Ke Ma

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EDUCATION AND CERTIFICATION

University of Nottingham **Nottinham, UK**
Ph.D. in Astrophysics *September 2023 – Present*
Supervisor: Prof. James S. Bolton, University of Nottingham
Project: Cosmology with the Lyman-Alpha forest
Research Focus: The Lyman-Alpha Forest; The Intergalactic Medium; Epoch of Reionization; High-Redshift Galaxies
Scholarship: China Scholarship Council (CSC) Research Excellence Scholarship

University College London **London, UK**
Master in Science in Theoretical Physics (Integrated Master) *September 2017 - June 2021*
Supervisor: *Prof. Andrew Pontzen, University College London*
GPA: 85/100 (Distinction, First Class Honors, Top 5%, Rank 1st second year)
Relevant Courses: Nuclear and Particle Physics (97%), Solid State Physics (96%), Mathematical Methods for Theoretical Physics (95%), Cosmology (91%), Galaxy Dynamics Formation and Evolution (79%)
Graduate Thesis: Improved Estimator of Dark Matter Entropy in Cosmological Simulations

RESEARCH EXPERIENCE

Effects of Cosmic Variance on the Lyα LFs at z~2.2 **Beijing, China**
Supervisor: Associate Professor Zheng Cai, Tsinghua University *October 2021 – June 2023*
Position: Research Assistant

- Selected out Lyα Emitters (LAEs) candidates using the SExtractor software from HSC NB387 and NB400 imaging data
- Investigated Luminosity Functions (LFs) of z~2.2 LAEs using self-written python codes to compare with literature
- Proposed and implemented a method to measure the galaxy number density dispersion from the LFs to observationally quantify the cosmic variance

(Paper accepted by the Astrophysical Journal)

Shanghai AI Lab **Shanghai, China**
Position: Research Intern *June 2021 – September 2021*

- Wrote basic gravitational simulation Python code using velocity-verlet algorithms
- Applied and modified the LSTM neural network on the simulation data using the PyTorch package
- Trained a deep learning model to replace the brutal-force simulation with less computational cost

PUBLICATIONS

- **An improved model for the effect of correlated Si-III absorption on the 1D Lyα forest power spectrum**
  Ke Ma et al., 2025, Submitted to MNRAS, https://arxiv.org/abs/2509.08613
- **MAMMOTH-Subaru V. Effect of Cosmic Variance on Lyα luminosity functions at z=2.2-2.3**
  Ke Ma et al., 2024, Accepted by ApJ, https://iopscience.iop.org/article/10.3847/1538-4357/ad04da/meta
- **MAMMOTH-Subaru IV. Large scale structure and clustering analysis of LAEs and Lyα blobs at z=2.2-2.3**
  Haibin Zhang et al., 2025, Accepted by ApJ, https://iopscience.iop.org/article/10.3847/1538-4357/adb41b/meta
- **MAMMOTH-Subaru III. Lyα Halo identified by stacking ~3300 LAEs at z=2.2-2.3**
  Haibin Zhang et al., 2024, Accepted by ApJ, https://iopscience.iop.org/article/10.3847/1538-4357/ad07d3/meta
- **MAMMOTH-Subaru II. Diverse populations of circumgalactic Lyα nebulae at cosmic noon**
  Mingyu Li et al., 2024, Accepted by ApJ, https://iopscience.iop.org/article/10.3847/1538-4365/ad812c/meta

AWARDS

China Scholarship Counicl (CSC) Research Excellence Scholarship *2023*

Dean's List (Top 5% graduating students) by UCL Faculty of Mathematical and Physical Science *2021*

Wood's Prize (Rank 1st for second year Physics) by UCL Department of Physics and Astronomy *2019*

SKILLS & INTERESTS

Languages: Mandarin (Native), English (Fluent)

Skills: Python (Profound), Github (Profound), Overleaf LaTex (Profound), Matlab (Basic), Mathematica (Basic), html (Basic), GADGET (Basic), SExtractor (Basic)

Interests: Stargazing, Reading, Video Editing