



Meng, Zi Yang

#### Academic qualifications

University of Science and Technology of China	B.Sc. in Physics	2005
Universität Stuttgart, Germany	M.Sc. in Physics	2007
Universität Stuttgart, Germany	Ph.D. in Physics	2011

#### Previous academic positions

Professor	Institute of Physics, Chinese Academy of Sciences	2018.08 – 2019.02
Associate Professor	Institute of Physics, Chinese Academy of Sciences	2014.08 – 2018.07
Postdoctoral Fellow	University of Toronto	2013.08 – 2014.07
Postdoctoral Research Associate	Louisiana State University	2011.09 – 2013.07

#### Present academic position

Professor	Department of Physics, The University of Hong Kong	2023.10
Associate Professor	Department of Physics, The University of Hong Kong	2019.03 – 2023.09

#### Research Interests & Expertise

Highly entangled quantum models and materials: quantum phase transitions, quantum magnetism, non-Fermi-liquid, quantum entanglement and 2D quantum moiré materials, Rydberg atom arrays.

Computational condensed matter physics: large-scale quantum Monte Carlo simulations, self-learning quantum Monte Carlo algorithms, Explainable-AI, tensor-network and neural-network.

#### Honours and Awards

- 1). Editorial Board Member of [Reports on Progress in Physics in IOPSCIENCE](#). (with Prof. Subir Sachdev as Editor-in-Chief).
- 2). 2020/21 Tianhe Star Award for [“outstanding accomplishments and promotion of computational oriented research on the Tianhe supercomputers of China”](#).

- 3). 2018 Highly Cited Research Article Award by Chinese Physics Society.
- 4). 2016 Mercator Fellow of the DFG research unit FOR1807 “*Advanced Computational Methods for Strongly Correlated Quantum Systems*”.
- 5). 2014 Young Thousand Talents Award of China.
- 6). Citation ~ 6200 (google scholar), h-index 42, ~140 publications.

### Representative publications in recent three years

- 1). *Intrinsic nonlinear Hall effect and gate-switchable Berry curvature sliding in twisted bilayer graphene*,  
Meizhen Huang, Zefei Wu, Xu Zhang, Xueming Feng, Zishu Zhou, Shi Wang, Yong Chen, Chun Cheng, Kai Sun, **Zi Yang Meng\***(corresponding author), Ning Wang\*,  
[Phys. Rev. Lett. 131, 066301 \(2023\) Editors' Suggestion](#)
- 2). *Unlocking the general relationship between energy and entanglement spectra via the wormhole effect*,  
Zheng Yan\*, **Zi Yang Meng\***,  
[Nature Communications 14, 2360 \(2023\)](#)
- 3). *Thermodynamic characteristic for correlated flat-band system with quantum anomalous Hall ground state*,  
Gaopei Pan, Xu Zhang, Hongyu Lu, Heqiu Li, Bin-Bin Chen, Kai Sun\*, **Zi Yang Meng\***,  
[Phys. Rev. Lett. 130, 016401 \(2023\)](#)
- 4). *Emergent glassy behavior in a kagome Rydberg atom array*,  
Zheng Yan, Yan-Cheng Wang, Rhine Samajdar, Subir Sachdev\*, **Zi Yang Meng\***,  
[Phys. Rev. Lett. 130, 206501 \(2023\)](#)
- 5). *Triangular lattice quantum dimer model with variable dimer density*,  
Zheng Yan, Yan-Cheng Wang, Rhine Samajdar, Subir Sachdev\*, **Zi Yang Meng\***,  
[Nature Communications 13, 5799 \(2022\)](#)
- 6). *Monte Carlo study of the pseudogap and superconductivity emerging from quantum magnetic fluctuations*,  
Weilun Jiang, Yuzhi Liu, Avraham Klein, Yuxuan Wang, Kai Sun, Andrey V. Chubukov, **Zi Yang Meng\***,  
[Nature Communications 13, 2655 \(2022\)](#)
- 7). *Scaling of entanglement entropy at deconfined quantum criticality*,  
Jiarui Zhao, Yan-Cheng Wang, Zheng Yan, Meng Cheng\*, **Zi Yang Meng\***,  
[Phys. Rev. Lett. 128, 010601 \(2022\)](#)
- 8). *Realization of Topological Mott Insulator in a Twisted Bilayer Graphene Lattice Model*,  
Bin-Bin Chen, Yuan Da Liao, Ziyu Chen, Oskar Vafek, Jian Kang, Wei Li\*, **Zi Yang Meng\***,  
[Nature Communications 12, 5480 \(2021\)](#)
- 9). *Fractionalized conductivity and emergent self-duality near topological phase transitions*,  
Yan-Cheng Wang, Meng Cheng, William Witczak-Krempa, **Zi Yang Meng\***,  
[Nature Communications 12, 5347 \(2021\)](#)
- 10). *Correlation-induced insulating topological phases at charge neutrality in twisted bilayer graphene*,  
Yuan Da Liao, Jian Kang\*, Clara N. Breiø, Xiao Yan Xu, Han-Qing Wu, Brian M. Andersen\*, Rafael M. Fernandes\*, **Zi Yang Meng\***,  
[Phys. Rev. X 11, 011014 \(2021\)](#)

## Representative publications beyond recent three years

1). *Kosterlitz-Thouless melting of magnetic order in the triangular quantum Ising material  $TmMgGaO_4$ ,*

Han Li, Yuan-Da Liao, Bin-Bin Chen, Xu-Tao Zen, Xian-Lei Sheng, Yang Qi\*, **Zi Yang Meng\***, Wei Li\*,

[Nature Communications 11, 1111 \(2020\)](#)

