Yong-Kun Zhang

National Astronomical Observatories, Chinese Academy of Sciences, Beijing, 100101, China

ykzhang@escape.ac.cn | +86 158 1052 7079 | paris.escape.ac.cn | 0000-0002-8744-3546

github.com/SukiYume

Fields of Interest

- Observations and analysis of transient sources, including of fast radio bursts (FRBs).
- Digital signal processing, discovering interesting phenomena from data collected by radio telescopes.
- Applying statistical, deep learning, and other fields' new methods to astrophysical research.

Skills

Languages: Chinese (native), English (Fluent), Japanese (N2)

Software: Python, Pytorch, CUDA, Web Scraper (see Outreach and Other Experience)

Education

- **Doctor of Philosophy**, Astrophysics — Sept 2019 – Jun 2024
  National Astronomical Observatories, Chinese Academy of Sciences (NAOC)
- **Bachelor of Science**, Physics — Sept 2015 – Jun 2019
  University of Chinese Academy of Sciences (UCAS)

References

- **Prof.** Di Li — Tsinghua University
  dili@tsinghua.edu.cn
- **Prof.** Chao-Wei Tsai — National Astronomical Observatories of China
  cwtsai@nao.cas.cn

Honors and Awards

- President Award (Special Prize) of Chinese Academy of Sciences — **Top 0.1%**, Jul 2024
- Excellent Graduate of Beijing — **Top 1%**, Jul 2024
- National Scholarship for Graduate Student — **Top 0.1%**, Dec 2023
- People's Choice Poster in ACAMAR 9 — **Top 5%**, Aug 2023
- Merit Student of UCAS — **Top 10%**, May 2021

Professional Service

- Referee for Monthly Notices of the Royal Astronomical Society — 2024
- Referee for Nature Astronomy — 2023

Teaching

- Advanced Astrophysics by Prof. Ji-Feng Liu (070400M01003H) — 2020-2022
  Teaching assistant for graduate course at UCAS

Talks

- DSA Meeting, Online — Dec 2023
  The Stochastic Nature of Active Repeating Fast Radio Bursts
- FRB 2023, Online — Nov 2023
  The Stochastic Nature of Active Repeating Fast Radio Bursts
- FRB 2023, Online, **Invited** — Nov 2023
  FAST Observations of Fast Radio Burst

- ACAMAR 9, Perth, Australia, Poster — Aug 2023
  The Stochastic Nature of Repeating FRBs
- Chinese Fast Radio Burst Conference 2023, Hefei, China — May 2023
  The Stochastic Nature of Active Repeating FRBs
- ACAMAR/FRB, Online — Sept 2021
  Time Domain Analysis of two active repeating FRBs
- FAST/Future Pulsar Symposium 9, Jinan, China — Jul 2021
  Periodic Analysis of FRB 121102

Approved PI Proposals

- FAST, PT2024_0148 — **9 hours**, 2024
  Monitoring an active repeating FRB in a clean environment
- FAST, PT2024_0263 — **6 hours**, 2024
  A Mini Survey for White Dwarf Pulsar
- FAST, PT2023_0100 — **9 hours**, 2023
  Do All Active Repeating FRBs Have Complex Magnetic Environments?
- GBT, GBT/22A-502 — **41 hours**, 2022
  Monitoring FRB 20200120E in a Globular Cluster for Polarization Insights
- FAST, PT2022_0067 — **24 hours**, 2022
  Constrain the Relation between Fast Radio Bursts and Star Formation Rates
- FAST, PT2021_0039 — **20 hours**, 2021
  Do all fast radio bursts repeat?

Outreach and Other Experience

- MSP / This is a popular science project I built for converting radio data into audio.
  Based on this project, I created a video titled "Sounds from the Depths of the Universe", which was given as a gift to new students at UCAS in 2020. The video was widely shared by media outlets such as People's Daily and CCTV News, receiving widespread acclaim.
- CHIME VOEvents / This is the website I built to summarize CHIME VOEvents.
- DRAFTS / This is a tool I built using deep learning for real-time searching of single pulses in radio data.
- XiaoQing / Based on web scraping and large language models, I created my AI assistant, XiaoQing.

Publications

First Author

- **The arrival time and energy of FRBs traverse the time-energy bivariate space like a Brownian motion** — **SciBu**, Apr 2024
  Zhang Yong-Kun, Li Di, Feng Yi, Wang Pei, Niu Chen-Hui, Dai Shi, Yao Ju-Mei, Tsai Chao-Wei
- **FAST Observations of FRB 20220912A: Burst Properties and Polarization Characteristics** — **ApJ**, Oct 2023
  Zhang Yong-Kun, Li Di, Zhang Bing, Cao Shuo, Feng Yi, Wang Wei-Yang, Qu Yuanhong, Niu Jia-Rui, et al.
- **FAST Observations of an Extremely Active Episode of FRB 20201124A. II. Energy Distribution** — **RAA**, Dec 2022
  Zhang Yong-Kun, Wang Pei, Feng Yi, Zhang Bing, Li Di, Tsai Chao-Wei, Niu Chen-Hui, Luo Rui, et al.
- **Circular polarization in two active repeating fast radio bursts** — **SciBu**, Dec 2022
  Feng Yi, **Zhang Yong-Kun(co-first)**, Li Di, Yang Yuan-Pei, Wang Pei, Niu Chen-Hui, Dai Shi, Yao Ju-Mei

