Xiaowei Ou

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Education

Massachusetts Institute of Technology Sep 2020 – Present
PhD, Physics *Cambridge, MA*

University of Michigan Sep 2016 – Apr 2020
Bachelor of Science, Physics and Astronomy & Astrophysics *Ann Arbor, MI*

Research Experience

Research Assistant Sep 2020 – Present
Massachusetts Institute of Technology *Cambridge, MA*

- Co-advised by Professor Anna Frebel and Lina Necib
- Study the Galaxy formation history and structure using stellar kinematics and chemistry
- Developed a procedure to incorporate measurement uncertainties in the clustering algorithm HDBSCAN to produce the most stable and robust kinematics clusters in *Gaia* early data release 3
- Derived precise parallaxes for stars at > 10 kpc away, $\sim 40\%$ improvement from *Gaia* parallaxes; Studied the MW circular velocity curve to probe the Galaxy's potential and updated the model of the DM density profile.
- Identified and studied new spectroscopically confirmed members in the Hercules UFD to probe its potential tidal disruption and underlying DM distribution
- Studied the *r*-process enrichment process in the GSE merger debris to constrain the time delay between different *r*-process production channels
- Build a *Gaia*DR3 synthetic survey from the Latte suite of the FIRE-2 simulations based on the code base ANANKE, previously used to match the *Gaia* DR2 release in Sanderson et al. (2020)

Research Assistant Sep 2016 – Apr 2020
University of Michigan *Ann Arbor, MI*

- Advised by Professor Ian Roederer
- Identified the chemical characteristics of the core of Sgr using the data derived from the APOGEE survey; Tagged and located Sgr stars in the leading and trailing tidal debris using chemical signatures identified in the core as an independent approach to the current Sgr debris model
- Derived Vanadium abundances of 255 metal-poor stars using improved atomic transition data through MOOG; Calibrated the measurements with Python, and compared the result with other Fe-group elements to identify correlations

Research Presentations

2023MNRAS.521.2623O Ou, Xiaowei, Necib, Lina, and Frebel, Anna: *Robust clustering of the local Milky Way stellar kinematic substructures with Gaia eDR3, MNRAS*,521,2623 (2023)
2023arXiv230312838O Ou, Xiaowei, Eilers, Anna-Christina, Necib, Lina, and Frebel, Anna: *The dark matter profile of the Milky Way inferred from its circular velocity curve,* arXiv e-prints,arXiv:2303.12838 (2023)
2020ApJ...900..106O Ou, Xiaowei, Roederer, Ian U., Sneden, Christopher, Cowan, John J., Lawler, James E., Shectman, Stephen A., and Thompson, Ian B.: *Vanadium Abundance Derivations in 255 Metal-poor Stars, ApJ*,900,106 (2020)
2023AJ....165...55C Chiti, Anirudh, Frebel, Anna, Ji, Alexander P., Mardini, Mohammad K., Ou, Xiaowei, Simon, Joshua D., Jerjen, Helmut, Kim, Dongwon, and Norris, John E.: *Detailed Chemical Abundances of Stars in the Outskirts of the Tucana II Ultrafaint Dwarf Galaxy, AJ*,165,55 (2023)

2022arXiv221015013W Wang, Shuyu, Necib, Lina, Ji, Alexander P., Ou, Xiaowei, Lisanti, Mariangela, de los Reyes, Mithi A. C., Strom, Allison L., and Truong, Mimi: *High-Resolution Chemical Abundances of the Nyx Stream,* arXiv e-prints,arXiv:2210.15013 (2022)
2022ApJ...936...78M Mardini, Mohammad K., Frebel, Anna, Chiti, Anirudh, Meiron, Yohai, Brauer, Kaley V., and Ou, Xiaowei: *The Atari Disk, a Metal-poor Stellar Population in the Disk System of the Milky Way, ApJ*,936,78 (2022)
2021ApJS..254...31C Chiti, Anirudh, Frebel, Anna, Mardini, Mohammad K., Daniel, Tatsuya W., Ou, Xiaowei, and Uvarova, Anastasiia V.: *Stellar Metallicities from SkyMapper Photometry. II. Precise Photometric Metallicities of ∼280,000 Giant Stars with [Fe/H] < -0.75 in the Milky Way, ApJS*,254,31 (2021)

Other Experience

LSST-DA Data Science Fellowship Program Fellow Sep 2023 – Sep 2025
Northwestern University *Cook County, IL*

- Participate in a two-year training program designed to teach skills required for Vera C. Rubin Observatory Legacy Survey of Space and Time (LSST) science
- Learn a wide range of essential skills, including the basics of managing and building code, statistics, machine learning, scalable programming, data management, image processing, visualization, and communication

Vice President for Physics Graduate Student Council May 2021 – May 2022
Massachusetts Institute of Technology *Cambridge, MA*

- Assist in communicating graduate students' needs with department admin
- Lead the effort to restart graduate student social post-pandemic

Treasurer for Ashdown House May 2021 – May 2023
Massachusetts Institute of Technology *Cambridge, MA*

- Manage finances for one of the biggest graduate residence halls on campus
- Make executive decisions and communicate with Campus Housing representing 500+ residents

Specialized Skills

Programming Languages: Python (intermediate), MATLAB (beginner), Mathematica (beginner)