

# 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. *Submitted 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

<b>Caltech Summer Undergraduate Research Fellowship (SURF)</b>	\$6,840
<b>Chun-Tsung Scholar</b> (Hui-Chun Chin and <u>Tsung-Dao Lee Scholarship</u> for undergraduate research)	\$1,200
<b>Xiyuan Scholar</b> (Fudan Undergraduate Research Program)	\$720
<b>First Prize at Fudan</b> , National College Student Curricular Academic Works Competition	\$720
<b>Rising Star Scholar</b> (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**.
- Wrote 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 submitted Astrophysical Journal.

### 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* observations 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

Supervisor: *Cosimo Bambi, Ph.D, Professor*

Shanghai, China  
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,  $\text{\LaTeX}$

**Software:** XSPEC, PyXPEC, Wolfram Mathematica, MATLAB, *CORSIKA*, Arduino, *COMSOL Multiphysics*, Origin, Git

**Facilities:** *NuSTAR*, *RXTE*, *Insight-HXMT*

## TEACHING EXPERIENCE

### Fudan University

*Teaching Assistant* to Prof. Zuimin Jiang in College Physics A: Mechanics

Shanghai, China  
Fall 2022

## PUBLIC TALK

### The Mismatch of Inclinations in the Black Hole X-ray Binary H 1743–322

Research contributed talk at *the 241st Meeting of the American Astronomical Society*

Seattle, US

Jan. 2023

### Studying the Inner Accretion Flows of Black Hole X-ray Binaries

Poster presentation at *the Caltech SURF Seminar*

Pasadena, US

Aug. 2022

### The Origin and Goals of X-ray Astronomy

Invited by *Fudan Liberal Arts Society*

Shanghai, China

Apr. 2022

## OUTREACH AND LEADERSHIP EXPERIENCE

### Director

*Outreach Department, Fudan Astronomy Society*

Sept. 2020 – Sept. 2021

- 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** 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.