Caprice L. Phillips

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RESEARCH INTERESTS

I am interested in brown dwarf and exoplanet atmospheric characterization, direct imaging techniques, high resolution spectroscopy of substellar objects, and stellar abundance measurements. My main research goals are to explore planetary formation through atmospheric characterization and retrieval of brown dwarfs and directly imaged exoplanets. Along with this, I am interested in detecting biosignatures and the habitability of temperate exoplanets.

EDUCATION

The Ohio State University

Columbus, OH

Ph.D. Astronomy

Expected 2025
August 2022

M.S. Astronomy

Thesis Topic: Searching for Biosignatures in the Atmospheres of Gas Dwarf Planets

Graduate Certificate In College and University Teaching (In Progress)

The University of Texas at Austin

Austin, TX

M.A. Astronomy

May 2019

Thesis Title: 2M0443+3723 B: A Young Companion at the Substellar Boundary with Potential Membership in the β Pictoris Moving Group

University of Arkansas at Little Rock

Little Rock, AR

B.S. Physics; Minor: Mathematics

December 2015

APPOINTMENTS

Research Analyst, Advisor: Dr. Megan Bedell

New York, NY

Flatiron Institute, Center for Computational Astrophysics

January 2024 – June 2024

- \circ Using iSpec and pyM00GI to determine stellar parameters and abundance measurement for FGK host stars of benchmark brown dwarf companions
- o Determining projected rotational velocities and radial velocities of stellar sample

Graduate Student Researcher & Visiting Scientist, Advisor: Dr. Jackie Faherty

The Ohio State University & American Museum of Natural History

January 2022 – present

 \circ Exploring atmospheric properties of substellar companions to probe planetary formation mechanisms \circ Using Brewster to robustly decouple temperature, gravity, composition, and cloud properties for planetary mass companions

Graduate Student Researcher, Advisor: Dr. Ji Wang

Columbus, OH

Department of Astronomy, The Ohio State University

January 2022 – present

 Combing photometry, low-to-medium resolution and high resolution spectroscopy of directly imaged exoplanets and brown dwarfs from KPIC to constrain carbon-to-oxygen ratios to explore if metal enrichment in atmospheres is universal

Graduate Student Researcher, Advisor: Dr. Ji Wang

Department of Astronomy, The Ohio State University

Columbus, OH September 2019 – January 2022

 \circ Investigated whether biosignatures on gas dwarfs are detectable with the MIRI, NIRSpec, and NIRISS instruments aboard *JWST* mission \circ Investigated whether biosignatures on temperate gas dwarfs/terrestrial-like planets are detectable with the upcoming *Twinkle* space mission \circ Determined suitable targets for observations for *Twinkle* and *JWST*

Graduate Student Researcher, Advisor: Dr. Brendan Bowler

Austin, TX

Department of Astronomy, The University of Texas at Austin

January 2017 – May 2019

 \circ Characterized the physical and empirical properties of a candidate benchmark brown dwarf companion in the β Pictoris Moving Group

PUBLICATIONS

FIRST AND SECOND AUTHOR:

Phillips, C., Faherty, J., Burningham, B., Vos, J., Gonzales, E., Calamari, E., Gaarn, J., Whiteford, N., *Retrieving Young Cloudy L-Dwarfs: A Nearby Planetary-Mass Companion BD+60 1417B and Its Isolated Red Twin W0047*, in prep

Phillips, C., Wang, J., Edwards, B., Rodriguez Martinez, R., Pai Asnodkar, A., BS, Gaudi, *Is LTT 1445 Ab a Hycean World or a cold Haber World? Exploring the Potential of Twinkle to Unveil Its Nature*, in review

Phillips, C., Wang, J., Kendrew, S., Greene, T., Hu, R., Valenti, J., Panero., W, Schulze, J, 2021, The Astrophysical Journal, 923,144, *Detecting Biosignatures in the Atmospheres of Gas Dwarfs Planets with the James Webb Space Telescope*

Phillips, C., Bowler, B., Mace, G., Liu, M., Sokal., K, 2020, The Astrophysical Journal, 896, 173, 2MASS J04435686+3723033 B: A Young Companion at the Substellar Boundary with Potential Membership in the β Pictoris Moving Group

OTHER CO-AUTHOR:

