Xiaoyuan Yang

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Education

Wuhan University Sep. 2021 - Jun. 2025
*Bachelor of Science in **Physics*** | **GPA**:3.60/4.0 87.4/100 Wuhan, China

- **Scholarship&Honor**:Third-class Scholarship (Sep. 2022); Merit Student (Sep. 2022)

Research Experience

Synthetic Observations of Dense Collapsing Gravomagneto Sheetlets
Jul. 2024 –Present
Department of Astronomy, University of Virginia *Supervisor: Prof. Zhi-Yun Li*

- Analyzed the data of non-ideal MHD simulation of the formation of protostellar discs from the collapse of dense magnetized molecular cloud cores to understand how the forces are balanced around the forming protostar , and to correlate the observable physical quantities with the magnetic field strength.
- Conducting RADMC-3D synthetic observations under various conditions to measure the observable physical quantities observationally and obtain the magnetic field strength indirectly.

Magnetized Wind Beyond the Outer Truncation in Protoplanetary Disks
Sep. 2023 – Present
Department of Astronomy and Institute for Advanced Study, Tsinghua University *Supervisor: Prof. Xue-Ning Bai*

- Obtained the steady-state solution of Weber-Davis wind using Newton-Raphson method.
- Conducting MHD numerical simulation with Athena++ to develop a semi-analytic model for the magnetized wind originating from regions near disk outer truncation.

Searching for Compact Objects from LAMOST Time-Domain Survey
Jul. 2022 – Present
Department of Astronomy, School of Physics and Technology, Wuhan University *Supervisor: Prof. Wei Wang*

- Search for single-lined spectroscopic binary systems with phase-resolved radial velocity measurements and the periodic signals from the radial velocity measurements with the Lomb-Scargle method, fit the radial velocity curve using Monte-Carlo method and calculate the mass function.

Numerical Simulation of Black Hole Accretion
Aug. 2023 – Nov. 2023
Shanghai Astronomical Observatory, Chinese Academy of Science(CAS) *Supervisor: Prof. Feng Yuan*

- Reproduced hydrodynamical non-radiative accretion flows with ZEUS-2D code to investigate the properties of non-radial rotating accretion flows by introducing an anomalous stress tensor into hydrodynamics equations.
- Carried out a set of two-dimensional (axially symmetric) hydrodynamic numerical experiments by using a simple starting configuration and a set of well-defined boundary conditions.

Seminar Series

Protoplanetary Disk and Planet Formation Summer School
Jul. 2024
Peking University, Tsinghua University and China Center for Advanced Science and Technology

- Participated in lectures and conducted discussion on magnetohydrodynamics, planet formation, disk observations, grid-based method for dust and gas dynamics, N-body method and SPH/meshless method.

Code/Astro Software Engineering Workshop for Astronomy
Jul. 2024
Center for Interdisciplinary Exploration and Resarch in Astrophysics, Northwestern University

- Attended lectures about Git mechanics and development of open-source Python packages.
- Built and uploaded an open-source Python packages for processing Athena++ hdf5 file.

Tsung Dao Lee Institute (TDLI) Astro-Division 2024 Winter Camp
Jan. 2024
Tsung Dao Lee Institute (TDLI), Shanghai Jiao Tong University

- Learned about planet formation, exoplanets searching, laboratory astrophysics, gravitational wave and plasma around black holes.
- Utilized the polarized General Relativistic Radiative Transfer (GRRT) simulation code RAPTOR to construct images and movies of M87 black hole and Sgr A^* and explored the properties of black hole shadows under various conditions including changes in mass, inclination, and additional relevant parameters.

Skills

Programming Python, C/C++, Fortran, MATLAB,LaTeX
Packages Astropy, TheJoker, Scipy, Numba

Membership

"Qibin" Astronomical Elite Class Apr. 2023 –Jun. 2025
Jointly Provided by Wuhan University and National Astronomical Observatories, CAS

- Attended seminars, research class, and internship on frontiers of both theoretical and observational astronomy.
- Doing undergraduate research project under the guidance of a mentor.