Curriculum Vitae of Congjun Wu

RESEARCH AREA

My research is on the study of **new states of matter** and their **organizing principles** in condensed matter and cold atom systems. It includes superconductivity, magnetism, orbital physics, topological states, 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 (deceased).
- 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, University of California, Santa Barbara.

HONORS and AWARDS

- American Physical Society (**APS**) Fellowship, nominated by Division of Condensed Matter Physics, APS (2018).
  Citation: "For research in helical edge liquids of topological insulators, itinerant magnetism, novel states of matter including cold fermions with high symmetries, orbital physics in optical lattices, spin-orbit coupled Bose-Einstein condensates, and for work on the quantum Monte-Carlo sign problem".
- Air Force Office of Scientific Research (AFOSR), Young Investigator Award, 2011-2014.
- Alfred P. Sloan Research Fellowship, 2008.
- *"Outstanding Young Researcher Award"* of Overseas Chinese Physics Association, 2008.
- The most influential paper award from Chinese Physics Society 2013 for *Wu, Mondragon-Shem, and Zhou, Chin. Phys. Lett. 28, 086104 (2011)* (This paper is one of two earliest works theoretically studying spin-orbit coupled BEC").

CITATION RECORDS

- Web of Science: Total citations **5646**, **H-index:** 39
- Researcher ID: http://www.researcherid.com/rid/L-1750-2015
- Google Scholar: https://scholar.google.com/citations?user=RVhTP8oAAAAJ&hl=en
  Total citations **7778**.

PH. D. STUDENTS CULTIVATED

1. Dr. Yi Li, Ph.D. 2013.
   She is currently an Assistant Professor at **Johns Hopkins University** since 07/2016. She was awarded the Sloan Research Fellowship in 2018, and the NSF Career Award in 2019.

She did postdoctoral research at **Princeton Center of Theoretical Sciences** from 07/2013 to 06/2016.

2. Dr. Shenglong Xu, Ph. D. 2016.
   He is currently a Research Assistant Professor from Department of Physics, **Texas A&M University** since 01/ 2020. He was a postdoctoral researcher at **University of Maryland** from 09/2016 - 12/2019.
3. Dr. Wang Yang, Ph. D. 2017.
   Currently a postdoctoral researcher at **University of British Columbia**, working with Prof. Ian Affleck.
4. Dr. Hsiang-Hsuan Hung, Ph. D. 2011.
   He did postdoctoral research at **UIUC** and **UT, Austin**, and is currently in industry.

POSTDOCTORAL RESEARCHERS SUPERVISED

- Dr. Wei-cheng Lee (08/2008-08/2010), Ph. D 2008 from UT Austin.
  He is currently an Assistant Professor at **Binghamton University, SUNY**.
- Dr. Zi Cai (09/2010–08/2012), Ph.D 2010 from Institute of Physics, Chinese Academy of Sciences. He has been an Assistant Professor at **Shanghai Jiaotong University** since Sept 2016.
- Dr. Da Wang (09/2012–08/2014), Ph. D. 2012 from Nanjing University. He has been an Associate Professor at **Nanjing University**, China since 2015.
- Dr. Jianda Wu (09/2014–08/2017), Ph. D 2014 from Rice University. He has been an Associate Professor at **T. D. Lee Insitute, Shanghai Jiaotong University**, China since 2018.
- Dr. Lunhui Hu (09/2018 –04/2020), Ph. D. 2018 from Zhejiang University. He is currently a postdoctoral researcher at Penn. State University.