2030STEM Collaboration, Adams J., Asai, MD, Cohen, R., et al., incl **Phillips, C**, 2023, Accelerating and scaling mentoring strategies to build infrastructure that supports underrepresented groups in STEM

Finnerty, L., Scholfield, T., Sappey, B. et al., incl Phillips, C, 2023, Keck/KPIC Emission Spectroscopy of WASP-33b, accepted

Echeverri, D., Xuan, J., Jovanovic., incl **Phillips, C**, 2023, Vortex Fiber Nulling for Exoplanet Observations II: Implementation and First Light, in prep

Xin, Y, Xuan, J, Mawet, D,. et al., incl **Phillips, C**, 2023, *On-sky speckle nulling through a single-mode fiber with the Keck Planet Imager and Characterizer*, in review

Edwards, B,. Changeat, Q., Tsiaras, A., incl **Phililps, C.**, 2023, *Characterising a World Within the Hot Neptune Desert: Transit Observations of LTT 9779 b with HST WFC3*, accepted

Stotesbury, I., Edwards, B., ABB, et al., incl **Phillips, C**, 2022, Twinkle - a small satellite spectroscopy mission for the next phase of exoplanet science

GRANTS & DISTINCTIONS

• IGEN Travel Grant (\$1000)	2023
• University of California Santa Cruz Other Worlds Laboratory Mini Grant (\$3150)	2023
• AAS International Travel Grant (\$1900)	2022
• Underrepresented Minority Communities in Planetary Science Travel Grant (\$2200)	2022
ullet Forming and Exploring Worlds Bursary Award (£500)	2022
• Sigma Xi Grant-In-Aid of Research (\$3426)	2022
• AAS FAMOUS Travel Grant (\$1000)	2022

2019

PROFESSIONAL SERVICE GRANTS

 \rightarrow **Heising-Simons Foundation Grant (\$100,000, PI)** #BlackSpaceWeek: A week dedicated to celebrating and amplifying Black scientists and engineers within the space community. Funding to support 2023 and 2024 #BlackSpaceWeek programming.

 \rightarrow The Ohio State University, College of Arts & Sciences Graduate Student Success Grant (\$2500, PI) Funding to support inaugural Black In Astro undergraduate research competition and travel grants to the American Astronomical Society conference

AWARDS & HONORS

• CCA Pre-Doctoral Fellowship Program, Flatiron Institute Center for Computational Astrophysics		2024
• P.E.O. Scholar Award (\$20,000)	2023 -	- 2024
 College of Arts and Sciences Graduate Student Award for Diversity Enhancement 		2023
• Kavli Fellow		2023
• Royal Astronomical Society Annie Maunder Medal for Outreach to #BlackInAstro team		2023
• Beth Brown Memorial Award for Best Oral Presentation (NSBP/AAS)		2022
 Ann S. Tuttle Citizenship, Engagement, and Outreach Prize (OSU) 		2022
• Ford Foundation Predoctoral Fellowship – Honorable Mention		2022
• 2 nd place BlackInX Interdisciplinary Twitter Research Poster Competition		2021
• Hayes Graduate Research Forum Mathematical and Physical Sciences -Third Place (OSU)		2021
• ExoExplorers Program (ExoPAG Executive Committee/NASA Exoplanet Exploration Program)		2021
• 3 rd place BlackInPhysics 3MT competition		2020
• LSSTC Data Science Fellowship (Large Synoptic Survey Telescope Corporation)		2018
• Dean's Strategic Fellowship (UT Austin)		2016
• Astronomy Graduate Excellence Fellowship (UT Austin)		2016
Outstanding Senior Award (McNair Scholars Program)		2016
• Ronald E. McNair Scholars Program (UALR)	2014	1-2016

Workshops & Summer Schools

Other Worlds Laboratory Exoplanet Summer Program (UC Santa Cruz, Santa Cruz, CA)	Summer 2023
Cloud Academy III (Les Houches, France)	March 2023
Other Worlds Laboratory Exoplanet Summer Program (UC Santa Cruz, Santa Cruz, CA)	Summer 2022
NYC Gaia DR3 Fête (Flatiron Institute, NYC)	June 2022
International High Performance Computing Summer School (Athens, Greece)	June 2022

