Lei Wang

Curriculum Vitae

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Personal data

Day of Birth	1st December 1983	Nationality	China
Sex	Male	Erdős #	2 (via Gergely Harcos)
Google Scholar	https://t.ly/wf7so		

Academic Positions

2019.9–Present **Professor**, *Institute of Physics, Chinese Academy of Sciences*, Beijing, China.

2016.3–2019.8 **Assistant Professor**, *Institute of Physics, Chinese Academy of Sciences*, Beijing, China.

2015.6 – 2016.2 **Senior research assistant (Oberassistent I)**, *ETH*, Zurich, Switzerland.

2011.9 – 2015.5 **Postdoctoral research assistant**, *ETH*, Zurich, Switzerland.
Supervisor: Prof. Dr. Matthias Troyer

Education

2006.9–2011.7 **PhD in Physics**, *Institute of Physics, Chinese Academy of Sciences*, Beijing, China.
Supervisors: Prof. Xincheng Xie and Prof. Xi Dai

2002.9–2006.6 **BSc in Physics**, *Nanjing University*, Nanjing, China.

Interests

Machine Learning	Deep learning and its application in scientific discoveries
Computation Physics	New algorithms for strongly correlated quantum matter
Quantum Computing	Physical implementation, quantum algorithms and applications

Organized events

August 2016 **International Summer School on Computational Approaches for Quantum Many Body Systems**, *University of Chinese Academy of Sciences*, Beijing, China.

July 2017 **Machine Learning and Many-Body Physics School and Conference**, *Kavli Institute for Theoretical Sciences*, Beijing, China.

July 2018 **Conference on Machine Learning and Physics**, *Tsinghua University*, Beijing, China.

May 2019 **Spring School on Deep Learning and Quantum Programming**, *South Bay Interdisciplinary Science Center*, Dongguan, China.

August 2022 **The 3rd Conference on Mathematical and Scientific Machine Learning**, *Peking University*, Beijing, China.

Selected Talks

Feb 2013 **Simulating dynamics and topological phases of cold fermionic gases**, *Finite-temperature non-equilibrium superfluid systems*, Queenstown, New Zealand.

June 2013 **Topological charge pumping of cold atoms**, *Topological Phases in Condensed Matter and Cold Atom Systems: towards quantum computations*, Cargese, France.

Feb 2015 **Surprises in simulation of quantum phase transitions**, *Workshop on Quantum Simulations*, Benasque, Spain.

April 2016 **New Adventures in Quantum Monte Carlo Method - How Did I Earn an Erdős Number of Two?**, *The 6th Workshop on Quantum Many-Body Computation*, Beijing Computational Science Research Center, China.

March 2017 **Can Machine Learning Teach Us Cluster Updates ?**, *SIGN 2017: International Workshop on the Sign Problem in QCD and Beyond*, INT Seattle, USA.

July 2017 **Machine Learning for Many-body Physics**, *Planetary Talk at Fourth National Conference on Statistical Physics and Complex Systems*, Xiaan, China.

September 2017 **Artificial Intelligence and Quantum Physics**, *Public lecture at AI in Physics Salon*, Beijing Computational Science Research Center, China.

March 2018 **From Boltzmann Machines to Born Machines**, *Invited Talk at APS March Meeting*, Los Angels, USA.

Sep 2018 **Neural Network Renormalization Group**, *Invited Talk at Physical Society of Japan Autumn Meeting*, Kyotanabe, Japan.

Dec 2018 **Tensor Networks for Generative Modeling**, *Tensor Network States: Algorithms and Applications*, RIKEN R-CCS, Japan.

July 2019 **Differentiable Programming Tensor Networks and Quantum Circuits**, *Machine Learning for Quantum Design*, Perimeter Institute, Canada.

Feb 2021 **Neural Canonical Transformations**, *Quantum Cafe Webinar*, CCQ Flatiron Institute, USA.

August 2021 **Fermi Flow: Ab initio study of fermions at finite temperature**, *Invited Presentation at XXXII IUPAP Conference on Computational Physics*, Coventry, England.

