Bin-Bin CHEN

Personal informations

Place and Date of Birth:	Guangdong, China	25th Nov. 1993
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Research Interests

My research interest focuses on efficient numerical simulations within the tensor network state ansatz, to tackle novel phenomena in quantum manybody systems, including quantum spin liquid, unconventional superconductivity, topological states, etc.

Working on the PyTorch library as well as the QSpace library, I have developed several efficient thermal tensor network methods, e.g. series expansion thermal tensor network (SETTN), exponential tensor renormalization group (XTRG) and differentiable tensor renormalization group (∂TRG) for accurate thermal simulations of quantum manybody systems.

Research Experiences

Feb 2018 - Mar 2020 (Joint PhD student)	**Theoretical Solid State Physics, Faculty of Physics**, **Ludwig-Maximilians University, Munich**. *co-supervisor: Andreas Weichselbaum, Wei Li* Research on efficient simulations of correlated electron systems
Since May 2015	**Micro-Nano Physics and Application research group**, **Beihang University, Beijing**. *co-supervisor: Wei Li, Ziyu Chen* Research on developing efficient thermal tensor network algorithms
Jul 2014 - May 2015	**Micro-Nano Physics and Application research group**, **Beihang University, Beijing**. *supervisor: Ziyu Chen* Research on preparation and characterization of Fe_3O_4 nanoparticles

Educations

Feb 2018 - Mar 2020	Joint PhD student in **Ludwig-Maximilians University**, Munich *co-supervisor: Andreas Weichselbaum, Wei Li* Funded by: Grant WE4819/3-1 by German research foundation (DFG)
Since Sep 2015	PhD student in **Beihang University**, Beijing *co-supervisor: Wei Li, Ziyu Chen* Major: Condensed Matter Physics
Sep 2011 - Jul 2015	Undergraduate student in **Beihang University**, Beijing Major: Applied Physics Graduate as Bachelor of Science in Physics

Academic Activities

Mar 4, 2019	**Oral presentation** in APS March Meeting, Boston, US *"Non-Abelian symmetries in thermal tensor network states"*
Sep 24, 2018	**Poster presentation** in RWTH Aachen / Forschungszentrum Jülich, Germany *"Exponential thermal tensor network approach for quantum lattice models"*
Sep 27, 2017	**Oral presentation** in a seminar, ICFO, Barcelona, Spain *"Series-expansion tensor network for quantum lattice models"*
Aug 29, 2017	**Oral presentation** in Special condensed matter theory seminar, LMU, Munich, Germany *"Quantum Manybody Simulation at Finite Temperatures: Thermal Tensor Network Approach"*
May 5, 2017	**Poster presentation** in the 7th workshop on quantum many-body computation, UCAS, Beijing, China *"Series-expansion thermal tensor network approach for quantum lattice models"*

Bin-Bin Chen's Publications

[First author]

Jun 23, 2020 | *"Automatic Differentiation for Second Renormalization of Tensor Networks"*
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
Phys. Rev. B 101, 220409(R) (2020)

Dec 05, 2019 | *"Quantum Many-Body Simulations of the 2D Fermi-Hubbard Model in Ultracold Optical Lattices"*
Bin-Bin Chen, Chuang Chen, Ziyu Chen, Jian Cui, Yueyang Zhai, Andreas Weichselbaum, Jan von Delft, Zi Yang Meng, Wei Li
arXiv:2008.02179 (2020)

Sep 26, 2018 | *"Exponential Thermal Tensor Network Approach for Quantum Lattice Models"*
Bin-Bin Chen, Lei Chen, Ziyu Chen, Wei Li and Andreas Weichselbaum
Phys. Rev. X 8, 031082 (2018)

Apr 7, 2017 | *"Series-expansion thermal tensor network approach for quantum lattice models"*
Bin-Bin Chen, Yun-Jing Liu, Ziyu Chen, and Wei Li
Phys. Rev. B 95, 161104(R) (2017)

[Non-first author]

Aug 25, 2020 | *"Kondo holes in the 2D itinerant Ising ferromagnet Fe3GeTe2"*
Mengting Zhao, **Bin-Bin Chen**, Yilian Xi, Yanyan Zhao, Hongrun Zhang, Haifeng Feng, Jincheng Zhuang, Xun Xu, Weichang Hao, Wei Li, Si Zhou, Shi Xue Dou, Yi Du
arXiv:2008.10842 (2020)

Feb 28, 2020 | *"Kosterlitz-Thouless melting of magnetic order in the triangular quantum Ising material $TmMgGaO_4$"*
Han Li, Yuan Da Liao, **Bin-Bin Chen**, Xu-Tao Zeng, Xian-Lei Sheng, Yang Qi, Zi Yang Meng, Wei Li
Nat Commun 11, 1111 (2020)

Jul 09, 2019 | *"Thermal Tensor Renormalization Group Simulations of Square-Lattice Quantum Spin Models"*
Han Li, **Bin-Bin Chen**, Ziyu Chen, Jan von Delft, Andreas Weichselbaum, Wei Li
Phys. Rev. B 100, 045110 (2019)

Apr 10, 2019 | *"Two-temperature scales in the triangular-lattice Heisenberg antiferromagnet"*
Lei Chen, Dai-Wei Qu, Han Li, **Bin-Bin Chen**, Shou-Shu Gong, Jan von Delft, Andreas Weichselbaum, and Wei Li
Phys. Rev. B 99, 140404(R) (2019)