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Research Area

Theoretical condensed matter physics: strongly correlated systems, topological quantum phases of matter, many-body localization and thermalization, entanglement and tensor network.

Education & Training

- B.Sc. Physics, Nanjing University (2008)
- Ph.D. Physics, Tsinghua University (2013)
- Postdoc, University of California, Santa Barbara (2013 - 2016)
- Postdoc, Harvard University (2016 - 2018)

Employment

- Assistant Professor, University of California, San Diego (2018 -)

Publications

Selected Articles:

- [1] Yi-Zhuang You, Andreas W. Ludwig, Cenke Xu. *Sachdev-Ye-Kitaev model and thermalization on the boundary of many-body localized fermionic symmetry protected topological states*. Phys. Rev. B **95** (16) 165136 (2017).
- [2] Yi-Zhuang You, Xiao-Liang Qi, Cenke Xu. *Entanglement holographic mapping of many-body localized system by spectrum bifurcation renormalization group*. Phys. Rev. B **93**, 104205 (2016).
- [3] Yi-Zhuang You, Cenke Xu. *Interacting topological insulator and emergent grand unification theory*. Phys. Rev. B **91**, 125147 (2015).
- [4] Yi-Zhuang You, Cenke Xu. *Symmetry-protected topological states of interacting fermions and bosons*. Phys. Rev. B **90**, 245120 (2014).
- [5] Yi-Zhuang You, Xiao-Gang Wen. *Projective non-Abelian statistics of dislocation defects in a Z_N rotor model*. Phys. Rev. B **86**, 161107(R) (2012).
- [6] Yi-Zhuang You, Itamar Kimchi, Ashvin Vishwanath. *Doping a spin-orbit Mott insulator: topological superconductivity from the Kitaev-Heisenberg model and possible applications to $(\text{Na}_2/\text{Li}_2)\text{IrO}_3$* . Phys. Rev. B **86**, 085145 (2012).
- [7] Yi-Zhuang You, Fan Yang, Su-Peng Kou, Zheng-Yu Weng. *Phase diagram and a possible unified description of intercalated iron selenide superconductors*. Phys. Rev. Lett. **107**, 167001 (2011).

Book Chapters:

- [8] Yi-Zhuang You, Zheng-Yu Weng. *Coexisting Itinerant and Localized Electrons*. In: *Iron-Based Superconductivity*, P. D. Johnson ed., Springer International Publishing, Springer Series in Material Science **211**, Chap. 10, p. 377-408 (2015).

Additional Articles:

- [9] Yi-Zhuang You, Yin-Chen He, Ashvin Vishwanath, Cenke Xu. From bosonic topological transition to symmetric fermion mass generation. *Phys. Rev. B* **97**(12), 125112 (2018).
- [10] Yi-Zhuang You, Yin-Chen He, Cenke Xu, Ashvin Vishwanath. *Symmetric fermion mass generation as deconfined quantum criticality*. *Phys. Rev. X* **8**(1), 011026 (2018).
- [11] Yi-Zhuang You, Zhao Yang, Xiao-Liang Qi. *Machine learning spatial geometry from entanglement features*. *Phys. Rev. B* **97**(4), 045153 (2018).
- [12] Yan Qi Qin, Yuan-Yao He, Yi-Zhuang You, Zhong-Yi Lu, Arnab Sen, Anders W Sandvik, Cenke Xu, Zi Yang Meng. *Duality between the deconfined quantum-critical point and the bosonic topological transition*. *Phys. Rev. X* **7**(3), 031052 (2017).
- [13] Xiao-Liang Qi, Zhao Yang, Yi-Zhuang You. *Holographic coherent states for random tensor networks*. *JHEP* 2017(8), 60 (2017).
- [14] Zhen Bi, Chao-Ming Jian, Yi-Zhuang You, Kelly Ann Pawlak, Cenke Xu. *Instability of the non-Fermi-liquid state of the Sachdev-Ye-Kitaev model*. *Phys. Rev. B* **95**(20), 205105 (2017).
- [15] Kevin Slagle, Zhen Bi, Yi-Zhuang You, Cenke Xu. *Out-of-time-order correlation in marginal many-body localized systems*. *Phys. Rev. B* **95**(16), 165136 (2017).
- [16] Yuan-Yao He, Han-Qing Wu, Yi-Zhuang You, Cenke Xu, Zi Yang Meng, Zhong-Yi Lu. *Quantum critical point of Dirac fermion mass generation without spontaneous symmetry breaking*. *Phys. Rev. B* **94**(24), 241111 (2016).
- [17] Han-Qing Wu, Yuan-Yao He, Yi-Zhuang You, Tsuneya Yoshida, Norio Kawakami, Cenke Xu, Zi Yang Meng, Zhong-Yi Lu. *Visualizing a bosonic symmetry protected topological phase in an interacting fermion model*. *Phys. Rev. B* **94**, 165121 (2016).
- [18] Zhen Bi, Yi-Zhuang You, Cenke Xu. *Exotic quantum critical point on the surface of three-dimensional topological insulator*. *Phys. Rev. B* **94**(2), 024433 (2016).
- [19] Kevin Slagle, Yi-Zhuang You, Cenke Xu. *Disordered XYZ spin chain simulated using the spectral bifurcation renormalization group*. *Phys. Rev. B* **94**, 014205 (2016).
- [20] Xue-Yang Song, Yi-Zhuang You, Leon Balents. *Low-energy spin dynamics of the honeycomb spin liquid beyond the Kitaev limit*. *Phys. Rev. Lett.* **117**, 037209 (2016).
- [21] Zhen Bi, Yi-Zhuang You, Cenke Xu. *“Self-dual” quantum critical point on the surface of 3d topological insulator*. *Phys. Rev. B* **94**, 024433 (2016).
- [22] Yizhi You, Yi-Zhuang You. *Geometric defects in bosonic symmetry protected topological phases*. *Phys. Rev. B* **93**, 245135 (2016).
- [23] Yizhi You, Yi-Zhuang You. *Stripe melting and a transition between weak and strong symmetry protected topological phases*. *Phys. Rev. B* **93**, 195141 (2016).