March 2022 m^* **of electron gases: a neural canonical transformation study**, *Invited Talk at APS March Meeting*, Chigago, USA.

Lectures

Feb 2018 **Deep Learning and Quantum Many-Body Computation**, *FOR 1807 Winter School on Numerical Methods for Strongly Correlated Quantum Systems*, Marburg, Germany.

October 2018 **Generative Models for Physicists**, *School and Conference on Physics, Inference, and Learning*, ITP, Beijing.

October 2019 **Differentiable programming quantum physics and quantum circuits**, *4th International Symposium on Research and Education of Computational Science*, The Computational Science Alliance of the University of Tokyo, Japan.

August 2019 **1. A hitchhiker's guide to machine learning, 2. Secrets of deep learning, 3. Generative models for physicists**, *Summer School on Machine Learning in Condensed Matter Physics*, DIPC San Sebastian, Spain.

July 2021 **1. Scientific machine learning with and without data, 2. Generative models, 3. Differentiable programming**, *CRC 183 Summer School Machine Learning in Condensed Matter Physics*, Cologne, Germany.

August 2021 **Two lessons from deep learning**, *Summer School: Machine Learning in Quantum Physics and Chemistry*, Warsaw, Poland.

Dec 2022 **Genertive AI for Science**, *127th CCF Advanced Disciplines Lectures: AI + Science*, Beijing, China.

Student and Postdocs

Postdoc 2017-2019 **Jin-Guo Liu**, *HKUST-GZ*, Assistant Professor.

PhD 2015-2020 **Shuo-Hui Li**, *HKUST*, Research Assistant Professor.

PhD 2016-2021 **Hong-Bin Ren**, *Baidu quantum*, Research scientist.
co-supervised with Prof. Xi Dai

PhD 2016-2021 **Wei Tang**, *Ghent University*, Postdoc.
co-supervised with Prof. Hong-Hao Tu and Prof. X. C. Xie

Open Source Organizations

QuantumBFS **A group of quantum developers around Bao Fu Si**.

TensorBFS **Tensorize Everything!**.

FermiFlow **Ab-initio study of fermions at finite temperature**.

Services

2020- **Chinese Physics Letter**, *Editorial Board Member*.

2021- **Science Bulletin**, *Executive Member of Editorial Board*.

2021- **Machine Learning: Science and Technology**, *Editorial Board Member*.

2022- **Journal of Machine Learning**, *Editorial Board Member*.

Grants

2018-2021 **Machine Learning and Many Body Physics**, *NSFC General Grant*, ¥680,000.

2021-2023 **Solving Many-electron Schrodinger Equations with Deep Learning**, *Huawei*, ¥1400,000.

2023-2025 **Solving finite-temperature many-electron problem using deep generative model based variational free-energy method**, *NSFC Key Research Program*, ¥800,000.

2023-2027 **Machine Learning and Many Body Physics**, *NSFC Outstanding Young Scientists*, ¥4000,000.

Publications

[1] **Lei Wang**, Xi Dai, Shu Chen, and X. C. Xie. *Magnetism of cold fermionic atoms on the p band of an optical lattice.* Phys. Rev. A **78**, 023603 (2008).

[2] XiaoYu Deng, **Lei Wang**, Xi Dai, and Zhong Fang. *Local density approximation combined with Gutzwiller method for correlated electron systems: Formalism and applications.* Phys. Rev. B **79**, 075114 (2009).

[3] Jia Ning Zhuang, **Lei Wang**, Zhong Fang, and Xi Dai. *Fast impurity solver based on Gutzwiller variational approach.* Phys. Rev. B **79**, 165114 (2009).

[4] Hua Jiang, **Lei Wang**, Qing-feng Sun, and X. C. Xie. *Numerical study of the topological anderson insulator in HgTe/CdTe quantum wells.* Phys. Rev. B **80**, 165316 (2009).

[5] **Lei Wang**, Hua Jiang, J. N. Zhuang, Xi Dai, and X. C. Xie. *Spin current through an ESR quantum dot: A real-time study.* Phys. Rev. B **81**, 075323 (2010).

