Drew Lapeer

(they/them)

Curriculum Vitae

University of Massachusetts Department of Astronomy
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Education

University of Massachusetts, Amherst, MA
PhD, Astronomy
MSc, Astronomy
2024-Present

University of Michigan, Ann Arbor, MI
Bachelor of Science, Astronomy & Astrophysics (High Honors)
Bachelor of Science, Interdisciplinary Physics
2021-2024

Washtenaw Community College, Ann Arbor, MI
Guest Student
2022-2023

Macomb Community College, Macomb, MI
General Studies (Michigan Transfer Agreement)
2019-2021

Honors & Awards

Walter W. Wada Award for Community Engagement, Department of Physics, University of Michigan (2024)
High Major Honors, Department of Astronomy, University of Michigan (2021-2024)
University Honors, University of Michigan (2021)
Dean's List, Macomb Community College (2019-2021)

Publications

Determining the Lower Limit of Central Black Hole Masses Detectable in Virgo UCDs/cEs using JWST NIRSpec IFU
Tahmasebzadeh, B., **Lapeer, A.**, Valluri, M., Vasiliev, E., Taylor, M.A., Thompson, S. (Published 2024)

An Overly Massive Black Hole Residing in the Core of an Ultra-compact Dwarf Galaxy Discovered with the JWST Near-infrared Spectrograph Integral Field Unit. (*Prep*)
Taylor, M.A., Thompson, S., Tahmasebzadeh, B., Valluri, M., Vasiliev, E., Drinkwater, M.J, Roediger, J., Côté, P., Ferrarese, L., Baumgardt, H., Peng, E.W., **Lapeer, A.**. Sumners, Z., Wang, K., Baldassare, V., Bentz, M.C., Blakeslee, J.P., Dage, K., Ko, Y., Liu, C., Woods, T.E.

Presentations & Conference Proceedings

Probing the Lower Limits of Detectable Black Hole Mass with JWST NIRSpec IFU Kinematics
Lapeer, A., Valluri, M., Tahmasebzadeh, B., Vasiliev, E., and Taylor, M.A. (Poster, 2024)
243rd AAS Meeting, New Orleans, 2024

Probing the Lower Mass Limit of Detectable SMBHs In Virgo Cluster CSS with JWST NIRSpec IFU Kinematics
Lapeer, A., Valluri, M., Tahmasebzadeh, B., Vasiliev, E., and Taylor, M.A. (Talk, 2023)
Student Astronomical Society Undergraduate Talk, Ann Arbor, 2023

Determining the Lower Mass Limit for Central Black Hole Masses Detectable in the Virgo Cluster by JWST NIRSpec
Tahmasebzadeh, B., **Lapeer, A.**, Valluri, M., Vasiliev, E., and Taylor, M.A. (Poster, 2023)
The First Year of JWST Science Conference, STSc, Baltimore, Sep 2023.

How Low Can You Go? Lower Limits of Recoverable SMBH Mass in Virgo Cluster UCDs from JWST NIRSpec IFU Data (Updated Version)
Lapeer, A., Valluri, M., Tahmasebzadeh, B., Vasiliev, E., and Taylor, M.A. (Poster and Lightning Talk, 2023)
Great Lakes Clusters and Streams Conference, Ann Arbor, 2023

How Low Can You Go? Lower Limits of Recoverable SMBH Mass in Virgo Cluster UCDs from JWST NIRSpec IFU Data
Lapeer, A., Valluri, M., Tahmasebzadeh, B., Vasiliev, E., and Taylor, M.A. (Poster, 2023)
University of Michigan Department of Astronomy Undergraduate Poster Symposium, Ann Arbor, 2023

