# Qunfeng Jiang

## Personal Information


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## Education

**Fudan University (QS World University Ranking 34')** Shanghai, China
*Bachelor of Science in Physics* Sept. 2019 – June. 2023

Core Courses: Classical mechanics, Statistical mechanics & Thermodynamics, Electrodynamics, Quantum mechanics I & II, Computational Physics

Graduate Course: Introduction to Astrophysics, Introduction to Soft Condensed Matter Physics, Surface Physics

## Publications

- **Jiang, Q.***, Connors, R., García, J., Mastroserio, G., Harrison, F., and Bambi, C., 2022. The Mismatch between the Inner-disk and the Orbital Inclination in the Black Hole X-ray Binary H 1743–322. *(Prepare) to submit Astrophysical Journal.*
- Yu, Z., **Jiang, Q.**, Abdikamalov, A.B., Ayzenberg, D., Bambi, C.*, Liu, H., Nampalliwar, S. and Tripathi, A., 2021. Constraining the Konoplya-Rezzolla-Zhidenko deformation parameters. II. Limits from stellar-mass black hole x-ray data. *Physical Review D*, 104(8), p.084035.
- Wang, X., Kong, D., Guo, M., Wang, L., Gu, C., Dai, C., Wang, Y., **Jiang, Q.**, Ai, Z., Zhang, C. and Qu, D., 2021. Rapid SARS-CoV-2 nucleic acid testing and pooled assay by tetrahedral DNA nanostructure transistor. *Nano letters*, 21(22), pp.9450-9457.
- Gou, Q., Li, Z., Giuseppe, D., Hou, C., Liu, J., Chang, X., Lv, H., Yang, L., Lin, S., Addazi, A., Liu, X., Kang, M., Marciano, A., Gou, J., Yin, S., Wang, Y., Yang, Z., Tian, X., Zhang, Q., Miozzi, S., Shao, C., Dou, J., Ou, X., Xue, Y., Fu, L., Zuo, Q., Wang, Z., Wang, Y., Gong, C., Yu, Z., Li, J., Liu, L. and **Jiang, Q.**, 2022, March. Observation of Horizontal Air Showers with LHAASO-KM2A. In *37th International Cosmic Ray Conference*. 12-23 July 2021. Berlin (p. 364).
- Jess Wade, Melissa Castrillón, **Qunfeng Jiang** (Chinese translator), 2022. Nano: The Spectacular Science of the Very (Very) Small. *Zhejiang Science and Technology Press*.

## Selected Awards and Honors

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| **Caltech Summer Undergraduate Research Fellowship (SURF)** | $6,840 |
| **Chun-Tsung Scholar** (Hui-Chun Chin and Tsung-Dao Lee Scholarship for undergraduate research) | $1,200 |
| **Xiyuan Scholar** (Fudan Undergraduate Research Program) | $720 |
| **First Prize at Fudan**, National College Student Curricular Academic Works Competition | $720 |
| **Rising Star Scholar** (Fudan Undergraduate Research Program) | $300 |

## Research Experience

**California Institute of Technology** Pasadena, US
Supervisor: *Javier Garcia, Ph.D, Research Assistant Professor* July. 2022 – Sept. 2022

**Studying the Inner Accretion Flows of Black Hole X-ray Binary H 1743-322 with RXTE and NuSTAR Data**

- Received a **$6,840 grant** from **Caltech** to conduct ten-week independent research in the *NuSTAR* Group with Prof. Javier Garcia and Prof. Fiona Harrison.

- Written six Python scripts with PyXspec to perform automatic spectra fitting with **557 *RXTE* observations** of the black hole binary H 1743-322 in the outbursts from 2003 to 2011.
- Performed global reflection modeling with `relxill` model to measure key physical properties including spin and inclination angle with *RXTE* and *NuSTAR* data.
- Found **the spin-orbit misalignment** of more than 30° in H 1743-322, which contradicts previous studies, and had written **a draft to be submitted** in the next few weeks.

**National Astronomical Observatories, Chinese Academy of Sciences** Beijing, China
Supervisor: *Roberto Soria, Ph.D, Professor* July. 2021 – Sept. 2021

**Studying coronae geometry and jet assumption of the black hole candidate MAXI J1348-630 in the 2019 outburst observed by INSIGHT-HXMT**

- Reduced the *INSIGHT-HXMT* observation of the black hole candidate MAXI J1348-630 in the 2019 outburst.
- Applied the state-of-the-art reflection model `relxill` model to fit the spectra and disproved the existence of two coronae, which is predicted by the results of QPOs models.
- Fitted X-ray and radio data with the jet model `bhjet` to test the assumption that the corona is the base of the jet.

**Fudan University** Shanghai, China
Supervisor: *Cosimo Bambi, Ph.D, Professor* Sept. 2020 – June. 2021

**Constraining the KRZ deformation parameters with stellar-mass black hole X-ray data**

- Reduced the *NuSTAR* observation of stellar-mass black hole EXO 1846+031.
- Applied a non-Kerr model with a new metric to the X-ray spectra of a stellar-mass black hole to test general relativity for the first time. the results are consistent with the Kerr solution.

Supervisor: *Antonino Marciano, Ph.D, Associate Professor* Sept. 2020 – July 2021

**Simulations of cosmic ray air shower with different hadronic models**

- Simulated cosmic rays and extensive air showers with `CORSIKA` software and generated muon lateral distribution histograms with `C++` codes.

Supervisor: *Dacheng Wei, Ph.D, Professor* June 2020 – Oct. 2020

**Electrical devices based on DNA molecules and their nanostructures**

- Fabricated a field-effect transistor (FET) with an actuatable liquid-gating sensing interface with DNA electro-actuators (DNA-EAs) manipulated electrostatically at the liquid-gate surface and realized direct detection of SARS-CoV-2 nucleic acids.
- Used secondary current distribution module in `COMSOL Multiphysics`® to simulate the electrical field distribution when an electro-actuation voltage was applied at the gate.

## Facilities and Software

**Languages & Machine Learning**: Python, Keras, Tensorflow, C++, Linux Bash, LaTeX
**Software**: XSPEC, PyXPEC, Wolfram Mathematica, MATLAB, CORSIKA, Arduino, COMSOL Multiphysics, Origin, Git
**Facilities**: NuSTAR, RXTE, Insight-HXMT

## Teaching Experience

**Fudan University** Shanghai, China
*Teaching Assistant* to Prof. Zuimin Jiang in College Physics A: Mechanics Fall 2022

## Outreach and Leadership Experience

**Director** Sept. 2020 – Sept. 2021

*Outreach Department, Fudan Astronomy Society*

- Received more than **$1500 grant** from Fudan University and **$500 grant** from local communities for outreach activities on astronomy.
- Organized a 7-day volunteer summer camp on astronomy for **more than 50 students** with **20 courses**, covering arts, science, and music, in an impoverished rural area in South China, which was reported by a local television news program.
- Coordinated regular activities with **50 volunteers** for **six months** to support local communities, museums, and regional outreach organizations, including Shanghai Children's Museum and the Asia Office of Astronomy for Development of the International Astronomical Union.

## Invited Talk

**The Origin and Goals of X-ray Astronomy** by Fudan Liberal Arts Society Apr. 2022