[6] Zi Cai, **Lei Wang**, X. C. Xie, and Yupeng Wang. *Interaction-induced anomalous transport behavior in one-dimensional optical lattices.* Phys. Rev. A **81**, 043602 (2010).

[7] Jian-Qing Qi, **Lei Wang**, and Xi Dai. *Antiferromagnetism of repulsively interacting fermions in a harmonic trap.* Chinese Physics Letters **27**, 083102 (2010).

[8] Zi Cai, **Lei Wang**, X. C. Xie, U. Schollwöck, X. R. Wang, M. Di Ventra, and Yupeng Wang. Quantum spinon oscillations in a finite one-dimensional transverse Ising model. Phys. Rev. B **83**, 155119 (2011).

[9] **Lei Wang**, Xi Dai, and X. C. Xie. *Frequency domain winding number and interaction effect on topological insulators.* Phys. Rev. B **84**, 205116 (2011).

[10] **Lei Wang**, Hua Jiang, Xi Dai, and X. C. Xie. *Pole expansion of self-energy and interaction effect for topological insulators.* Phys. Rev. B **85**, 235135 (2012).

[11] **Lei Wang**, Xi Dai, and X. C. Xie. *Interaction-induced topological phase transition in the Bernevig-Hughes-Zhang model.* Europhysics Letter **98**, 57001 (2012).

[12] Thomas Uehlinger, Daniel Greif, Gregor Jotzu, Leticia Tarruell, Tilman Esslinger, **Lei Wang** and Matthias Troyer. *Double transfer through Dirac points in a tunable honeycomb optical lattice.* Eur. Phys. J. Special Topics, **217**, 121 (2013). (Cover image)

[13] Hsiang-Hsuan Hung, **Lei Wang**, Zheng-Cheng Gu and Gregory A. Fiete. *Topological phase transition in a generalized Kane-Mele-Hubbard model: A combined Quantum Monte Carlo and Green's function study.* Phys. Rev. B **87**, 121113(R) (2013).

[14] **Lei Wang**, Alexey A. Soluyanov and Matthias Troyer. *Proposal for direct measurement of topological invariants in optical lattices.* Phys. Rev. Lett **110**, 166802 (2013).

[15] Zi Cai, Hsiang-Hsuan Hung, **Lei Wang**, Dong Zheng and Congjun Wu. *Pomeranchuk cooling of the SU(2N) ultra-cold fermions in optical lattices.* Phys. Rev. Lett **110**, 220401 (2013).

[16] **Lei Wang**, Matthias Troyer and Xi Dai. *Topological charge pumping in a one-dimensional optical lattice.* Phys. Rev. Lett **111**, 026802 (2013).

[17] Zi Cai, Hsiang-Hsuan Hung, **Lei Wang** and 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).

[18] **Lei Wang** and Matthias Troyer. *Seeing Hofstadter's Butterfly in Atomic Fermi Gases.* Phys. Rev. A **89**, 011603(R) (2014).

[19] Jakub Imriška, Mauro Iazzi, **Lei Wang**, Emanuel Gull, Daniel Greif, Thomas Uehlinger, Gregor Jotzu, Leticia Tarruell, Tilman Esslinger and Matthias Troyer. *Thermodynamics and magnetic properties of the anisotropic 3D Hubbard model*, Phys. Rev. Lett **112**, 115301 (2014).

[20] Hsiang-Hsuan Hung, Victor Chua, **Lei Wang** and Gregory A. Fiete. *Finite-size and interaction effects on topological phase transitions via numerically exact quantum Monte Carlo calculations*, Phys. Rev. B **89**, 235104 (2014).

[21] **Lei Wang** and Matthias Troyer. *Renyi Entanglement Entropy of Interacting Fermions Calculated Using Continuous-Time Quantum Monte Carlo Method*, Phys. Rev. Lett. **113**, 110401 (2014).