10 CAREER SIGNIFICANT PUBLICATIONS

1. Shenglong Xu, Congjun Wu, *"Space-time crystal and space-time group*, Phys. Rev. Lett. **120**, 096401 (2018).
   The **link**: https://doi.org/10.1103/PhysRevLett.120.096401
2. Zhong-chao Wei, Congjun Wu, Yi Li, Shi-Wei Zhang, Tao Xiang, *"Majorana Positivity and the Fermion sign problem of Quantum Monte Carlo Simulations"*, Phys. Rev. Lett. **116**, 250601 (2016).
   The **link**: https://doi.org/10.1103/PhysRevLett.116.250601
3. Shenglong Xu, Yi Li, Congjun Wu, *"Sign-Problem-Free Quantum Monte Carlo Study on Thermodynamic Properties and Magnetic Phase Transitions in Orbital-Active Itinerant Ferromagnets"*, Phys. Rev. X **5**, 021032, (2015).
   The **link**: https://doi.org/10.1103/PhysRevX.5.021032
4. 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).
   The **link**: https://doi.org/10.1103/PhysRevLett.112.217201
5. Yi Li, Congjun Wu, "High-Dimensional Topological Insulators with Quaternionic Analytic Landau Levels", Phys. Rev. Lett. **110**, 216802 (2013).
   The **link**: https://doi.org/10.1103/PhysRevLett.110.216802
6. Congjun Wu, Doron Bergman, Leon Balents, and S. Das Sarma, "Flat bands and Wigner crystallization in the honeycomb optical lattice", Phys. Rev. Lett. **99**, 70401 (2007).
   Times Cited: 253. The **link**: https://doi.org/10.1103/PhysRevLett.99.070401
7. Congjun Wu, B. Andrei Bernevig, and Shou-Cheng Zhang, "*The helical liquid and the edge of quantum spin Hall systems*", Phys. Rev. Lett. **96**, 106401(2006).
   Times Cited 531. The **link**: https://doi.org/10.1103/PhysRevLett.96.106401
8. Congjun Wu, Jiangping Hu, and Shou-Cheng Zhang, "*Exact SO(5) symmetry in spin 3/2 fermion-*

ic systems", Phys. Rev. Lett. **91** , 186402 (2003).
Times Cited 218. The **link**: https://doi.org/10.1103/PhysRevLett.91.186402

9. **Congjun Wu** and Shou-Cheng Zhang, *"Dynamic generation of spin-orbit coupling"*, Phys. Rev. Lett. **93**, 36403 (2004).
The **link**: https://doi.org/10.1103/PhysRevLett.93.036403
10. Congjun Wu, Ian Mondragon Shem, and Xiang-Fa Zhou, *"Unconventional Bose-Einstein condensations from spin-orbit coupling"* , Chin. Phys. Lett. 28, 097102 (2011) (arXiv:0809.3532)
Times Cited 241. The **link**: http://stacks.iop.org/0256-307X/28/i=9/a=097102

SCIENTIFIC DUTIES

- Serve in the Editorial Broad for *"Chinese Physics Letters"* since 2015.
- 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*.

PHYSICS COLLOQUIA (14)

1. Online talk organized by **Editorial Board of Frontiers of Physics**, *"Unification of orbital active honeycomb material"*, Aug. 5, 2020.
2. T. D. Lee Institute, **Shanghai Jiaotong University**, *"Interaction and Correlation Aspects of Ferromagnetism"*, July 7, 2020.
3. Department of Physics, **University of California, San Diego**, *"Symmetry and Correlation Aspect of Quantum Dynamics"*, April 18, 2019.
4. Department of Physics, **Simon Fraser University**, *"Novel orbital physics – Unconventional BEC and Curie-Weiss Metal states in optical lattices"*, Nov. 17, 2017.
5. Department of Physics, **University of British Columbia**, *"Novel orbital physics – Unconventional BEC and Curie-Weiss Metal states in optical lattices"*, Nov. 16, 2017.
6. Department of Physics, **University of California, San Diego**, *"Novel orbital physics – Unconventional BEC and Curie-Weiss Metal states in optical lattices"*, Nov. 9, 2017.
7. 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.
8. Department of Physics, **Huazhong University of Science & Technology**, Physics Colloquia, "*New progress on itinerant ferromagnetism and the Curie-Weiss Metal State*", Jun 23, 2016.
9. Department of Physics, **University of Texas at Dallas**, Physics Colloquia, "*Unconventional orbital phases with cold atoms* ", Sept, 2015.
10. Department of Physics, **Tulan University**, Physics Colloquia, "*Exact results on itinerant ferromagnetism*", Oct 22, 2014.
11. Department of Physics, **University of Houston**, Physics Colloquia, "*Unconventional metamagnetism and orbital ordering in transition metal oxides* ", March 27, 2012.
12. Institut fur Laserphysik, **University of Hamburg**, Germany, Unconventional Bose-Einstein condensation beyond the no-node paradigm", Jan. 31, 2012.
13. Department of Physics, **Washington State University**, Physics Colloquia, "*Orbital Phases of cold atoms: unconventional BEC, ferromagnetism, and unconventional Cooper pairing*", Nov. 17, 2009.
14. Department of Physics, **Washington University in St. Louis**, Physics Colloquia, "*Unconventional magnetism and dynamic generation of spin-orbit coupling*", Jan. 17, 2007.