OBSERVING EXPERIENCE

Keck II, KPIC, Mauna Kea Observatory (remote observing)	1 night
LBT, MODS/LBC/PEPSI, Mount Graham International Observatory, (queue observing)	11 nights
Keck II, NIRC2, LGS, Mauna Kea Observatory, (P.I. B. Bowler)	1 night

TELESCOPE PROPOSALS

 $[\]rightarrow$ JWST Cycle 2 - \$TBD, 19.0 Hours, (Co-I, PI Ben Burningham), ID. #3670 Sinking silicates: tracing rainout across the LT transition

[→] Large Binocular Telescope (PEPSI), Constraining the Abundances of Solar-Type (FGK) Host Stars of Brown Dwarfs in the Solar Neighborhood, 10 hours awarded (PI), 2023B

→ Large Binocular Telescope (PEPSI), Constraining the Abundances of Solar-Type (FGK) Host Stars of Brown Dwarfs in the Solar Neighborhood - Pilot Study, 5 hours awarded (PI), 2023A

Seminars & Colloquia

UK Centre for Astrobiology Earth, Life and Space Seminar Series (Edinburgh, United Kingdom)	July 2023
UC Berkeley Theoretical Astrophysics Center (TAC) Seminar Series (webinar)	April 2023
UC Santa Cruz PLUNCH Seminar (webinar)	March 2023
Case Western Reserve University Particle/Astro CERCA Seminar Series (webinar)	November 2022
NASA GSFC Exoplanet Seminar Series (webinar)	June 2022
University of Delaware Astro Seminar (webinar)	May 2022
CCA Astronomical Data Meeting (New York City, New York)	March 2022
University of Kansas Astronomy and Space Physics Seminar (webinar)	January 2022
STScI Exoplanet, Star, and Planet Formation Seminar Series (webinar)	January 2022
The Pennsylvania State University CEHW Astronomy Seminar (webinar)	November 2021
National Society of Black Physicists Innovate Seminar Series (webinar)	September 2021
American Physical Society: "Quarks to Cosmos" (webinar)	April 2021
NASA JPL Exoplanet Seminar (webinar)	March 2021
Exoplanet Explorers (ExoExplorers) Science Series (webinar)	February 2021
College of Charleston, Department of Physics and Astronomy Colloquium (webinar)	October 2020

RESEARCH TALKS (*INVITED)

A Holistic Retrieval Approach for an Intermediate Mass Brown Dwarf: IRXS J2351+3127B, *Other Worlds Laboratory Exoplanet Summer Program*, July 2023, UC Santa Cruz

- * Retrieving Young L-Dwarfs: A Holistic Approach with Low and High Resolution Data, *The University of Edinburgh, School of Physics and Astronomy*, July 2023, Edinburgh, Scotland
- *A Holistic Retrieval Approach for an Intermediate Mass Brown Dwarf: IRXS J2351+3127B, *University of Leicester, School of Physics and Astronomy*, July 2023, Leicester, UK
- *Astrobiology/JWST Session (Exoplanet Hunters: The Collaborative Search for the Expected Unexpected with JWST), National Academy of Sciences Kavli Frontiers in Science Symposium, March 2023, Irvine, California

The Atmospheric Retrieval of a Planetary-Mass Companion (contributed talk), *Great Lakes Exoplanet Area Meeting (GLEAM)*, November 2022, Columbus, Ohio

Is LTT 1445 Ab a Cold Haber World or a Hycean World?: An Exploration with Twinkle (contributed talk), *National Society of Black Physicists Meeting*, November 2022, Charlottesville, Virginia

Is LTT 1445 Ab a Cold Haber World or a Hycean World?: An Exploration with Twinkle (contributed talk), # 54th Division of Planetary Science Meeting, October 2022, London, Ontario

Is LTT 1445 Ab a Cold Haber World or a Hycean World?: An Exploration with Twinkle (contributed talk), *Other Worlds Laboratory Exoplanet Summer Program*, June 2022, UC Santa Cruz

Is LTT 1445 Ab a Cold Haber World or a Hycean World?: An Exploration with Twinkle (contributed talk), *Emerging Researchers in Exoplanet Science (ERES) Conference VII*, August 2022, Pennsylvania State University

*Detectability of Biosignatures in Temperate Gas Dwarfs with Twinkle (contributed talk), *Twinkle and the Next Generation of Exoplanet Scientists Conference*, September 2021