[22] **Lei Wang**, Philippe Corboz and Matthias Troyer. *Fermionic Quantum Critical Point of Spinless Fermions on a Honeycomb Lattice*, New J. of Phys., **16**, 103008 (2014), selected by the Editors for IOPselect.

[23] **Lei Wang**, Hsiang-Hsuan Hung and Matthias Troyer. *Topological Phase Transition in the Hofstadter-Hubbard Model*, Phys. Rev. B **90**, 205111 (2014).

[24] **Lei Wang**, Mauro Iazzi, Philippe Corboz and Matthias Troyer. *Efficient Continuous-time Quantum Monte Carlo Method for the Ground State of Correlated Fermions*, Phys. Rev. B **91**, 235151 (2015), Editors' suggestion.

[25] **Lei Wang**, Ye-Hua Liu, Jakub Imriška, Ping Nang Ma, Matthias Troyer. *Fidelity susceptibility made simple: A unified quantum Monte Carlo approach*, Phys. Rev. X **5**, 031007 (2015).

[26] **Lei Wang**, Hiroshi Shinaoka, Matthias Troyer. *Fidelity Susceptibility Perspective on the Kondo Effect and Impurity Quantum Phase Transitions*, Phys. Rev. Lett. **115**, 236601 (2015).

[27] Ye-Hua Liu and **Lei Wang**. *Quantum Monte Carlo study of mass-imbalanced Hubbard models*, Phys. Rev. B **92**, 235129 (2015), Editors' suggestion.

[28] **Lei Wang**, Ye-Hua Liu, Mauro Iazzi, Matthias Troyer, Gergely Harcos. *Split orthogonal group: A guiding principle for sign-problem-free fermionic simulations*, Phys. Rev. Lett. **115**, 250601 (2015).

[29] Shuta Nakajima, Takafumi Tomita, Shintaro Taie, Tomohiro Ichinose, Hideki Ozawa, **Lei Wang**, Matthias Troyer, Yoshiro Takahashi. *Topological Thouless Pumping of Ultracold Fermions*, Nature Physics **12**, 296 (2016).

[30] **Lei Wang**, Ye-Hua Liu and Matthias Troyer. *Stochastic series expansion simulation of the t-V model*, Phys. Rev. B **93**, 155117 (2016).

[31] Jakub Imriška, **Lei Wang**, Matthias Troyer. *First order topological phase transition of the Haldane–Hubbard model*, Phys. Rev. B **94**, 035109 (2016).

[32] Ilia Zintchenko, **Lei Wang** and Matthias Troyer. *Ferromagnetism of the Repulsive Atomic Fermi Gas: three-body recombination and domain formation*, Eur. Phys. J. B **89**, 180 (2016)

[33] **Lei Wang**, *Discovering Phase Transitions with Unsupervised Learning*, Phys. Rev. B **94**, 195105 (2016)

[34] Li Huang, Yilin Wang, **Lei Wang**, Philipp Werner, *Detecting phase transitions and crossovers in Hubbard models using the fidelity susceptibility*, Phys. Rev. B **94**, 235110 (2016)

[35] Li Huang, **Lei Wang**. *Accelerate Monte Carlo Simulations with Restricted Boltzmann Machines*, Phys. Rev. B **95**, 035105 (2017)

[36] Li Huang, Yi-feng Yang, **Lei Wang**, *Recommender Engine for Continuous Time Quantum Monte Carlo Methods*, Phys. Rev. E **95**, 031301(R) (2017)

[37] Jan Gukelberger, **Lei Wang**, and Lode Pollet, *Ising Antiferromagnet in the 2D Hubbard Model with Mismatched Fermi Surfaces*, Phys. Rev. B 95, 205121 (2017)

[38] Wei Tang, Lei Chen, Wei Li, X. C. Xie, Hong-Hao Tu, **Lei Wang**, *Universal Boundary Entropies in Conformal Field Theory: A Quantum Monte Carlo Study* Phys. Rev. B **96**, 115136 (2017), Editors' suggestion.