Research

Graduate Research Assistant: Department of Astronomy, University of Massachusetts Amherst (Aug. 2024 - Present)
(Advised by Prof. Daniela Calzetti)
Using a combination of ALMA, HST, and JWST data, we aim at implementing a new 'AI with Humans in the Loop' algorithm for obtaining complete samples of star clusters in 13 nearby galaxies. Following their identification, we aim to infer the timescales associated with young stellar clusters to emerge from their natal clouds, and tie a host of physical parameters of their natal clouds to the assembly history of the host galaxies.
Undergraduate Research Assistant: Department of Astronomy, University of Michigan (Aug. 2022 - Aug. 2024)
(Advised by Prof. Monica Valluri.)
Utilized the AGAMA galactic dynamics framework to investigate the modeling of ultracompact dwarf galaxies (UCDs) and compact elliptical galaxies (cEs). Using large batches of mock galaxies, probed the ability to recover masses of central supermassive black holes in such systems from JWST NIRSpec IFU kinematics. The main goal was obtaining a lower limit of detectable supermassive black hole mass in UCDs/cEs from NIRSpec IFU kinematics. Utilizing Schwarzschild modeling alongside mock data, demonstrated that this lower limit is $M_{BH}/M_* > 0.01$. Also worked substantially with the JWST data reduction pipeline to maximize the quality of final data products.

Teaching & Outreach

Peer Tutor (2022-2024)
Peer tutor of math, physics, and computer science at Washtenaw Community College. Assisted students from a variety of backgrounds with studying, homework help, and the implementation successful academic habits. Assisted with math ranging from basic arithmetic to differential equations, physics I and II, and introductory Python, C++, and Linux programming

courses.

Astronomy Monthly (2023-2024)

Designed, coordinated, and implemented a monthly workshop at Washtenaw Community College aimed at educating and engaging individuals with astronomy. Workshop topics included: rudimentary observing techniques, an introduction to citizen science in astronomy, understanding astronomy from a cultural and historic perspective, and trips to local astronomical facilities. Currently working alongside Dr. Daniel Majaess to design and implement several lectures and a lab for the astronomy curriculum at Washtenaw Community College.

Undergraduate Student Mentor (2023-2024)

Co-mentored three lower-level astronomy undergraduate students at the University of Michigan (Jennifer Dupuis, Ishika Gupta, Ilan Shanon) alongside graduate student Cayenne Matt and undergraduate Allan VanZandt. Held semi-regular meetings and routinely communicated advice regarding curriculum, research, and navigation of the academic world.

Course Telescope Operator (2023-2024)

Operated the Angell Hall 0.4m telescope for various introductory astronomy courses at the University of Michigan. This included setting up the telescope, operating it according to various course labs, and answering students questions.

Michigan Math and Science Scholars (MMSS) Program – Hunting for the Dark: Black Holes and Dark Matter (2023, 2024)

Assisted in the facilitation of a 14 day MMSS course surrounding the concepts of dark matter, black holes, and introductory astronomy/astrophysics under Prof. Monica Valluri. Designed lectures and a project aimed at teaching Python and introducing students to common programming methods used in astrophysical research.

Affiliations & Service

Astro Grad School Guide, (*Primary Author, 2024*)
American Astronomical Society (AAS), (*Member, Certified Referee, 2023 - Present*)
AAS Division on Dynamical Astronomy, (*Member, 2023 - Present*)
Student Astronomical Society, University of Michigan (*Member, Telescope Operator, 2021 - 2024*)
Society of Physics Students, University of Michigan (*Member, 2021 - 2024*)
Not Rich at UMich, University of Michigan (*Board Member, Director of Transportation, 2023 - 2024*)
Entomology Club, University of Michigan (*Board Member, DEI Officer, 2023 - 2024*)
Michigan Esports, University of Michigan (*Board Member, Competitive Director, 2021 - 2023*)

Skills

Computational: C++, Python, Bash, HTML, CSS, Linux, Remote Computing, NumPy, Astropy, scikit-learn, AGAMA, Matplotlib, astroML, GALFIT, DS9, Computational Modeling Methods (e.g. Regression, MCMC, GMM), Numerical Computational Methods (e.g. ODE Integration, Kernel Density Estimation, Numerical Differentiation & Integration), Dynamic Orbit-Based Modeling, ML Classification, JWST Reduction Pipeline, MAST Operation, Data Reduction, Data Analysis, Data Visualization, LaTeX

Observational: Single-Slit Spectroscopy, Aperture Photometry, Noise Determination, Radio Profiling, CCD/CMOS Imaging, TCS Operation, Observatory Operation

Teaching & Outreach: Course & Lab Design, Scientific Communication & Engagement, Observatory Oriented Outreach, Lab Instruction, Student Mentoring