Detecting Biosignatures in the Atmospheres of Gas Dwarf Planets with the James Webb Space Telescope (contributed talk), *AbGradCon*, September 2021

Constraining Detection Limits for Potential Biosignatures in super-Earth Atmospheres with JWST (contributed talk), *ExoPAG 23*, January 2021, virtual due to COVID-19

Detecting Biosignatures in the Atmospheres of Gas Dwarf Planets with the James Webb Space Telescope (contributed talk), *Bay Area Exoplanet Meeting*, June 2021, virtual due to COVID-19

Constraining Detection Limits for Potential Biosignatures in super-Earth Atmospheres with JWST (contributed talk), *National Society of Black Physicists*, November 2020, virtual due to COVID-19

2M0443+3723 B: A Young Companion at the Substellar Boundary with Potential Membership in the β Pictoris Moving Group (contributed talk), *National Society of Black Physicists*, November 2019, Providence, RI

Detecting Biosignatures in the Atmospheres of Gas Dwarf Planets with the James Webb Space Telescope, *Edward F. Hayes Graduate Research Forum*, April 2021

Can We Detect Ammonia in the Atmospheres of super-Earths with the James Webb Space Telescope?, *Black In Physics 3MT Competition*, October 2020

RESEARCH POSTERS

"A Holistic Retrieval Approach for an Intermediate Mass Brown Dwarf: IRXS J2351+3127B" (University of Exeter, UK), *ExoClimes VI*, June 2023

"Retrieving Cloudy L-Dwarfs: A Nearby Planetary-Mass Companion BD+60 1417B and Its Red Twin W0047" (Les Houches, France), Cloud Academy III, March 2023

"Retrieval of the BD+60 1417B system: A nearby planetary-mass companion" (Seattle, Washington), *American Astronomical Society, AAS Meeting #241*, January 2023

"Is LTT 1445 Ab a Hycean World or a cold Haber World? Exploring the Potential of Twinkle to Unveil its Nature", Black In Physics Poster Session, October 2022

"Exploring the Lower Boundary of the Radius Valley with Twinkle: Studying Atmospheric Composition and Detecting Biosignatures of a Terrestrial-like planet LTT 1445 Ab", Forming and Exploring Habitable Worlds, November 2022 (virtual)

"A Data Driven Approach to Unlocking Planet Formation: The Atmospheric Retrieval of the BD+60 1417 System" (Toulouse, France) - Cool Stars Conference, July 2022

"A Data Driven Approach to Unlocking Planet Formation: The Atmospheric Retrieval of the BD+60 1417 System" (Athens, Greece) - International High Performance Computing Summer School, June 2022

"Detecting Biosignatures in the Atmospheres of Gas Dwarf Planets with the James Webb Space Telescope" (Virtual) - BlackInX Conference, July 2021

"Characterizing a New Candidate Benchmark Brown Dwarf Companion in the β Pic Moving Group" (National Harbor, Maryland) - American Astronomical Society, AAS Meeting #231, January 2018

DEI & OUTREACH CONFERENCE CONTRIBUTIONS

#AbolishQuals: Barriers to Success for Graduate Students of Color in Astronomy (Seattle, Washington), American Astronomical Society #241th Meeting - special session, January 2023

The ExoExplorers: Early-Career Perspectives on the Intersection of Exoplanet Science and DEIA in Astronomy (Seattle, Washington), American Astronomical Society #241th Meeting - special session, January 2023

The Impact of Grassroot Organizations: A Tale of the Retention through the Black Space Community (Ashley L. Walker, Phillips, C, Ronald S. Gamble Jr., Bryne Hadnott, KeShawn Ivory, Dakotah Tyler, Robert Washington III), (Seattle, Washington), American Astronomical Society #241th Meeting, iPoster, January 2023

Black In Astro: A Grassroots Organization to Celebrate and Amplify the Black Experience in Space-Related Fields (Columbus, Ohio), Great Lakes Exoplanet Area Meeting (GLEAM), November 2022

"Equity & Inclusivity Efforts of the Department of Astronomy at The University of Texas at Austin" (Austin, Texas) - Women in Astronomy IV Conference, July 2017

TEACHING APPOINTMENTS

Academic Facilitator, URSA Program

Columbus, OH

Polaris Program, The Ohio State University

Summer 2021 & Summer 2022

 \Rightarrow Created and implemented physics and astronomy curriculum, along with teaching and leading discussions during daily courses focused on exoplanets for incoming underrepresented first-year undergraduates to OSU