[39] **Lei Wang**, *Exploring cluster Monte Carlo updates with Boltzmann machines* Phys. Rev. E **96**, 051301(R) (2017)

[40] Lei Chen, Hao-Xin Wang, **Lei Wang**, Wei Li, *Conformal Thermal Tensor Network and Universal Entropy on Topological Manifolds*, Phys. Rev. B **96**, 174429 (2017)

[41] Jing Chen, Song Cheng, Haidong Xie, **Lei Wang**, and Tao Xiang, *On the Equivalence of Restricted Boltzmann Machines and Tensor Network States*, Phys. Rev. B **97**, 085104 (2018), Editors' suggestion.

[42] H.-M. Guo, **Lei Wang**, R. T. Scalettar, *Quantum phase transitions of multi-species Dirac fermions*, Phys. Rev. B 97, 235152 (2018)

[43] Zhao-Yu Han, Jun Wang, Heng Fan, **Lei Wang**, Pan Zhang, *Unsupervised Generative Modeling Using Matrix Product States*, Phys. Rev. X **8**, 031012 (2018)

[44] Song Cheng, Jing Chen, **Lei Wang**, *Information Perspective to Probabilistic Modeling: Boltzmann Machines versus Born Machines*, Entropy **20**, 583 (2018)

[45] Jin-Guo Liu, **Lei Wang**, *Differentiable Learning of Quantum Circuit Born Machine*, Phys. Rev. A **98**, 062324 (2018)

[46] Shuo-Hui Li, **Lei Wang**, *Neural Network Renormalization Group*, Phys. Rev. Lett. **121**, 260601 (2018)

[47] Wei Zhang, **Lei Wang**, and Ziqiang Wang, *Interpretable Machine Learning Study of Many-Body Localization Transition in Disordered Quantum Ising Spin Chains*, Phys. Rev. B **99**, 054208 (2019)

[48] Dian Wu, **Lei Wang**, Pan Zhang, *Solving Statistical Mechanics using Variational Autoregressive Networks*, Phys. Rev. Lett. **122**, 080602 (2019), Editors' Suggestion

[49] Wei Tang, X. C. Xie, **Lei Wang**, Hong-Hao Tu, *The Klein bottle entropy of the compactified boson conformal field theory*, Phys. Rev. B **99**, 115105 (2019)

[50] Song Cheng, **Lei Wang**, Tao Xiang, Pan Zhang, *Tree Tensor Networks for Generative Modeling* , Phys. Rev. B **99**, 155131 (2019)

[51] Jinfeng Zeng, Yufeng Wu, Jin-Guo Liu, **Lei Wang**, Jiangping Hu, *Learning and Inference on Generative Adversarial Quantum Circuits*, Phys. Rev. A **99**, 052306 (2019)

[52] Tang-Shi Yao, Cen-Yao Tang, Meng Yang, Ke-Jia Zhu, Da-Yu Yan, Chang-Jiang Yi, Zi-Li Feng, He-Chang Lei, Cheng-He Li, Le Wang, **Lei Wang**, You-Guo Shi, Yu-Jie Sun, Hong Ding, *Machine Learning to Instruct Single Crystal Growth by Flux Method*, Chinese Physics Letters, **36**, 068101 (2019)

[53] Hai-Jun Liao, Jin-Guo Liu, **Lei Wang**, Tao Xiang, *Differentiable Programming Tensor Networks*, Phys. Rev. X **9**, 031041 (2019)

[54] Jin-Guo Liu, Yi-Hong Zhang, Yuan Wan, **Lei Wang**, *Variational Quantum Eigensolver with Fewer Qubits*, Phys. Rev. Research **1**, 023025 (2019)

[55] Da Wang, **Lei Wang**, Congjun Wu, *Slater and Mott insulating states in the SU(6) Hubbard model*, Phys. Rev. B **100**, 115155 (2019)

[56] Wei Tang, X. C. Xie, **Lei Wang**, Hong-Hao Tu, *Quantized thermal Hall conductance from edge current calculations in the lattice model* , Phys. Rev. B **100**, 155112 (2019)

