JAKOB M. HELTON

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CURRENT POSITION

A third-year doctoral student at the University of Arizona pursuing a M.S. and Ph.D. in Astronomy, with research focused on understanding the formation and evolution of galaxies and galaxy clusters in the early Universe. Member of the JWST Advanced Deep Extragalactic Survey (JADES) in addition to the Near-Infrared Camera (NIRCam) and the Mid-Infrared Instrument (MIRI) Science Teams.

EDUCATION

University of Arizona *August 2021 - Present*
Degree: M.S. and Ph.D. Concentration: Astronomy

Princeton University *September 2017 - May 2021*
Degree: B.A. Concentration: Astrophysical Sciences

PUBLICATIONS

3. **J. M. Helton**, F. Sun, C. Woodrum, et al., *The JWST Advanced Deep Extragalactic Survey: Discovery of an Extreme Galaxy Overdensity at $z = 5.4$ with JWST/NIRCam in GOODS-S*, 2024, ApJ, 962, 124

   - Selected distant sources within a large sample of galaxies using slitless spectroscopy.
   - Applied stellar population synthesis models to fit the star-formation histories of distant sources and estimated their physical parameters using Markov Chain Monte Carlo.
   - Discovered significant correlations of physical parameters for distant sources using non-linear least squares minimization, Spearman correlation analysis, and linear regression.

2. **J. M. Helton**, A. L. Strom, J. E. Greene, et al., *The nebular properties of star-forming galaxies at intermediate redshift from the Large Early Galaxy Astrophysics Census*, 2022, ApJ, 934, 81.

   - Observed and reduced new spectroscopic data for galaxies with extensive ancillary data.
   - Utilized data augmentation and manipulation to create samples of galaxies with consistent physical conditions to properly compare these samples without worry of observational biases.
   - Determined significant temporal trends of physical parameters for galaxies using non-linear least squares minimization and Spearman correlation analysis

1. **J. M. Helton**, S. D. Johnson, J. E. Greene, et al., *Discovery and origins of giant optical nebulae surrounding quasar PKS0454−22*, 2021, MNRAS, 505, 4

   - Developed a tool for removing the visual artifacts produced by bright point sources within integral field spectroscopic data using non-negative matrix factorization.
   - Identified and characterized galaxies and nebulae surrounding a quasar using integral field spectroscopy, non-linear least squares minimization, and detailed photoionization modeling.
   - Implemented a Gaussian mixture model to estimate the peculiar velocities of sources.

TECHNICAL SKILLS

Operating Systems	MacOS, Windows, Linux
Programming Languages	Python, Java, HTML, Javascript
Other Software and Tools	LaTeX, GitHub, MySQL, Pandas, TensorFlow, Microsoft Excel