- [24] Yuan-Yao He, Han-Qing Wu, Yi-Zhuang You, Cenke Xu, Zi Yang Meng, Zhong-Yi Lu. *Bona fide interaction-driven topological phase transition in correlated SPT states*. Phys. Rev. B **93**, 115150 (2016).
- [25] Yi-Zhuang You, Zhen Bi, Dan Mao, Cenke Xu. *Quantum phase transitions between bosonic symmetry-protected topological states without sign problem: Nonlinear sigma model with a topological term*. Phys. Rev. B **93**, 125101 (2016).
- [26] Cenke Xu, Yi-Zhuang You. *Self-dual quantum electrodynamics as boundary state of the three dimensional bosonic topological insulator*. Phys. Rev. B **92**, 220416 (2015).
- [27] Han-Qing Wu, Yuan-Yao He, Yi-Zhuang You, Cenke Xu, Zi Yang Meng, Zhong-Yi Lu. *Quantum Monte Carlo study of strange correlator in interacting topological insulators*. Phys. Rev. B **92**, 165123 (2015).
- [28] Yi-Zhuang You, Cenke Xu. *Topological orders with global gauge anomalies*. Phys. Rev. B **92**, 054410 (2015).
- [29] Kevin Slagle, Yi-Zhuang You, Cenke Xu. *Exotic quantum phase transitions of strongly interacting topological insulators*. Phys. Rev. B **91**, 115121 (2015).
- [30] Yi-Zhuang You, Zhen Bi, Alex Rasmussen, Meng Cheng, Cenke Xu. *Bridging fermionic and bosonic short range entangled states*. New J. Phys. **17**, 075010 (2015).
- [31] Cenke Xu, Yi-Zhuang You. *Bosonic short-range entangled states beyond group cohomology classification*. Phys. Rev. B **91**, 054406 (2015).
- [32] Zhen Bi, Yi-Zhuang You, Cenke Xu. *Anyon and loop braiding statistics in field theories with topological Θ term*. Phys. Rev. B **90**, 081110(R) (2014).
- [33] Yi-Zhuang You, Zhong Wang, Jeremy Oon, Cenke Xu. *Topological number and fermion Green's function of strongly interacting topological superconductors*. Phys. Rev. B **90**, 060502(R) (2014).
- [34] P. Zhang, P. Richard, T. Qian, X. Shi, J. Ma, L.-K. Zeng, X.-P. Wang, E. Rienks, C.-L. Zhang, P. Dai, Y.-Z. You, Z.-Y. Weng, X.-X. Wu, J. P. Hu, H. Ding. *Observation of momentum-confined in-gap impurity state in $Ba_{0.6}K_{0.4}Fe_2As_2$: evidence for antiphase s_{\pm} pairing*. Phys. Rev. X **4**, 301001 (2014).
- [35] Yi-Zhuang You, Zhen Bi, Alex Rasmussen, Kevin Slagle, Cenke Xu. *Wave function and strange correlator of short range entangled states*. Phys. Rev. Lett. **112**, 247202 (2014).
- [36] Yi-Zhuang You, Zheng-Yu Weng. *Two-fluid description for iron-based superconductors*. New J. Phys. **16**, 023001 (2014).
- [37] Yi-Zhuang You, Chao-Ming Jian, Xiao-Gang Wen. *Synthetic topological degeneracy by anyon condensation*. Phys. Rev. B **87**, 045106 (2013).
- [38] Yi-Zhuang You, Zhu Chen, Xiao-Qi Sun, Hui Zhai. *Superfluidity of bosons in Kagome lattice with frustration*. Phys. Rev. Letts. **109**, 265302 (2012).
- [39] Xiaodong Zhou, Peng Cai, Aifeng Wang, Wei Ruan, Cun Ye, Xianhui Chen, Yizhuang You, Zheng-Yu Weng, Yayu Wang. *Evolution from unconventional spin density wave to superconductivity and a novel gap-like phase in $NaFe_{1-x}Co_xAs$* . Phys. Rev. Letts. **109**, 037002 (2012).
- [40] Itamar Kimchi, Yi-Zhuang You. *Kitaev-Heisenberg- J_2 - J_3 model for the iridates A_2IrO_3* . Phys. Rev. B **84**, 180407(R) (2011).