[57] Romain Fournier, **Lei Wang**, Oleg V. Yazyev, QuanSheng Wu, *An Artificial Neural Network Approach to the Analytic Continuation Problem*, Phys. Rev. Lett. **124**, 056401 (2020)

[58] Danqing Hu, Jian-Jun Dong, Li Huang, **Lei Wang**, Yi-feng Yang, *An effective classical correspondence of the Mott transition*, Phys. Rev. B **101**, 075111 (2020), Editors' Suggestion

[59] Jun Wang, Zhao-Yu Han, Song-Bo Wang, Zeyang Li, Liang-Zhu Mu, Heng Fan, **Lei Wang**, *Efficient Quantum Tomography with Fidelity Estimation* , Phys. Rev. A **101**, 032321 (2020)

[60] Shuo-Hui Li, Chen-Xiao Dong, Linfeng Zhang, **Lei Wang**, *Neural Canonical Transformation with Symplectic Flows*, Phys. Rev. X **10**, 021020 (2020)

[61] Hao Xie, Jin-Guo Liu, **Lei Wang**, *Automatic differentiation of dominant eigensolver and its applications in quantum physics*, Phys. Rev. B **101**, 245139 (2020)

[62] Ying-Hai Wu, **Lei Wang**, Hong-Hao Tu, *Tensor network representations of parton wave functions*, Phys. Rev. Lett. **124**, 246401 (2020)

[63] Hong-Ye Hu, Shuo-Hui Li, **Lei Wang**, Yi-Zhuang You, *Machine Learning Holographic Mapping by Neural Network Renormalization Group*, Phys. Rev. Research **2**, 023369 (2020)

[64] Bin-Bin Chen, Yuan Gao, Yi-Bin Guo, Yuzhi Liu, Hui-Hai Zhao, Hai-Jun Liao, **Lei Wang**, Tao Xiang, Wei Li, Z. Y. Xie, *Automatic Differentiation for Second Renormalization of Tensor Networks* , Phys. Rev. B **101**, 220409(R) (2020)

[65] Xiu-Zhe Luo, Jin-Guo Liu, Pan Zhang, **Lei Wang**, *Yao.jl: Extensible, Efficient Framework for Quantum Algorithm Design*, Quantum **4**, 341 (2020)

[66] Wei Tang, Hong-Hao Tu, **Lei Wang**, *Continuous matrix product operator approach to finite temperature quantum states*, Phys. Rev. Lett. **125**, 170604 (2020)

[67] Jin-Guo Liu, Liang Mao, Pan Zhang, **Lei Wang**, *Solving Quantum Statistical Mechanics with Variational Autoregressive Networks and Quantum Circuits*, Machine Learning: Science and Technology **2**, 025011 (2021)

[68] Jin-Guo Liu, **Lei Wang**, Pan Zhang, *Tropical Tensor Network for Ground States of Spin Glasses*, Phys. Rev. Lett. **126**, 090506 (2021)

[69] Song Cheng, **Lei Wang**, Pan Zhang, *Supervised Learning with Projected Entangled Pair States*, Phys. Rev. B **103**, 125117 (2021)

[70] Wei Tang, X. C. Xie, **Lei Wang**, Hong-Hao Tu, *Tensor network simulation of the (1+1)-dimensional O(3) nonlinear σ-model with $\theta = \pi$ term* , Phys. Rev. D. **104**, 114513 (2021)

[71] Hao Xie, Linfeng Zhang, **Lei Wang**, *Ab-initio study of interacting fermions at finite temperature with neural canonical transformation*, Journal of Machine Learning, **1**, 38 (2022)

[72] Xiaotong Ni, Hui-Hai Zhao, **Lei Wang**, Feng Wu, Jianxin Chen, *Integrating Quantum Processor Device and Control Optimization in a Gradient-based Framework*, npj Quantum Inf **8**, 106 (2022)

[73] Yueshui Zhang, **Lei Wang**, *Structure of continuous matrix product operator for transverse field Ising model: An analytic and numerical study*, Chinese Phys. B **31** 110205 (2022)

