

JAKOB M. HELTON

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OBJECTIVE

A fourth-year undergraduate student at Princeton University pursuing a degree in astrophysics, with research interests in observational extragalactic astrophysics and cosmology, and a strong background in independent research, problem solving, and computing.

EDUCATION

Princeton University

September 2017 - Present

Class Rank: Second Quintile

Cumulative GPA: 3.64/4.00

Concentration: Astrophysical Sciences

Departmental GPA: 3.84/4.00

RESEARCH EXPERIENCE

Department of Astrophysical Sciences, Princeton University

June 2018 - Present

Undergraduate Research Assistant working under Prof. Sean Johnson and Prof. Jenny Greene

- First-author paper submitted in October, 2020.
- Studying the giant optical nebulae surrounding quasar PKS0454-22.
- Creating a survey on all of the MUSE quasar observations taken to date; implementing and modifying photoionization modeling code to understand the physical conditions of nebulae within MUSE datacubes using simple line ratios.

Department of Astrophysical Sciences, Princeton University

June 2019 - Present

Undergraduate Research Assistant working under Dr. Allison Strom and Prof. Jenny Greene

- First-author paper in preparation.
- Studying the physical conditions of intermediate redshift galaxies from LEGA-C.
- Creating spectral modeling code to fit the continuum and emission lines of galaxies; implementing and modifying photoionization modeling code to understand the physical conditions of galaxies using simple line ratios.

Department of Astrophysical Sciences, Princeton University

January 2020 - June 2020

Undergraduate Research Assistant working under Prof. Jo Dunkley

- Co-author paper submitted in July, 2020.
- Studying the cosmological curvature parameter using the CMB Power Spectrum from ACT DR4.
- Testing the general purpose Bayesian analysis code Cobaya and the ACT DR4 CMB Power Spectrum Likelihood; creating cosmological parameter covariance matrices using the CMB Power Spectrum from ACT DR4.

PUBLICATIONS

3. **J. M. Helton**, A. L. Strom, J. E. Greene, et al., *The physical conditions in $0.6 < z < 1.0$ galaxies from LEGA-C*, in preparation
2. **J. M. Helton**, S. D. Johnson, J. E. Greene, et al., *Discovery and origins of giant optical nebulae surrounding quasar PKS0454-22*, in review
1. S. Aiola, E. Calabrese, et al., including **J. M. Helton**, *The Atacama Cosmology Telescope: DR4 Maps and Cosmological Parameters*, 2020, JCAP, 12, 047

PRESENTATIONS

5. **J. M. Helton**, S. D. Johnson, J. E. Greene, et al. *Discovery and origins of giant optical nebulae surrounding quasar PKS0454–22*. Oral presentation at Princeton University’s Galread in Princeton, NJ (August 2020).
4. **J. M. Helton**, A. L. Strom, J. E. Greene, et al. *The physical conditions in $0.6 < z < 1.0$ galaxies from LEGA-C*. Poster presentation at the 235th American Astronomical Society Meeting in Honolulu, HI (January 2020).
3. **J. M. Helton**, S. D. Johnson, J. E. Greene, et al. *On the extended line-emitting nebulae surrounding quasar-host galaxies*. Poster presentation at the Princeton University Research Day in Princeton, NJ (May 2019).
2. **J. M. Helton**, S. D. Johnson, J. E. Greene, et al. *On the extended line-emitting nebulae surrounding quasar-host galaxies*. Poster presentation at the Stanford University Research Conference in Palo Alto, CA (April 2019).
1. **J. M. Helton**, S. D. Johnson, J. E. Greene, et al. *On the extended line-emitting nebulae surrounding quasar-host galaxies*. Oral presentation at Drexel University’s Quasar Day meeting in Philadelphia, PA (February 2019).

TELESCOPE ALLOCATIONS

Keck/MOSFIRE	Near-Infrared Spectroscopy, 0.5 Nights (Co-I)
Magellan/FIRE	Near-Infrared Spectroscopy, 6.5 Nights (Co-I)
Magellan/IMACS	Optical Spectroscopy, 2.0 Nights (Co-I)

SKILLS

Programming Languages	Python, IDL, Java, Javascript, HTML
Software & Tools	Unix, L ^A T _E X, DS9, QFitsView, FIREHOSE
Observing	Keck/MOSFIRE, Magellan/IMACS, Magellan/LDSS3

EXTRA-CURRICULARS

McGraw Center for Teaching and Learning	January 2018 - Present
Head Tutor for Single-Variable Calculus, Multi-Variable Calculus, and Linear Algebra	
Department of Physics, Princeton University	January 2019 - January 2020
Undergraduate Teaching Assistant for Introductory Physics Labs (Mechanics and Electromagnetism)	
Department of Astrophysical Sciences, Princeton University	January 2020 - August 2020
Organizer for the department-wide Galread Extragalactic Discussion Group	
Carnegie Observatories, Carnegie Institution for Science	June 2020 - August 2020
Student Mentor for the Carnegie Astrophysics Summer Student Internship Program	

REFERENCES

Prof. Sean Johnson	University of Michigan	seanjoh@umich.edu
Prof. Jenny Greene	Princeton University	jgreene@astro.princeton.edu
Prof. Jo Dunkley	Princeton University	jdunkley@princeton.edu
Dr. Allison Strom	Princeton University	allison.strom@princeton.edu