2). *Evidence of the Berezinskii-Kosterlitz-Thouless Phase in a Frustrated Magnet,*

Ze Hu, Zhen Ma, Yuan-Da Liao, Han Li, Chunsheng Ma, Yi Cui, Yanyan Shangguan, Zhentao Huang, Yang Qi\*, Wei Li\*, **Zi Yang Meng\***, Jinsheng Wen\*, Weiqiang Yu\*,

[Nature Communications 11, 5631 \(2020\)](#)

3). *Quantum phases of  $SrCu_2(BO_3)_2$  from high-pressure thermodynamics,*

Jing Guo, Guangyu Sun, Bowen Zhao, Ling Wang, Wenshan Hong, Vladimir A. Sidorov, Nvsen Ma, Qi Wu, Shiliang Li, **Zi Yang Meng\***, Anders W. Sandvik\*, Liling Sun\*,

[Phys. Rev. Lett. 124, 206602 \(2020\)](#)

4). *Itinerant Quantum Critical Point with Fermion Pockets and Hot Spots,*

Zi Hong Liu, Gaopei Pan, Xiao Yan Xu, Kai Sun, **Zi Yang Meng\***,

[Proc. Natl. Acad. Sci. U.S.A. 116 \(34\), 16760-16767 \(2019\)](#)

5). *Dynamical Signature of Symmetry Fractionalization in Frustrated Magnets,*

Guangyu Sun, Yan-Cheng Wang, Chen Fang, Yang Qi, Meng Cheng, **Zi Yang Meng\***,

[Phys. Rev. Lett. 121, 077201 \(2018\)](#)

6). *Nearly deconfined spinon excitations in the square-lattice spin-1/2 Heisenberg antiferromagnet,*

Hui Shao\*, Yan Qi Qin, **Sylvain Capponi**, Stefano Chesi, **Zi Yang Meng\***, Anders W. Sandvik\*,

[Phys. Rev. X 7, 041072 \(2017\)](#)

7). *Duality between the deconfined quantum-critical point and the bosonic topological transition,*

Yan Qi Qin, Yuan-Yao He, Yi-Zhuang You, Zhong-Yi Lu, Arnab Sen, Anders W. Sandvik, Cenke Xu, **Zi Yang Meng\***,

[Phys. Rev. X 7, 031052 \(2017\)](#)

8). *Non-Fermi-liquid at  $(2+1)d$  ferromagnetic quantum critical point,*

Xiao Yan Xu, Kai Sun, Yoni Schattner, Erez Berg, **Zi Yang Meng\***,

[Phys. Rev. X 7, 031058 \(2017\)](#)

## Grant Records

1). Project Coordinator (PC) of [Research Grants Council \(RGC\) of Hong Kong Collaborative Research Fund \(CRF\) Scheme](#)

Project No.: C7037-22GF

Project title: Many-body paradigm in quantum moiré material research

Funding year: 2023 – 2026 (on-going)

Amount: 5,964,800 HKD

2). Principle Investigator (PI) of [French National Research Agency \(Agence Nationale de la Recherche\) and the Research Grants Council \(RGC\) of Hong Kong Joint Research Scheme](#)

Project No.: A\_HKU703/22

Project title: Automate: Advanced Numerical Methods for Highly Entangled Quantum Matter

Funding year: 2023 – 2027 (on-going)

Amount: 3,000,000 HKD

3). PI of Research Grants Council (RGC) of Hong Kong General Research Fund Scheme  
Project No.: 17302223

Project title: The novel phases and numerical simulation of Rydberg arrays,

Funding year: 2024 - 2025 (to be started)

Amount: 428,794 HKD

4). PI of Research Grants Council (RGC) of Hong Kong General Research Fund Scheme  
Project No.: 17309822

Project title: Quantum moiré materials and non-local measurements for quantum matter,

Funding year: 2023 - 2025 (on-going)

Amount: 783,000 HKD

5). PI of Research Grants Council (RGC) of Hong Kong General Research Fund Scheme  
Project No.: 17301721

Project title: Computational investigations on correlated quantum materials

Funding year: 2022 - 2024 (on-going)

Amount: 598,015 HKD

6). Co-Investigator of [Research Grants Council \(RGC\) of Hong Kong Areas of Excellence \(AoE\) Scheme](#)

Project No.: AoE/P-701/20

Project title: 2D materials research: fundamentals towards emerging technologies

Funding year: 2021 - 2029 (on-going)

Amount: 92,021,000 HKD

7). PI of Research Grants Council (RGC) of Hong Kong General Research Fund Scheme  
Project No.: 17301420

Project title: Computational artificial intelligence on quantum many-body systems

Funding year: 2021 - 2023 (on-going)

Amount: 899,792 HKD

8). PI of Research Grants Council (RGC) of Hong Kong General Research Fund Scheme  
Project No.: 17303019,

Project title: Large-scale quantum simulations of criticality and dynamics of correlated electron systems

Funding year: 2019 - 2022 (completed)

Amount: 753,667 HKD

## Others

1). Full publication list: <https://quantummc.xyz/publication/>.

2). Graduated 8 PhD students, 3 Postdoctoral fellows as primary supervisor.

3). Currently supervising of 7 PhD students and 1 Research Assistant Professor and 2 Postdoctoral fellows.

4). Teaching at all university levels, create new undergraduate course "[PHYS3151: Machine Learning in Physics](#)" and undergraduate/graduate course "[PHYS4150/8150: Computational Physics](#)" in HKU. **Both courses are with the highest student rating in the department.**

5). Referee for several peer-reviewed journals (Physical Review B, Physical Review Letters and Physical Review X, Nature Communications, Nature, etc.).