Basic Information

2008 年毕业于美国普度大学，2008.9-2011.4在日本理化学研究所任博士后。研究方向为量子计算与量子信息。

Contact Information

E-mail: wanghf@mail.xjtu.edu.cn
Tel: (029)82663394

Research Fields

我们的主要研究方向是量子算法与量子仿真，量子机器学习和基于忆阻器网络的计算。

随着电子线路的尺寸越来越小，量子效应开始显现，如何在这种情况下进行计算？ 在经典计算机上模拟量子体系的复杂度随体系的大小呈指数增长，如何高效的模拟量子体系？量子计算机是由量子体系构建而成，量子信息的存储，传输，处理和读出都必须服从量子力学原理。量子计算把待解决的问题映射到一个特定的量子体系中，利用物理学原理求解这些问题。我们研究的核心问题是：哪些问题在经典计算机上难以求解，而在量子计算机上可以高效解决？设计高效的量子算法解决这些问题。

我们已经发展了一些量子算法：求解一个物理体系的薛定谔方程；制备一个物理体系的任意一个量子态；量子体系动力学的仿真；确定 Ramsey 数；绝热量子算法求解EC3 问题；求解本征值问题，搜索问题，离散数学问题，奇异值分解问题，线性方程组，数据拟合问题，优化问题等。已在国际重要期刊发表文章10余篇。主持国家自然科学基金面上项目一项，陕西省自然科学基金面上项目一项。

近期发表的部分文章：

1. Quantum algorithm for total least squares data fitting, Hefeng Wang and Hua Xiang, Physics Letters A, 383, 2235-2240 （2019）.

2. Quantum Simulation of Resonant Transitions for Solving the Eigenproblem of an Effective Water Hamiltonian, Zhaokai Li, Xiaomei Liu, Hefeng Wang†, Sahel Ashhab, Jiangyu Cui, Hongwei Chen, Xinhua Peng‡, and Jiangfeng Du, Physical Review Letters, 122, 090504 (2019).

3. A quantum eigensolver for symmetric tridiagonalmatrices，Hefeng Wang and Hua Xiang，Quantum Information Processing，18，93 (2019)

4. Quantum algorithm for preparing the ground state of a system via resonance transition, Hefeng Wang, Scientific Reports，7，16342 (2017)

5. Quantum algorithm for obtaining the eigenstates of a physical system, Hefeng Wang, Phys. Rev. A 93, 052334 (2016)

6. Determining Ramsey numbers on a quantum computer, Hefeng Wang, Phys. Rev. A 93, 032301 (2016)

7. Ultrafast adiabatic quantum algorithm for the NP-complete exact cover problem, Hefeng Wang & Lian-Ao Wu, Scientific Reports，6，22307 (2016)

8. A quantum algorithm for obtaining the energy spectrum of a physical system without guessing its eigenstates,

Hefeng Wang, Phys. Chem. Chem. Phys., 2014, 16 (30), 16241 - 16245

9. A quantum algorithm for solving some discrete mathematical problems by probing their energy spectra, Hefeng Wang, Heng Fan, Fuli Li, Physical Review A 89, 012306 (2014)

10. Quantum algorithm for obtaining the energy spectrum of a physical system, Hefeng Wang, S. Ashhab, Franco Nori, Phys. Rev. A 85, 062304 (2012)

11. Quantum algorithm for simulating the dynamics of an open quantum system, Hefeng Wang, S. Ashhab, Franco Nori, Phys. Rev. A, 83, 062317 (2011)

12. Robust and scalable optical one-way quantum computation, Hefeng Wang, Chui-Ping Yang, Franco Nori, Phys. Rev. A 81, 052332 (2010)

13. Measurement-based quantum phase estimation algorithm for finding eigenvalues of non-unitary matrices, Hefeng Wang, Lian-Ao Wu, Yu-xi Liu, Franco Nori, Phys. Rev. A, 82, 062303 (2010)

14. Efficient quantum algorithm for preparing molecular-system-like states on a quantum computer, Hefeng Wang, S. Ashhab, Franco Nori, Phys. Rev. A 79, 042335 (2009)

15. Quantum Algorithm for Obtaining the Energy Spectrum of Molecular Systems, Hefeng Wang, Sabre Kais, Alán Aspuru-Guzik, Mark R. Hoffmann, Phys. Chem. Chem. Phys. 10, 5388, 2008