Shiyuan Wang

PERSONAL DATA

Gender: Female
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EDUCATION

Beijing Normal University **Beijing, CHN**
MSc in Astronomy *September 2022 - June 2025 (expected)*

– GPA: 3.8/4.0
– Core Courses: Relativistic Astrophysics, Dark Energy Theory and Related Cosmological Experiments, Observational Cosmology, radiative processes in astrophysics, Computational Astronomy

Qingdao University **Qingdao, CHN**
BSc in Applied Physics *September 2018 - June 2022*

– Core Courses: Mathematical methods for Physicists, Theoretical Mechanics, Thermodynamics and Statistical Physics, Computational physics, Probability Statistics and Linear Algebra

PUBLICATIONS

- **Wang, S.**, & Xia, J. (2025). Constraints on Evolutions of Fundamental Constants from Clustering of Fast Radio Bursts Dispersion Measure[J]. The Astrophysical Journal, 2025, 982(2): 86.
- **Wang, S.**, & Xia, J. (2025). Measuring the cosmic growth rate with CSST spectroscopic survey and Fast Radio Bursts. Eur. Phys. J. C 85, 414 (2025))

RESEARCH EXPERIENCE

Cosmological Constraints via FRB and Galaxy Surveys *2023.9-2024.12*

- Investigated limitations of kinetic Sunyaev-Zeldovich (kSZ) tomography in cosmological applications, such as velocity bias in velocity reconstruction.
- Developed a cosmological model combining mock FRB samples with CSST spectroscopic survey to obtain high precision kSZ velocity bias.
- Utilized MCMC and Fisher forecasting to constrain cosmic growth rate, dark energy models, Hubble constant, and modified gravity model.
- Achieved a precision of 0.1% of the constraint on $f\sigma_8$, and improvements of cosmological parameters compared to those obtained from Planck.

Study fundamental physical constants with FRB *2024.9-2025.2*

- Proposed a novel DM-$\alpha(z)$ correlation function to constrain fine-structure constant $\alpha(z)$ evolution, the deviation from the standard evolution of the CMB temperature, and the temporal variation of the proton-to-electron mass ratio.
- Built bayesian pipeline to constrain these fundamental constants at a precision of $10^{-3} \sim 10^{-4}$, respectively.

RESEARCH INTEREST

Large-scale structure and observational cosmology

- Analyze the **real data** from galaxy and CMB surveys to study the structure and the evolution history of the universe, including **late Universe** and **reionization epoch**.

- Measurement and cosmological applications of peculiar velocity field from galaxy surveys, or combined with CMB experiments (based on kSZ velocity reconstruction).
- Focus on **non-standard cosmological model**, especially the skew spectrum in redshift space.

Processing and applications of FRB data

- Analyze and model FRB observables to constrain cosmological parameters, such as late universe, reionization epoch and probe gravity.
- Investigate the baryonic feedback on small scales to study the optical depth profile or the electron profile in halo model (This part is mainly related to DM).
- Joint exploration using FRBs and other cosmological probes (e.g. 21 cm) to break degeneracy.

SKILLS

Programming	Python, LaTex, Linux, CosmoMC, Matlab
English Proficiency	IELTS 6.5 (Listening:6; Reading: 7.5; Writing: 6; Speaking: 5.5)

AWARDS & HONORS

- **Excellent TA**, Beijing Normal University, 2024
- **The First Price Scholarship**, Beijing Normal University, 2023
- **Postgraduate entrance examination star of Qingdao University**, Qingdao University, 2022