INVITED CONFERENCE TALKS (29)

15. **Emergent phenomena in ultracold atoms: topology, interaction, and dynamics** at Kavli Institute for Theoretical Science, Beijing, *"Symmetry and Correlation Aspect of Quantum Dynamics"*, June 13 2019, invited talk.
16. **Memorial workshop for Shoucheng Zhang** at Tsinghua University, "Quarternionic analyticity and high dimensional topological matter", June 10 2019, invited talk.
17. **Memorial workshop for Shoucheng Zhang** at Stanford University, "Application of the symmetry principle in condensed matter physics", May 4, 2019, invited talk.
18. **Workshop for Topological Quantum Information** at Shanghai Tech University, "Orbital-active honeycomb material", Shanghai, Nov 19-20, invited talk.
19. **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.
20. **AFOSR Program Review**, "*Quantum dynamics: Spact-time Crystal and Bethe String states"*, Arlington, Jun 18-22.
21. **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.
22. **"Quantum material workshop"**, Fudan University, "*Quantum dynamics: Spact-time Crystal and Bethe String states"*, Shanghai, April 20 -22, 2018.
23. **"Sign 2017, International workshop in the sign problem in QCD and beyond"**, "Fermion positivity and sign problem", University of Washington, Seattle, March 2017.
24. **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.
25. **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.
26. **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.
27. **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.
28. **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.
29. **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.
30. **The 6th International Symposium on Cold Atom Physics**, "Quaternionic states of matter from synthetic gauge fields", Taiyuan, China, Jun 16, 2014.
31. **The 7th Cross-Strait and International Conference on Quantum Manipulation**, title TBA, Institute of Physics, Chinese Academy of Sciences, Beijing, June 28- 30, 2013.
32. **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.
33. **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.

34. **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.
35. **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.
36. **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.
37. **Exotic Insulating Phases of Matter**, The Johns Hopkins University, "*Topological orbital states with cold atoms"*, Jan. 14-16, 2010.
38. **Canadian Institute for Advanced Research, Cold Atoms Meeting**, Halifax, Canada "*Novel orbital physics with fermions in optical lattices*, August 12-16, 2009.
39. **American Physical Society March Meeting 2009**, Pittsburgh, PA, "*Novel orbital physics with fermions in optical lattices*, Mar. 20, 2009.
40. **New Directions in Low-Dimensional Electron Systems (Conference)**, Kavli Institute for Theoretical Physics, University of California, Santa Barbara, Feb 23, 2009.
41. **The 39th Winter Colloquium on the PHYSICS OF QUANTUM ELECTRONICS**, "*Novel orbital physics with fermions in optical lattices*. Jan. 8, 2009.
42. **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.
43. 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 (81)