- [41] Yi-Zhuang You, Hong Yao, Dung-Hai Lee. *The spin excitations of the block-antiferromagnetic state in $K_{0.8}Fe_{1.6}Se_2$* . Phys. Rev. B **84**, 020406(R) (2011).
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- [43] Chen-Ning Yang, Yi-Zhuang You. *One-dimensional w-component fermions and bosons with repulsive delta function interaction*. Chinese Phys. Letts. **28**(2), 020503 (2010).
- [44] Yi-Zhuang You. *Ground state energy of one dimensional δ -function interacting bose and Fermi gas*. Chinese Phys. Lett. **27**(8), 080305 (2010).
- [45] Yizhuang You, Xiaohan Wang, Sihui Wang, Yonghua Pan, Jin Zhou. *A new method to demonstrate frustrated total internal reflection in the visible band*. Am. J. Phys. **76**(3), 224-228 (2008).

Preprints:

- [46] Nvsen Ma, Guang-Yu Sun, Yi-Zhuang You, Cenke Xu, Ashvin Vishwanath, Anders W Sandvik, Zi Yang Meng. *Dynamical signature of fractionalization at the deconfined quantum critical point*. arXiv:1803.01180 (2018).
- [47] Xiaochuan Wu, Xiao Chen, Chao-Ming Jian, Yi-Zhuang You, Cenke Xu. *A candidate theory for the “strange metal” phase at finite energy window*. arXiv:1802.04293 (2018).
- [48] Zhihuang Luo, Yi-Zhuang You, Jun Li, Chao-Ming Jian, Dawei Lu, Cenke Xu, Bei Zeng, Raymond Laflamme. *Observing Fermion pair instability of Sachdev-Ye-Kitaev model on a quantum spin simulator*. arXiv:1712.06458 (2017).
- [49] Chao-Ming Jian, Alex Rasmussen, Yi-Zhuang You, Cenke Xu. *Emergent symmetry and tricritical points near the deconfined quantum critical point*. arXiv:1708.03050 (2017).
- [50] Zheng Bi, Ruixing Zhang, Yi-Zhuang You, Andrea Young, Leon Balents, Chao-Xing Liu, Cenke Xu. *Bilayer graphene as a platform for bosonic symmetry protected topological states*. arXiv: 1602.03190 (2016).
- [51] Kevin Slagle, Zhen Bi, Yi-Zhuang You, Cenke Xu. *Many-body localization of symmetry protected topological states*. arXiv:1505.05147 (2015).
- [52] Yi-Zhuang You, Meng Cheng. *Measuring modular matrices by shearing lattices*. arXiv:1502.03192 (2015).
- [53] Meng Cheng, Zhen Bi, Yi-Zhuang You, Zheng-Cheng Gu. *Towards a complete classification of symmetry-protected phases for interacting fermions in two dimensions*. arXiv: 1501.01313 (2015).
- [54] Yi-Zhuang You, Yoni BenTov, Cenke Xu. *Interacting topological superconductors and possible origin of $16n$ chiral fermions in the Standard Model*. arXiv: 1402.4151 (2014).
- [55] Fangzhou Liu, Zhenghan Wang, Yi-Zhuang You, Xiao-Gang Wen. *Modular transformations and topological orders in two dimensions*. arXiv: 1303.0829 (2013).

Services

- Referee for APS Journals (Phys. Rev. Lett., Phys. Rev. X, Phys. Rev. B), American Journal of Physics, and Chinese Physics Letters.

- Co-organizer for “Artificial Intelligence and Quantum Physics” workshop, Nanjing University, Dec. 2017