SHUYU TAN (she/her/hers)

Laboratory for Space Research, 405B, Block A, Cyberport 4, Hong Kong
E-mail: shuyut@hku.hk

EDUCATION

M.Phil. (master by research) in Physics 09/2020 - 07/2022
The University of Hong Kong, Hong Kong (supported with full scholarships)
Supervisor: Prof. Quentin Parker
MPhil Thesis: Planetary Nebulae in the Galactic Bulge (link to PDF)
Relevant Courses: General Relativity, Planetary Sciences, Data Analysis and Modelling

B.Sc. in Physics 10/2016 - 06/2019
Imperial College London, London, UK
Overall: 63.7, *Second Class Honours (Upper Division)*
Relevant Courses: Statistics, Mathematical Methods, Physics of the Universe, Relativity, Astrophysics, Astronomical Image Processing, Cosmology (graduate)

RESEARCH INTERESTS

Galaxy evolution, near-field cosmology, astronomical data analysis, numerical simulations

RESEARCH EXPERIENCES

Research Assistant 10/2022 - present
The University of Hong Kong, Hong Kong
Supervisor: Prof. Quentin Parker
- Age estimation, machine-learning and statistical analysis of planetary nebulae (PNe) observations to understand the chemical evolutionary history in the Galactic bulge
- Preparing the relevant manuscripts based on this research

M.Phil. Project - Planetary Nebulae in the Galactic Bulge 09/2020 - 07/2022
The University of Hong Kong, Hong Kong
Supervisor: Prof. Quentin Parker
- PNe image analysis, reduction procedure development for the VLT long-slit spectroscopic data of PNe, spectrum fitting, PN chemical abundance determination, and the data analysis

Research Project - Coordinate transformations in Galactic dynamics 06/2020 - 09/2020
Shanghai Jiao Tong University, Shanghai, China
Supervisor: Prof. Zhao-Yu Li & Prof. Juntai Shen
- Computed action-angle coordinates of solar-neighbouring stars in *Gaia* DR2 and interpreted the star kinematics through a combination of physical and angle-action coordinates

B.Sc. Final-year Project - Weak Lensing with the Dark Energy Survey (DES) 01/2019 - 05/2019
Imperial College London, London, UK
Supervisor: Prof. Alan Heavens
- Two-point correlation function measurement using galaxy fluxes from the DES Y1 data and applied machine learning and data resampling methods to quantify the cosmic magnification effect

Research Project - Exploring the phase mixing in the Milky Way 07/2018 - 09/2018
Shanghai Astronomical Observatory, CAS, Shanghai, China
Supervisor: Prof. Juntai Shen & Prof. Zhao-Yu Li
- Modelling of the phase-space structures of solar-neighbouring stars in *Gaia* DR2 and provided evidence for an initially out-of-equilibrium stellar phase-space distribution

Research Student 06/2018 - 07/2018
National Astronomical Observatories of China, Beijing, China
Supervisor: Prof. Xuelei Chen
- Testing data analysis, foreground cleaning strategies for the Tianlai Dish Pathfinder Array

PUBLICATIONS

My MPhil thesis led to a series of six papers, for which I was the only first author on each paper.

I. **Tan, S**. et al. “Morphologies and Central Stars of Planetary Nebulae in the Galactic bulge from VLT, HST and Pan-STARRS imaging”, MNRAS (IF: 5.235) 519.1 (2023): 1049-1067.

II. **Tan, S**. et al. “When the Stars Align: A Remarkable 5σ Concordance of Planetary Nebulae Major Axes in the Centre of our Galaxy”, **ApJ Letters** (IF: 8.811) 951 L44.

III. [Submitted] **Tan, S**. et al. “A Catalogue of Planetary Nebulae Chemical Abundances in the Galactic Bulge”, MNRAS (IF: 5.235) submitted in Aug 2023 - being editing based on referee report

IV. [Submitted] **Tan, S**., & Parker, Q. A. “Whither or Wither the Sulfur Anomaly in Planetary Nebulae?”, ApJ Letters (IF: 8.811) submitted in Sep 2023 - under review

V. **Tan, S**.,& Parker, Q. A. “Chemical evolution in the Galactic bulge as traced by planetary nebulae” - in preparation - manuscript editing

VI. **Tan, S**., & Parker, Q. A. “Abundance discrepancy factor in planetary nebulae” - in preparation

TALKS, CONFERENCES AND WORKSHOPS

Invited video interview, AAS Journal Author Series, online (link to video)	09/2023
Sagan Exoplanet Summer Hybrid Workshop**,** online	07/2022
Summer School in Statistics for Astronomers XVII, online	06/2022
The 16th Iberian Cosmology Meeting, online	05/2022

TEACHING EXPERIENCES

Lab Demonstrator (language of instruction: English) 11/2020 - 05/2022
The University of Hong Kong**,** Hong Kong
Courses**:** PHYS2261: Introductory heat and thermodynamics; PHYS2255: Introductory electricity and magnetism

Teaching Assistant (language of instruction: English) 06/2020 - 10/2020
Shanghai Jiao Tong University**,** Shanghai, China
Course**:** Galactic dynamics (graduate)

SKILLS AND INTERESTS

Observations: Astronomical image processing, spectroscopic data reduction, chemical abundance determination of the interstellar medium
Modelling: N-body simulation of stellar kinematics, Bayesian inference with MCMC
Programming**:** Python (libraries: NumPy, SciPy, pandas, Astropy, Scikit-Learn), Fortran (intermediate), R (basic), SQL (basic), MATLAB (basic), Unix, Linux
Softwares**:** IRAF, PyRAF, LaTeX, MS Office suite, OriginLab
Languages**:** English (proficient), Chinese (native)

REFERENCES

Prof. Quentin A Parker
Professor
Laboratory for Space Research
The University of Hong Kong
Pokfulam Road, Hong Kong
E-mail: quentinp@hku.hk

Prof. Zhao-Yu Li
Professor
Department of Astronomy
Shanghai Jiao Tong University
Shanghai, China 200240
E-mail: lizy.astro@sjtu.edu.cn