44. Department of Physics, **Shanghai-Tech University**, *"Interaction and Correlation Aspects of Ferromagnetism"*, July 7, 2020.
45. Department of Physics, **University of California, San Diego**, *"Unification of orbital-active honeycomb materials"*, Nov. 27, 2019.
46. Department of Physics, **University of Chicago**, *"Symmetry and Correlation Aspect of Quantum Dynamics"*, May 28, 2019.
47. Department of Physics, **University of California, Berkeley**, "*Orbital-active Honeycomb Materials"*, April 30, 2019.
48. Westlake University, Hangzhou, China, "*Quantum Dynamics – Space-time group and Bethe String states"*, Nov. 23, 2018.
49. Department of Physics, **University of Buffalo**, SUNY, "*Quantum Dynamics – Space-time group and Bethe String states"*, Sept 18, 2018.
50. **Institute of Physics**, Chinese Academy of Sciences, "*Topological superconductivity with spin-$\frac{3}{2}$ half-Heusler semi-metal beyond triplet pairing"*, Sept. 7, 2018.
51. **Wuhan Institute of Physics and Mathematics**, Chinese Academy of Sciences, "*Quantum Dynamics – Space-time group and Bethe String states"*, Sept. 7, 2018.
52. **Chern Institute of Mathematics**, Nanka University, "*Quantum Dynamics – Space-time group and Bethe String states"*, Aug 12, 2018.
53. **Department of Physics**, Tsinghua University, "*Large gap 2D topological insuator"*, Aug 15, 2018.
54. **Center for Advanced Studies**, Tsinghua University, "*Quantum Dynamics -Space-time crystal and Bethe String states*", Aug 9, 2018.
55. Center for Quantum Materials, **Peking University**, "*Quantum Dynamics - Space-time Crystal*

and Bethe String States", Aug 2,2018.

56. Department of Physics, **Shanghai University of Technology**, "*Quantum Dynamics - Space-time Crystal and Bethe String States"*, July 17, 2018.
57. Department of Physics, **Huazhong University of Science & Technology**, "*Quantum Dynamics -Space-time crystal and Bethe String states*", July 3, 2018.
58. Department of Physics, **Zhejiang University**, "*New development of itinerant electrons: Curie-Weiss metal and spin-orbit ordering*", June 7, 2018.
59. Department of Physics, Shanghai Jiaotong University, "*Topological superconductivity with spin-$\frac{3}{2}$ half-Heusler semi-metal beyond triplet pairing"*, June 4, 2018.
60. Center for Quantum Materials, **Peking University**, "*Topological superconductivity with spin-$\frac{3}{2}$ half-Heusler semi-metal beyond triplet pairing"*, Dec 21, 2017.
61. Department of Physics, **East China Normal University**, "*Novel orbital physics – unconventional BEC and Curie-Weiss Metal states in optical lattices*", Dec 15, 2017.
62. Department of Physics, **Fudan University**, "*Enhance topological gap in 2D materials to the scale of atomic spin-orbit coupling*", Dec 14, 2017.
63. Department of Physics, **Fudan University**, "*Unconventional magnetism and spontaneous spin-orbit ordering*, July 2017.
64. Department of Physics, **Beijing Normal University**, "*Unconventional magnetism and spontaneous spin-orbit ordering*, July, 2017.
65. **"Majorana flatband, magnetic domains, and Septet superconductivity"**, Majorana workshop, Shanghai Jiaotong University, Jun 2017.
66. Department of Physics, **Johns Hopkins University**, "*Unconventional magnetism and spontaneous spin-orbit ordering*, March 29, 2017.
67. Condensed Matter Theory Center, **University of Maryland**, "*Orbital phases in optical lattices and solids: unconventional BEC and large gap topological states*, March 28, 2017.
68. Department of Physics, **University of California, San Diego**, "*Unconventional magnetism and spontaneous spin-orbit ordering*, Jan, 2017.
69. Department of Physics, **Purdue University**, "*Unconventional orbital phases with cold atoms* ", March 03, 2016.
70. Department of Physics, **University of British Columbia**, "Novel Sp(2N)/SU(2N) quantum magnetism and Mott physics - large spins are different", Nov 16, 2015.
71. 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.
72. **INT workshop, University of Washington**, "Novel Sp(2N)/SU(2N) quantum magnetism and Mott physics - large spins are different", March 25, 2015.
73. **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.
74. 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.
75. 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.
76. Department of Physics, **Boston College**, "Novel Sp(2N)/SU(2N) quantum magnetism and Mott physics – large spin is different", Oct. 15, 2014.
77. Department of Physics, **Harvard University**, "Quaternionic analytic Landau level in 3D", Oct 17, 2013.
78. Workshop for celebration Prof. Shou-cheng Zhang's 50 birthday, "Quaternionic BEC and Lan-

dau levels", March 23-25, 2013.