Co-Author

- **Scintillation Velocity and Arc Observations of FRB 20201124A** — **ApJL**, Jul 2024
  Wu Ziwei, et al. (including **Zhang Yong-Kun**)

- **The Relativistic Spin Precession in the Compact Double Neutron Star System PSR J1946+2052** — **ApJ**, May 2024
  Meng Lingqi, et al. (including **Zhang Yong-Kun**)
- **Scintillation Arc from FRB 20220912A** — **SCPMA**, Jan 2024
  Wu Zi-Wei, et al. (including **Zhang Yong-Kun**)
- **Discovery and Timing of Millisecond Pulsars in the Globular Cluster M5 with FAST and Arecibo** — **ApJS**, Dec 2023
  Zhang Lei, et al. (including **Zhang Yong-Kun**)
- **Atypical radio pulsations from magnetar SGR 1935+2154** — **arXiv**, Aug 2023
  Wang Pei, et al. (including **Zhang Yong-Kun**)
- **A radio pulsar phase from SGR J1935+2154 provides clues to the magnetar FRB mechanism** — **SciA**, Jul 2023
  Zhu Weiwei, et al. (including **Zhang Yong-Kun**)
- **Blinkverse: A Database of Fast Radio Bursts** — **Univ**, Jul 2023
  Xu Jiaying, Feng Yi, Li Di, Wang Pei, **Zhang Yongkun**, Xie Jintao, Chen Huaxi, Wang Han, et al.
- **Magnetic field reversal in the turbulent environment around a repeating fast radio burst** — **Sci**, May 2023
  Anna-Thomas Reshma, Connor Liam, Dai Shi, Feng Yi, Burke-Spolaor Sarah, Beniamini Paz, Yang Yuan-Pei, **Zhang Yong-Kun**, et al.
- **Do Multi-Structural One-Off FRBs Trace Similar Cosmology History with Repeaters?** — **Univ**, May 2023
  Zhu Yuhao, Niu Chenhui, Cui Xianghan, Li Di, Feng Yi, Tsai Chaowei, Wang Pei, **Zhang Yongkun**, et al.
- **An extreme active repeating fast radio burst in a clean environment** — **arXiv**, Apr 2023
  Feng Yi, Li Di, **Zhang Yong-Kun**, Tsai Chao-Wei, Wang Wei-Yang, Yang Yuan-Pei, Qu Yuanhong, Wang Pei, et al.
- **Atlas of dynamic spectra of fast radio burst FRB 20201124A** — **ChPhB**, Feb 2023
  Wang Bo-Jun, et al. (including **Zhang Yong-Kun**)
- **FAST Observations of an Extremely Active Episode of FRB 20201124A: I. Burst Morphology** — **RAA**, Dec 2022
  Zhou D. J., et al. (including **Zhang Yong-Kun**)
- **FAST Observations of an Extremely Active Episode of FRB 20201124A. III. Polarimetry** — **RAA**, Dec 2022
  Jiang Jin-Chen, Wang Wei-Yang, Xu Heng, Xu Jiang-Wei, Zhang Chun-Feng, Wang Bo-Jun, Zhou De-Jiang, **Zhang Yong-Kun**, et al.
- **FAST Observations of an Extremely Active Episode of FRB 20201124A. IV. Spin Period Search** — **RAA**, Dec 2022
  Niu Jia-Rui, Zhu Wei-Wei, Zhang Bing, Yuan Mao, Zhou De-Jiang, **Zhang Yong-Kun**, Jiang Jin-Chen, Han J. L., et al.
- **A fast radio burst source at a complex magnetized site in a barred galaxy** — **Natur**, Sept 2022
  Xu H., et al. (including **Zhang Yong-Kun**)
- **Radio Detection of an Elusive Millisecond Pulsar in the Globular Cluster NGC 6397** — **ApJL**, Aug 2022
  Zhang Lei, et al. (including **Zhang Yong-Kun**)
- **A repeating fast radio burst associated with a persistent radio source** — **Natur**, Jun 2022
  Niu C. -H., et al. (including **Zhang Yong-Kun**)
- **Frequency-dependent polarization of repeating fast radio bursts-implications for their origin** — **Sci**, Mar 2022
  Feng Yi, Li Di, Yang Yuan-Pei, **Zhang Yongkun**, Zhu Weiwei, Zhang Bing, Lu Wenbin, Wang Pei, et al.
- **A bimodal burst energy distribution of a repeating fast radio burst source** — **Natur**, Oct 2021
  Li D., Wang P., Zhu W. W., Zhang B., Zhang X. X., Duan R., **Zhang Y. K.**, Feng Y., et al.
- **Shining on from the first light: The early sciences of FAST** — **ChSBu**, Aug 2021
  Li Di, Wang Pei, **Zhang Yongkun**

- **CRAFTS for Fast Radio Bursts: Extending the Dispersion-Fluence Relation with New FRBs Detected by FAST** **ApJL**, Mar 2021
  Niu Chen-Hui, et al. (including **Zhang Yong-Kun**)
- **A Single-pulse Study of PSR J1022+1001 Using the FAST Radio Telescope** **ApJ**, Feb 2021
  Feng Yi, et al. (including **Zhang Yong-Kun**)