, 134449 (2008).
30. Shu Chen, **Congjun Wu**, Shou-Cheng Zhang, and Yupeng Wang, *"Exact spontaneous plaquette ground states for spin-3/2 ladder models"*, Phys. Rev. B **72**, 214428 (2005).
31. **Congjun Wu**, *"Competing orders in the one dimensional spin 3/2 fermionic system"*, Phys. Rev. Lett. **95**, 266404 (2005).
32. C. H. Chern, H. D. Chen, **Congjun Wu**, Jiangping Hu, and Shou-Cheng Zhang, "*Non-Abelian Berry's phase and Chern numbers in higher spin pairing condensates*", Phys. Rev. B **69**, 214512 (2004).
33. **Congjun Wu**, Jiangping Hu, and Shou-Cheng Zhang, "*Exact SO(5) symmetry in spin 3/2 fermionic systems*", Phys. Rev. Lett. **91** , 186402 (2003).

3. Topological insulators

34. Gang Li, Werner Hanke, Ewelina M. Hankiewicz, Felix Reis, Joerg Schaefer, Ralph Claessen, **Congjun Wu**, Ronny Thomale "A new paradigm for the quantum spin Hall effect at high temperatures", arXiv:1807.09552.
35. Gu-Feng Zhang, Yi Li, **Congjun Wu**, *"The honeycomb lattice with multi-orbital structure: topological and quantum anomalous Hall insulators with large gaps"*, Phys. Rev. B 90, 075114 (2014)
36. Yi Li, Shou-Cheng Zhang, **Congjun Wu**, *"Topological insulators with SU(2) Landau levels"*, Phys. Rev. Lett. 111, 186803 (2013)
37. Yi Li, Xiangfa Zhou, **Congjun Wu**, *"2D and 3D topological insulators with isotropic and parity-*

breaking Landau levels", Phys. Rev. B **85**, 125122 (2012).

38. Yi Li, Kenneth Intriligator, Yue Yu, **Congjun Wu**, *"Isotropic Landau levels of Dirac fermions in high dimensions"*, Phys. Rev. B **85**, 085132 (2012).
39. Yi Li, **Congjun Wu**, "High-Dimensional Topological Insulators with Quaternionic Analytic Landau Levels", Phys. Rev. Lett. **110**, 216802 (2013)
40. Dong Zheng, **Congjun Wu**, Guang-Ming Zhang, *"Particle-hole symmetry and interaction effects in the Kane-Mele-Hubbard model"*, Phys. Rev. B 84, 205121 (2011).
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