79. KITP workshop "Frustrated Magnetism and quantum spin liquids" "Power-law Correlated 2D SU(6) Quantum Paramagnets", Sept. 18, 2012.
80. Workshop on "Topological insulators and superconductors", "Unconventional magnetism in transition metal oxides", July, 2012.
81. Department of Physics, **UCSD**, "Quantum Monte-Carlo simulation of novel 2D quantum magnetism with power-law correlations", Nov 21, 2012.
82. Department of Physics, **The Florida State University**, "Isotropic Landau Levels of Relativistic and Non-Relativistic Fermions in 3D Flat Space", September 14, 2012.
83. Department of Physics, **University of British Columbia**, Canada, *"Isotropic Landau Levels of Relativistic and Non-Relativistic Fermions in 3D Flat Space"*, March 20, 2012.
84. Department of Physics, **University of California, Irvine**, "*Unconventional metamagnetism and orbital ordering in transition metal oxides* ", Feb 8, 2012.
85. Department of Physics, **Tsinghua University**, *"Unconventional Bose-Einstein condensation beyond the no-node paradigm"*, Aug 23, 2011.
86. Department of Physics, **University of Science and Technology of China**, "*Unconventional metamagnetic transition and orbital ordering in transition metal oxides*", July 29, 2010.
87. Key Lab of Quantum Information **University of Science and Technology of China**, "*Unconventional Bose-Einstein condensations beyond the no-node paradigm*", July 25, 2010.
88. Center for quantum information, **Tsinghua University**, *"Unconventional Bose-Einstein condensation beyond the no-node paradigm"*, July 19, 2011.
89. Department of Physics, **Wuhan University**, *"Unconventional metamagnetism and orbital ordering in transition metal oxides"*, July 5, 2011.
90. Department of Physics, **Wuhan University**, *"Novel p-orbital physics in optical lattices - unconventional BECs, exotic band and Mott insulators of fermions"*, July 4, 2011.
91. Center of Advanced Study, **Tsinghua University**, *"Novel orbital physics in the p-band"*, Jun. 28, 2011.
92. **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"*.
93. Department of Physics, **University of Texas, Austin**. March 3, 2011, '*Unconventional metamagnetic transition in the t_{2g} orbital system of $Sr_3Ru_2O_7$*.
94. Department of Physics, **Rice University**, "*Novel orbital physics with cold atoms – Unconventional BEC, Ferromagnetism, and f-wave Cooper pairing states*", Nov. 2, 2010.
95. **Institute of Physics, Chinese Academy of Sciences**, "*Unconventional metamagnetic transition in the t_{2g} orbital system of $Sr_3Ru_2O_7$*", Aug 17, 2010.
96. **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.
97. **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.
98. **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.
99. 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.
100. 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.
101. Department of Physics, **University of California, San Diego** , condensed matter seminar, "*Novel Orbital Physics with Cold atoms in Optical lattices*" , May 27, 2009.

