Chi Han

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Education

- College of LSA, 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 Experience

- University of Michigan Physics Department, instructors: Prof. Camille Avestruz and Dr. Kuan Wang
  - Anisotropic Distribution of Subhaloes: Coherent Accretion and Internal Orbits (SU 2023 -)
    - Processed TNG300-1 data from IllustrisTNG Simulation to verify the coherent accretion from cosmic filaments.
    - Investigated the correlation between anisotropies in the distribution of dark matter halo parameters and coherent accretion. Applied statistical techniques in the study.
- University of Michigan Astronomy Department, instructors: Prof. John Monnier and Dr. Tyler Gardner
  - Isochrone Fitting Model for Binary Systems in the ARMADA Survey (FA 2022 - WN 2023)
    - 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 -)
    - Inspected the distribution of the difference between photometric and dynamic masses of binary systems consisting of rapidly rotating A-stars using isochrone fitting.
  - Validating the Metallicity Map of the Milky Way based on Open Cluster Orbits with Machine Learning (SU 2023 -)
    - Applied classical techniques in machined 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 algorthm.

- University of Michigan Astronomy Department, instructors: Prof. Jon Miller and Dr. Mark Reynolds
  - Late Time Swift Observations of the Relativistic TDE Candidate AT2022cmc (WN 2022)
    - Used NASA's HEASARC Xspec to process optical, spectral, and time series data from the Swift Observatory.

Poster and Publications

- Poster The ARMADA Survey: Photometric Mass and Age for Intermediate Mass Binary Systems (Apr, 2023)
  Chi Han, John Monnier, Colton Peterson (Univ. Michigan), Tyler Gardner (Univ. Exeter)
- ATEL 15439 Late Time Swift Observations of the Relativistic TDE candidate AT2022cmc (Apr, 2022)
  C. Han, M. T. Reynolds, J. M. Miller, B. Gediman, Y. Hemrattaphan, M. K. Zak (Univ. Michigan)
- Subhalo Anisotropic Distribution: Anisotropic Distribution of Subhaloes: Coherent Accretion and Internal Orbits*
  Chi Han, Kuan Wang, Camille Avestruz (Univ. Michigan)
- Effect on Binary System Isochrone Fitting from Rapid Rotators*
  Chi Han, John Monnier, Colton Peterson (Univ. Michigan), Tyler Gardner (Univ. Exeter)

* indicates in progress

Teaching and Outreach

- Telescope Operator (2022 -)
  - I operate the 0.4m Cassegrain Reflector at Angell Hall for public events and introductory astronomy classes.
- 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.
- Contributed LaTeX Lecture Note for Future Teaching - Physics 406 (Statistical Mechanics, WN 2023)
- Member of Student Astronomical Society at University of Michigan (2021 -)

Relevant Coursework

- Physics 401 (Mechanics)
- Physics 405 (Electrodynamics)
- Physics 406 (Statistical Mechanics)
- Physics 453 (Quantum Mechanics)
- Physics 526 (Cosmology)
- Physics 535* (General Relativity)
- Math 454 (Partial Differential Equation)
- Math 525* (Theory of Probability)
- Math 556 (Functional Analysis)
- Astro 361 (Astronomical Techniques)
- Astro 402 (Stellar Astrophysics)
- Astro 404 (Galaxy and The Universe)
- Astro 406 (Computational Astrophysics)

* indicates in progress