

# Chi Han

---

email: hanchi@umich.edu

homepage: suzutsuki-ch.github.io

## EDUCATION

---

- University of Michigan - Ann Arbor (2020-2024, overall GPA: 3.803)
  - B.S. Honors Physics (major GPA: 3.920)
  - B.S. Honors Astronomy and Astrophysics (major GPA: 3.754)
  - B.S. Mathematical Physics (major GPA: 3.725)

## RESEARCH INTERESTS

---

I am broadly interested in topics within cosmology and stellar astrophysics, and I enjoy applying computational methods to my studies. During my PhD, I hope to work with data from surveys and contribute to simulation projects. In cosmology, I aim to delve into the study of structure formation and the expansion of the universe, as well as explore the physics of various dark matter models. In stellar astrophysics, I hope to focus on dynamics in many-body systems and study stellar rotation through simulations. Additionally, I am interested in various astronomical imaging techniques.

## 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 machine learning methods to unveil the relation between orbit modes and subhalo properties.
- **Isochrone Fitting Model for Binary Systems in the ARMADA Survey (FA 2022 - WN 2023)**  
Instructors: Prof. John Monnier, Dr. Tyler Gardner
  - Used the Python package `isochrones` to construct an isochrone fitting model 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.
- **Effect on Isochrone Fitting of Binary Systems from Stellar Rotation (SU 2023 - )**  
Instructors: Prof. John Monnier, Dr. Tyler Gardner
  - 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 classical techniques in machine learning such as random forest 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.

- **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.

## POSTERS AND PUBLICATIONS

---

- **ANISOTROPIC DISTRIBUTION OF SUBHALOES: COHERENT ACCRETION AND INTERNAL ORBITS\***  
*Chi Han, Kuan Wang, Camille Avestruz (Univ. Michigan)*
- **POSTER THE ARMADA SURVEY: PHOTOMETRIC MASS AND AGE FOR INTERMEDIATE MASS BINARY SYSTEMS**  
*Chi Han, John Monnier, Colton Peterson (Univ. Michigan), Tyler Gardner (Univ. Exeter)*
- **ATEL 15439 LATE TIME SWIFT OBSERVATIONS OF THE RELATIVISTIC TDE CANDIDATE AT2022CMC**  
*C. Han, M. T. Reynolds, J. M. Miller, B. Gediman, Y. Hemrattaphan, M. K. Zak (Univ. Michigan)*

\* indicates in progress

## 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 - )

## RELEVANT ELECTIVE COURSEWORK

---

- Astronomy: ASTRO 406 (Computational Astrophysics)
- Physics: PHYS 457<sup>†</sup> (Particle Physics and Cosmology); PHYS 526 (Cosmology); PHYS 535\* (General Relativity)
- Math: MATH 454 (Partial Differential Equation); MATH 556 (Applied Functional Analysis); MATH 572<sup>†</sup> (Numerical Differential Equation)

\* in progress, <sup>†</sup> will take next semester