102. Department of Physics, **California Institute of Technology**, condensed matter seminar, "*Novel Orbital Physics with Cold atoms in Optical lattices*" , Nov 21, 2008.
103. Department of Physics, **University of California, Riverside**, condensed matter seminar, "*Novel Orbital Physics with Cold atoms in optical lattices*", Oct. 29, 2008.
104. Department of Physics, **University of California, Los Angels**, condensed matter seminar, "*Novel Orbital Physics with Cold atoms in Optical lattices*" , Oct 22, 2008.
105. Department of Physics, **Stanford University**, condensed matter seminar, "Novel orbital Physics with Cold atoms in Optical Lattices", Oct. 16, 2008.
106. Department of Physics, **University of Michigan**, condensed matter seminar, "*Orbital Physics with Cold atom optical lattices*", Sept. 16, 2008.
107. Department of Physics, **University of California, Davis**, condensed matter seminar, "*Novel Orbital Physics with Cold Atoms in Optical Lattices*", April 17, 2008.
108. 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.
109. 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.
110. Microsoft station-Q, **University of California, Santa Barbara**, "*Novel features of orbital physics of cold bosons and fermions in optical lattices*", Oct. 23, 2007.
111. 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.
112. 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.
113. 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.
114. Department of Physics, **University of Hong Kong**, Condensed Matter Seminar, "*Unconventional magnetism and dynamic generation of spin-orbit coupling*", Feb. 28, 2007.
115. Department of Physics, **University of Michigan**, Condensed Matter Seminar, "*Unconventional magnetism and dynamic generation of spin-orbit coupling*", Feb. 20, 2007.
116. 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.
117. 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.
118. 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.
119. Department of Physics, **Pennsylvania State University, Condensed Matter Seminar**, "*Unconventional magnetism and dynamic generation of spin-orbit coupling*", Jan. 24, 2007.
120. Department of Physics, **University of California, San Diego**, Condensed Matter Seminar, "*Pomeranchuk instability and dynamic generation of spin-orbit coupling*", Nov. 15, 2006.
121. Department of Physics, **Ohio State University**, Cold Atom Physics Seminar, "*Quantum phases of spin-3/2 fermions*", May 09, 2006.
122. 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.
123. Department of Physics, **Princeton University**, Condensed Matter Seminar, "*Hidden symmetry and novel phases in spin-3/2 cold atomic systems*", Jan. 23, 2006.

124. 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. **Congjun Wu**, "*Quaternion, harmonic oscillator, and high-dimensional topological states*", arxiv:1910.09678, for a memorial volume for Professor Shoucheng Zhang, to be published.
8. Wenjun Zheng, Jiangping Hu, and **Congjun Wu**, *"Dynamic stripes, RVB spin liquid and high T_c 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. Symmetry and Correlation Aspect of Quantum Dynamics

9. Zhe Wang, Jianda Wu, Wang Yang, Anup Kumar Bera, Dmytro Kamenskyi, A.T.M. Nazmul Islam, Shenglong Xu, Joseph Matthew Law, Bella Lake, **Congjun Wu**, Alois Loidl, "*Experimental Observation of Bethe Strings*", Nature **554**, 219 (2018).
10. Shenglong Xu, **Congjun Wu**, *"Space-time crystal and space-time group symmetry*, Phys. Rev. Lett. **120**, 096401 (2018).
11. Wang Yang, Jianda Wu, Shenglong Xu, Zhe Wang, **Congjun Wu**, *"Quantum spin dynamics of the axial antiferromagnetic spin-1/2 XXZ chain in a longitudinal magnetic field"*, Phys. Rev. B **100**, 184406 (2019).

2. Mathematical Principle of Quantum Monte-Carlo sign-problem and applications

12. Tianxing Ma, Da Wang, **Congjun Wu**, "Doping-driven Antiferromagnetic Insulator - Superconductor Transition: a Quantum Monte Carlo Study", arXiv:1806.03652 .
13. Zhong-chao Wei, **Congjun Wu**, Yi Li, Shi-Wei Zhang, Tao Xiang, *"Majorana Positivity and the Fermion sign problem of Quantum Monte Carlo Simulations"*, Phys. Rev. Lett. **116**, 250601 (2016).
14. **Congjun Wu** and Shou-Cheng Zhang, "*A sufficient condition for the absence of the sign problem in the fermionic quantum Monte-Carlo algorithm*", Phys. Rev. B **71**, 155115 (2005).
15. Sylvain Capponi, **Congjun Wu**, and Shou-Cheng Zhang, "*Current carrying ground state in a bi-layer model*", Phys. Rev. B **70**, 220505(R), (2004).

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