

Chi Han

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EDUCATION

- University of Michigan - Ann Arbor (2020-2024, overall GPA: 3.834)
 - B.S. Honors Physics (major GPA: 3.937)
 - B.S. Honors Astronomy and Astrophysics (major GPA: 3.794)
 - B.S. Mathematical Physics (major GPA: 3.776)

RESEARCH EXPERIENCE

- **Anisotropic Distribution of Subhaloes: Coherent Accretion and Internal Orbits (SU 2023 -)**
Instructors: Prof. Camille Avestruz, Dr. Kuan Wang
 - Processed data from IllustrisTNG Simulation to study the orbit of subhalos before and after their accretion.
 - Verified the coherent accretion of subhalos from cosmic filaments using spherical KDE.
 - Clustered subhalo orbits after accretion using functional data clustering techniques in machine learning to unveil the relation between orbit modes and subhalo properties.
 - Studied correlations of halo properties with different orbit modes.
- **Isochrone Fitting Model for Binary Systems in the ARMADA Survey (FA 2022 -)**
Instructors: Prof. John Monnier, Dr. Tyler Gardner
 - Used the Python package `isochrones` to construct an isochrone fitting model and pipeline for approximately 70 targets in the ARMADA survey.
 - Applied MCMC techniques to investigate the correlations between parameters used for fitting.
 - Used the HD6456 system for a detailed study and discovered degeneracy caused by varying metallicity.
 - Inspected the distribution of the difference between photometric and dynamic masses of binary systems consisting of rapidly rotating A-stars using isochrone fitting.
 - The study potentially leads to methods for rotation correction in isochrone fitting.
- **Constructing the Metallicity Map of the Milky Way based on Open Cluster Orbits (SU 2023 -)**
Instructors: Prof. John Monnier, Dr. Tyler Gardner
 - Applied machine learning techniques to make a metallicity map of the Milky Way with open cluster orbit. Used GALPY to obtain the birth position of over 1000 open clusters in the Gaia catalog.
 - Cross-checked with existing studies on Milky Way metallicity to verify the metallicity predicted with the machine learning algorithm.
- **Instrumentation work on infrared camera shutter and accelerometer (SU 2022)**
Instructor: Prof. John Monnier
 - Developed python and arduino script to read in accelerometer data, communicate with a raspberry pi, and analyze it through fourier transforms.
 - Developed C scripts to control the shutter of infrared cameras on MIRC-X.
- **Late Time Swift Observations of the Relativistic TDE Candidate AT2022cmc (WN 2022)**
Instructors: Prof. Jon Miller, Dr. Mark Reynolds
 - Used NASA's HEASARC Xspec to process optical, spectral, and time series data from the Swift Observatory.
 - **Han, C.**, Reynolds, M. T., Miller, J. M., Gediman B., Hemrattaphan Y., Zak, M. K. (2022)
LATE TIME SWIFT OBSERVATIONS OF THE RELATIVISTIC TDE CANDIDATE AT2022CMC
[Astronomers Telegram, 15439](#)

PUBLICATIONS

- **Han, C.**, Wang, K., Avestruz, C., Anbajagane, D.
ANISOTROPIC DISTRIBUTION OF SUBHALOES: COHERENT ACCRETION AND INTERNAL ORBITS
arXiv preprint: <https://arxiv.org/abs/2312.08337>, to be submitted to *The Astrophysical Journal*, December 2023

POSTER AND TALKS

- **Han, C.**, Gardner, T., Monnier, J.D., Peterson, C. (2023, April 14).
THE ARMADA SURVEY: PHOTOMETRIC MASS AND AGE FOR INTERMEDIATE MASS BINARY SYSTEMS.
[Poster Presentation]
2023 Astronomy Undergraduate Poster Session, University of Michigan.
- **Han, C.** (2023, November 6).
SUBHALO ORBITS AFTER ACCRETION: CLUSTERING WITH MACHINE LEARNING AND VISUALIZATION
[Talk]
ALCCA Group Meeting, University of Michigan.
- **Han, C.**, Wang, K., Avestruz, C.
ANISOTROPIC DISTRIBUTION OF SUBHALOES: COHERENT ACCRETION AND INTERNAL ORBITS
Poster in preparation.
243rd AAS Meeting, New Orleans, Louisiana.

TEACHING AND OUTREACH

- Telescope Operator (2022 -)
 - Operate the 0.4m Cassegrain Reflector at Angell Hall for public events and introductory astronomy classes.
- Contributed \LaTeX [Lecture Note](#) for Future Teaching - Physics 406 (Statistical Mechanics, WN 2023)
- Learning Assistant - Physics 104 (Programming for Introductory Science Courses, FA 2023)
 - Participate in lectures and hold office hours to answer questions on scientific programming with python.
- Member of Student Astronomical Society at University of Michigan (2021 -)

SKILLS

- Coding Languages:
 - Proficient: Python (scikit-learn, scipy, emcee, pytorch, lmfit, isochrones, illustris_python), MATLAB
 - Intermediate: JAVA, C/C++
- Spoken Languages: Mandarin Chinese (Native), English (Fluent), Japanese (Intermediate), Bahasa Indonesia (Beginner)

RELEVANT ELECTIVE COURSEWORK

- Astronomy: ASTRO 406 (Computational Astrophysics, A)
- Physics: PHYS 457[†] (Particle Physics and Cosmology); PHYS 526 (Cosmology, A); PHYS 535* (General Relativity)
- Math: MATH 454 (Partial Differential Equation, A); MATH 556 (Applied Functional Analysis, A); MATH 572[†] (Numerical Differential Equation)
* in progress, [†] will take next semester