XINYUE LIANG

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Education

Xiamen University Sep. 2021- Expected 2024
Graduate Student, Department of Astronomy Xiamen, CN
Xiamen University Sep. 2017 - Jun. 2021
Bachelor of Science Xiamen, CN

- Thesis advisor: Advisors:Prof.Zheng Zhen-Ya, Prof. Taotao Fang
- Thesis title: The Optical and X-ray Signatures of Supermassive Black Hole Binary

Research Experience

The robustness in identifying and quantifying high-redshift bars using JWST observations
Submitted to A&A arXiv:2311.04019 Feb. 2023 – Present
Advisors: Prof. Taotao Fang, Prof. Luis C. Ho, Dr. Si-Yue Yu

- We use three categories of simulated images to investigate how the limitations of observations can impact the identification and measurements of bars, specifically under the JWST CEERS observation conditions.
- Find that bar identification and measurements are greatly affected by resolution but only slightly influenced by noise. Moreover, at $z = 3.0$, approximately 50% of barred galaxies may go undetected due to observational limitations.
- Additionally, we have developed functions to correct the observational biases measuring bar properties.
- Remarkably, the simulated apparent bar fraction ($f_{\rm bar}$) is in good agreement with JWST observations reported by Conte et al., suggesting that the observed $f_{\rm bar}$ is significantly underestimated, especially at higher redshifts, leading to an overstated evolution of the $f_{\rm bar}$

On the Principal Component Analysis of Surface Density Profiles Step. 2021 – May. 2022
Advisors: Prof. Taotao Fang, Prof. Luis C. Ho, Dr. Si-Yue Yu

- We apply the principal component analysis (PCA) to the surface density profiles (SDPs) of the galaxies from the *Spitzer* Survey of Stellar Structure in Galaxies (S^4G).
- Find that the result of PCA is related to the shape of the SDPs, and can be used to quantify the contribution of bulge component.
- As a result, We define a new bulge type indicator, which turns out to be well consistent with the transitional bulge indicator $\Delta\langle\mu_e\rangle$.

The properties of barred galaxies in TNG50 June 2022 – Present
Advisors: Prof. Taotao Fang, Prof. Luis C. Ho, Dr. Si-Yue Yu

- In this work, we aim to quantify the properties of barred galaxies using the mock images of TNG50 and compare them to the observations.
- We identify the barred galaxies by ellipse fitting, which is common used in observation work.
- Currently we have measured the semi-major axis and ellipticity of the bars both in TNG50 and DESI and are going to compare them quantitatively in the next step.

Research Interests

- Galaxy formation and evolution
- Quantitative galaxy morphology
- Cosmic evolution of disk structure
- Galaxy-galaxy interaction

Specialized Skills

Programming Languag: Python (Experienced), C, Shell
Software and Packages: Photutils, Imfit, TOPCAT, Statmorph, AutoProf, CIAO, HEAsoft

Teaching Experience

Observational Astrophysics
Teaching assistant *2022 Spring*

Awards & Honors

Undergraduate Research and Training Program Grant, Chinese Academy of Sciences
Shanghai Astronomical Observatory, Chinese Academy of Sciences *2019*
Guangqi Scholarship of Shanghai Astronomical Observatory
Shanghai Astronomical Observatory, Chinese Academy of Sciences *2019, 2020*
National Astronomical Observatory Scholarship
National Astronomical Observatories, Chinese Academy of Sciences *2020*