Teaching Assistant, ASTR 1141, "Life in the Universe"

Columbus, OH

Department of Astronomy, The Ohio State University

Fall 2020 & Spring 2021

⇒ Introductory course with focus on astrobiology and nature of life in the universe

Teaching Assistant, ASTR 3350, "Astronomical Observation and Data Analysis"

Columbus, OH

Department of Astronomy, The Ohio State University

Fall 2020

⇒ Undergraduate course with focus on modern astronomy with contemporary data analysis methods implemented in the Python programming language

Teaching Assistant, ASTR 309N, "Lives and Deaths of Stars"

Austin, TX

Department of Astronomy, The University of Texas at Austin

Spring 2019

⇒ Undergraduate course on supernovas, white dwarfs, neutron stars, and black holes

Teaching Assistant, ASTR 321, "The Future of Humanity"

Austin, TX

Department of Astronomy, The University of Texas at Austin

Spring & Fall 2018

⇒ Upper-division undergraduate writing astronomy course based on technological advancement. Graded and provided constructive feedback on written assignments

Teaching Assistant, ASTR 309C, "Birth of Stars & Planets"

Austin, TX

Department of Astronomy, The University of Texas at Austin

Fall 2017

 \Rightarrow Undergraduate astronomy course focused on star & planet formation

RESEARCH ADVISING

Phoenix Sarian - UC Santa Cruz Lamat Institute REU Program

Co-advising with Anusha Pai Asnodkar

July 2023 -

ADVISING & MENTORING

Simons-NSBP Scholars Program

New York, NY

Graduate Fellow— informal mentor to undergraduate scholars

Summer 2022, Summer 2023

The SciAccess Zenith Mentorship Program

Columbus, OH

Informal graduate student mentor for high school student in Space Science Mentoring Program

Fall 2020

TAURUS Summer Research Program

Austin, TX

Informal graduate student mentor and developed imposter syndrome graduate student panel seminar