[74] Xue-Yi Guo, Shang-Shu Li, Xiao Xiao, Zhong-Cheng Xiang, Zi-Yong Ge, He-Kang Li, Peng-Tao Song, Yi Peng, Kai Xu, Pan Zhang, **Lei Wang**, Dong-Ning Zheng, Heng Fan, *Thermal variational quantum simulation on a superconducting quantum processor*, Chinese Phys. B, **32** 010307 (2023)

[75] Qi Yang, Xing-Yu Zhang, Hai-Jun Liao, Hong-Hao Tu, **Lei Wang**, *Projected d-wave superconducting state: a fermionic projected entangled pair state study*, Phys. Rev. B **107**, 125128 (2023)

[76] Yueshui Zhang, Anton Hulsch, Hua-Chen Zhang, Wei Tang, **Lei Wang**, Hong-Hao Tu, *Universal scaling of Klein bottle entropy near conformal critical points*, Phys. Rev. Lett. **130**, 151602 (2023)

[77] Hao Xie, Linfeng Zhang, **Lei Wang**, m^* *of two-dimensional electron gas: a neural canonical transformation study*, SciPost Phys. **14**, 154 (2023)

[78] Stephan Humeniuk, Yuan Wan, **Lei Wang**, *Autoregressive neural Slater-Jastrow ansatz for variational Monte Carlo simulation*, SciPost Phys. **14**, 171 (2023)

[79] Han Xu, Zhichao Zhou, Xin Wang, **Lei Wang**, Yu Wang, *Trion states and quantum criticality of attractive SU(3) Dirac fermions*, Phys. Rev. Research **5**, 023180 (2023)

Eprints on arxiv

`http://arxiv.org/a/wang_l_1`

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[2] **Lei Wang**, Jia-Ning Zhuang, Xi Dai and X. C. Xie. *An Impurity Solver Using the Time-Dependent Variational Matrix Product State Approach*, arXiv:1001.2943

[3] **Lei Wang**, Hao Shi, Shiwei Zhang, Xiaoqun Wang, Xi Dai and X. C. Xie. *Charge-density-wave and topological transitions in interacting Haldane model*, arXiv:1012.5163

[4] **Lei Wang**, Troels F. Rønnow, Sergio Boixo, Sergei V. Isakov, Zhihui Wang, David Wecker, Daniel A. Lidar, John M. Martinis and Matthias Troyer. *Comment on: "Classical signature of quantum annealing"*, arXiv:1305.5837

[5] Bela Bauer, **Lei Wang**, Iztok Pižorn, Matthias Troyer. *Entanglement as a resource in adiabatic quantum optimization*, arXiv:1501.06914

[6] Linfeng Zhang, Weinan E, **Lei Wang**, *Monge-Ampère Flow for Generative Modeling* , arXiv:1809.10188

[7] Xihan Li, Xiang Chen, Rasul Tutunov, Haitham Bou-Ammar, **Lei Wang**, Jun Wang, *Self-consistent Gradient-like Eigen Decomposition in Solving Schrödinger Equations*, arXiv:2202.01388

[8] Yingzhanghao Zhou, Xiang Chen, Peng Zhang, Jun Wang, **Lei Wang**, Hong Guo, *AD-NEGF: An End-to-End Differentiable Quantum Transport Simulator for Sensitivity Analysis and Inverse Problems*, arXiv:2202.05098

[9] Anna Dawid et al, *Modern applications of machine learning in quantum sciences*, arXiv:2204.04198

[10] Hao Xie, Zi-Hang Li, Han Wang, Linfeng Zhang, **Lei Wang**, *A deep variational free energy approach to dense hydrogen*, arXiv:2209.06095

[11] Dian Wu et al, *Variational Benchmarks for Quantum Many-Body Problems* , arXiv:2302.04919

[12] Xing-Yu Zhang, Shuang Liang, Hai-Jun Liao, Wei Li, **Lei Wang**, *Differentiable programming tensor networks for Kitaev magnets*, arXiv:2304.01551

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