Kangning Diao

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Education

Tsinghua University	*Sept 2020 – June 2025*
Ph.D. Student, Department of Astronomy	*(est.)*

- **Adviced by:** Prof. Yi Mao
- **Research interest:**

   Astronomy: Reionization, 21 cm line, Galactic structure, Low frequency radio observation, Large scale structure;

   Statistics and Machine Learning: Differentiable simulations, Application and validation of ML models, Fast sampling methods.

University of California, Berkeley	*Jan 2024 – June 2025*
Visiting Student, Berkeley Center for Cosmological Physics	

- **Hosted by:** Prof. Uros Seljak

Tsinghua University	*Sept 2016 – June 2020*
BS in Physics	

Awards

First class comprehensive scholarship, Tsinghua University	*2023-2024*
Second class comprehensive scholarship, Tsinghua University	*2022-2023*
Outstanding Teaching Assistant, Department of Physics, Tsinghua University	*2022-2023*

Publications

First Author

Kangning Diao, Zack Li, Richard D.P. Grumitt, Yi Mao. *synax: A Differentiable and GPU-accelerated Synchrotron Simulation Package.* Submitted to ApJS. arXiv: 2410.01136 ↗

Kangning Diao, Richard D.P. Grumitt, Yi Mao. *Modeling Foreground Spatial Variations for 21 cm Gaussian Process Component Separation.* Submitted to ApJ. arXiv: 2407.11296 ↗

Kangning Diao, Zhaoting Chen, Xuelei Chen, Yi Mao. *Reionization Parameter Inference from 3D Minkowski Functionals of the 21 cm Signals.* 2024, ApJ, 974, 141. arXiv: 2406.20058 ↗

Kangning Diao, Yi Mao. *Multi-fidelity Emulator for Cosmological Large Scale 21 cm Lightcone Images: a Few-shot Transfer Learning Approach with GAN.* ICML 2023 Machine Learning for Astrophysics workshop. arXiv: 2307.04976 ↗ (ApJ version in prep.)

Others

Xiaosheng Zhao, Yuan-Sen Ting, **Kangning Diao**, Yi Mao. *Can Diffusion Model Conditionally Generate Astrophysical Images?* 2023, MNRAS, 526, 1699 arXiv: 2307.09568 ↗

Contribution: provided the GAN baseline, prepared dataset, and wrote paper.

Talks

Seminars

AstroAI Seminar, Harvard University	*Oct. 2024*
Lunar Science Meeting, UC Berkeley	*Sept. 2024*
Galaxy & Cosmology seminar, Tsinghua University	*June. 2023*

Conntributed

HI as a Cosmological Probe Conference, Nazareth, Israel	*May 2023*
Global 21cm Workshop, Berkeley, U.S.	*Oct 2022*
SAZERAC 21cm 2022, Virtual	*May 2022*

Posters

Computing senses Cosmos, Hangzhou, China	*Oct 2023*
ICML 2023 ML4Astro workshop, Hawaii, U.S.	*Aug 2023*

Others

ML Session, *Introduction to Gradient Based Sampling methods*, Tsinghua University, China	*Dec 2023*
ML Session, *A Quickstart for Parallel Computing with* `JAX`, Tsinghua University, China	*Dec 2022*

References

Prof. Yi Mao, Tsinghua University, Beijing, China.	*ymao@tsinghua.edu.cn*
Prof. Uros Seljak, UC Berkeley, Berkeley, U.S.	*useljak@berkeley.edu*
Prof. Xuelei Chen, NAOC, Beijing, China.	*xuelei@cosmology.bao.ac.cn*
Dr. Zack Li, UC Berkeley, Berkeley, U.S.	*zackli@berkeley.edu*

Teaching Experience

Analytical Mechanics, Teaching Assistant	*Fall 2022*
General Relativity, Teaching Assistant	*Spring 2022*
Applications of General Relativity, Teaching Assistant	*Fall 2021*
General Relativity, Teaching Assistant	*Spring 2021*
General Physics I: Mechanics and Special Relativity, Teaching Assistant	*Fall 2020*

Service & Outreach

Organizer of Machine Learning Session, DoA, Tsinghua	*2022-2023*
Coach & Organizer of Tsinghua Student Taekwondo Association	*2020-2021*
Captain of Tsinghua Taekwondo Team	*2017-2018*