2017-2018

PROFESSIONAL SERVICE

I ROPESSIONAL DERVICE	
Committee on the Status of Minorities in Astronomy (CSMA) Selected committee board member to enhance the participation of underrepresented minorities in astronomy	2023 - present
Black In Astro	
Vice-president of BlackInAstro	2020 - Present
Executive Secretary	
NASA Review Panel	2021,2022
Black In Physics • Documentation lead for Black In Physics Week	2021, 2022
The Ohio State University Department of Astronomy Diversity Committee	,
Graduate student representative	2019 - 2023
Press/Media Coverage	
2022-2023 College of Arts and Sciences Award Winners Announced (Link)	2023
Caprice Phillips wins P.E.O. Scholar Award (Link)	2023
Royal Astronomical Society Unviels 2023 Award Winners (Link)	2023
The Representation of Blackness in Astronomy - Nature Astronomy Q&A (Link)	2022
Beth Brown Memorial Award Winners for 2022 (Link)	2022 2022
Astrobites: It's #BlackSpaceWeek 2022 (Link) AAS NOVA: Atmospheres of Small Planets Through a Big Telescope (Link)	2022
Astrobites: Atmospheres of Small Planets Through a Big Telescope (Link)	202
Popular Science Magazine Interview (Link)	202
Exploring Potential Biosignatures with Twinkle (Link)	202
Twinkle' satellite to scan for potentially habitable worlds (Link)	202
Scientists May Detect Signs of Extraterrestrial Life in the Next 5 to 10 Years (Link)	202
Astrobites: #BlackInAstro Experiences - Caprice Phillips (Link)	202
AAS Journal Author Series (Youtube Video)	2020
Invited Outreach	
California Academy of Sciences - NightSchool	Virtual
Invited guest to discuss detecting potential biosignatures on exoplanets	July 2023
Panelist for Space Balls Monthly Movie Nights - Science Fiction vs Science Fact	Virtual
Invited panelist guest to discuss Space Balls movie and exoplanets	November 2022
Black In Science Podcast	Virtual
Guest on podcast about being Black In Astronomy	November 2022
Friends of Ohio State Astronomy and Astrophysics (FOSAA) event	Virtual
"Detecting Potential Biosignatures in the Atmospheres of Gas Dwarfs with JWST"	October 2021
Columbus School for Girls	Virtual
Speaker on research and journey in astronomy	April 2021
The Big Fib Podcast	Virtual
Podcast featuring stars & planets	June 2021
Science Around Cincy	Columbus,OH
Invited Guest for YouTube series	June 2021
Dear Grad Student Podcast	Virtual
Guest on podcast discussing graduate school general experiences	September 2020
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Space Draft: Tucson's Flavor of Astronomy on Tap Virtual public talk: "Super-Earths to Brown Dwarfs: Mysterious In-between Objects"	Virtual July 2020
Making Space for All Webinar Series Talk on exoplanets and habitability for inclusive and accessible astronomy webinar series	Virtual <i>May 2020</i>
Movement Consulting Invited speaker for discussion of unspoken rules of academia	Virtual July 2020
Invited Panels	
Simons-NSBP Scholars Program Panelist for discussion about graduate school journey	Virtual July 2023
Disney STRANGE WORLD Stem and Sci Fi Panel Panelist on chat about the intersections between science fact and fiction	Virtual November 2022
American Geological Union Invited panelist for exoplanet science with JWST	Virtual October 2021
APS Public Engagement Webinar Series Invited panelist for talk on social media	Virtual <i>July 2021</i>
• Committee on the Status of Minorities in Astronomy AAS Panel • Virtual Panelist for Anti-Blackness in Astronomy	Columbus,OH January 2021
• BlackInPhysics Panel • Virtual panelist for undergraduate discussion: "How to be a Successful Student"	Columbus, OH October 2020
• Women in Space Panel Live Q&A about astronomy careers for elementary, middle and high school students	Virtual September 2020
SELECTED OUTREACH	
Discover Black In Astro: The Impact of Citizen Astronomy Efforts Developed and co-moderated panel discussion for Black Space Week 2023	Virtual June 2023
Astro[sound]bites Podcast	Virtual
Podcast guest with Black In Astro team to discuss research and Black Space Week 2023 Black In Astro Undergraduate Research Showcase	June 2023 Virtual
Co-organized & co-moderated undergraduate research competition during Black Space Week 2023	June 2023
BlackSpaceWeek Organizer Developed and helped organize workshops and professional events	Virtual June 2021 - Present
Black In Astro Travel Grants Developed and co-led evaluation for sponsored student travel grants	March - May 2023
• Case Western University - Physics Underrepresented Minority Students Group Online Q&A for undergraduates and graduate students about graduate school journey and experiences	Virtual October 2022
Black In Astro Undergraduate Research Competition Co-organized & moderated undergraduate research competition	Virtual November 2021
StriveHigher Inc Women's Herstory month: meet an astrophysicist and astronomer	Virtual March 2021
Girls in STEM Program: Sponsored by the Museum of Discovery Presented a mentoring talk with girls aged 12-15	Virtual March 2021
• Q&A Session with JWST Instagram outreach for JWST	Virtual February 2021

Westview High School Virtual Discussed with high school physics class about astronomy career February 2021 The Women+ of Color Project Virtual *Volunteer statement of purpose reading/feedback for program attendees* October 2020 The Columbus Astronomical Society Virtual Presented a virtual talk with graduate students on the history of women in astronomy March 2020 Sequoia and Kings Canyon National Park Mineral King, CA Designed evening program on natural skies & pop-up activities on natural skies & natural sounds Summer 2019 **UT Austin College of Natural Sciences** Austin, TX Presented a poster on Black Women in Astronomy for the Black Excellence in STEM Festival 2019 **Capital of Texas Undergraduate Research Conference** Austin, TX Graduate student judge

SCIENTIFIC COLLABORATIONS

Twinkle Science Consortium, The Keck Planet Imager and Characterizer (KPIC) Team, Backyard Worlds: Planet 9 extended science team

2018

Professional Societies

American Astronomical Society Junior Member National Society of Black Physicists Full Member Division of Planetary Sciences Junior member

REFERENCES

Ji Wang (email: wang.12220@osu.edu)

Department of Astronomy The Ohio State University McPherson Laboratory 140 West 18th Avenue Columbus OH, 43210-1173

Jackie Faherty (email: jfaherty17@gmail.com)

American Museum of Natural History Department of Astrophysics 79th Street and Central Park West

New York, NY 10023

Laura Lopez (email: lopez.513@osu.edu)

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