ABBY BAULT

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Lawrence Berkeley National Laboratory

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EDUCATION

University of California, Irvine   September 2018 - August 2024

Department of Physics and Astronomy

Ph.D in Physics   awarded Summer 2024

M.S in Physics   awarded December 2020

Wayne State University

B.S in Physics   awarded May 2018

Concentration: Astrophysics

RESEARCH AND TEACHING EXPERIENCE

Postdoctoral Scholar   September 2024 - Present

Lawrence Berkeley National Laboratory

Supervisor: Julien Guy

Current Projects:

- Optimization of MAS CCDs for future spectroscopic surveys
- Continuing mitigation of problematic DESI fiber positioners
- Research and development for future spectroscopic fiber positioners
- Quasar continuum reconstruction using spectral encoding
- Baryon Acoustic Oscillations (BAO) from the CIV forest

Graduate Student   2018 - August 2024

University of California, Irvine

Graduate Research Assistant   2019 - 2024

Advisor: David Kirkby

Thesis Title: Advancing Dark Energy Studies with DESI: Innovations in Instrumentation and Lyman-alpha Forest Cosmology

My research interests include both cosmology and instrumentation. I am involved with the Dark Energy Spectroscopic Instrument (DESI) Collaboration where I have contributed to: instrument commissioning, the Lyman-alpha Forest group, including my study of how quasar redshift errors impact the correlations used for BAO studies, and the Focal Plane group where I am working toward improving the performance of some poorly behaving robotic fiber positioners. I have also completed several observing shifts and was a mentor in the DESI mentoring program.

Graduate Teaching Assistant   2018 - 2019

Lower division physics courses for engineering students.

DOE Office of Science Graduate Student Research Program Fellow 2022
Lawrence Berkeley National Laboratory

Project: Optimizing the DESI Focal Plane for Dark Energy Studies
The DESI Focal Plane uses 5,000 robots to align fibers to collect the light from tens of millions of distant galaxies. My project as a SCGSR fellow was focused on improving the performance of the poorly behaving robots. I explored the vast parameter space for about 20 robots that were removed from the DESI focal plane in 2021 to see if there were a set of parameters that improved their behavior. I found that these robots perform better at higher motor speeds and have been actively involved in continuing this project since the Fellowship ended.

PRESENTATIONS AND INVITED TALKS

Invited Talks

DESI Collaboration Meeting Plenary December 2024
Mitigation and Recovery of DESI Linear Phi Positioners

University of Michigan HEP-Astro Seminar October 2023
Eyes on the Sky: How 5,000 Robots are Unraveling the Mystery of Dark Energy

April APS Quarks to Cosmos April 2023
Early Results Using the Lyman-alpha Forest in DESI

DESI Collaboration Meeting Instrument Plenary December 2022
Update on the DESI Focal Plane

DESI Research Forum March 2020
Goldilocks and the DESI Camera

Presentations

UC Berkeley Astronomy Night November 2024

DESI Collaboration Meeting Instrument Parallel Session July 2023, December 2022

DESI Collaboration Meeting Lyman-alpha Forest Parallel Session December 2022

DESI Collaboration Meeting Spotlight Talk Summer 2024, 2023, 2022, 2021
Winter 2023, 2022

AWARDS AND FELLOWSHIPS

UC Berkeley Inaugural Shining Lights Fellowship Program 2024-2025

UC Irvine Outstanding Contributions to the Department 2024

DESI Builder: For outstanding contributions to the fiber positioners and Lyman-α science 2023

DOE Office of Science Graduate Student Research Program Fellow 2022

University of Pittsburgh Summer Undergraduate Research Fellowship 2017

Wayne State University Maria Mitchell Endowed Scholarship 2015

Wayne State University Presidential Scholarship 2014 - 2018

LEADERSHIP, OUTREACH, AND EXTRA CURRICULARS

DESI Professional Development Committee (PDC) Member 2024 - Present

Underrepresented Genders in Physics and Astronomy (UNITY) at UC Irvine *President and Treasurer*	2019 - 2024
Physics Graduate Caucus (PGC) at UC Irvine *Officer, Astronomy floor representative, and UNITY representative*	2018 - 2024
DESI Peer Mentor *Mentor to undergraduate students in DESI*	2021 - 2022
UC Irvine Physics and Astronomy Community Excellence (PACE) *Mentor to incoming graduate students*	2019 - 2022
UC Irvine Physics and Astronomy Department Blog *Newsletter and Student Spotlight Supervisor*	2018 - 2022
UC Irvine Grad Slam Semi-Finalist	2021

SELECTED PUBLICATIONS

A full list of publications can be found on arXiv here.

1. K. W. Lin, **A. Bault**, A. Karcher, J. Guy, S. E. Holland, W. F. Kolbe, P. E. Nugent "Optimizing Charge-coupled Device Readout Enabled by the Floating-Gate Amplifier" *Accepted to PASP* (2025) [2503.07930]

2. **A. Bault**, D. Kirkby et al. "Impact of Quasar Redshift Errors on the 3D Lyman-α forest-quasar cross-correlation in DESI Early Data" *Accepted to JCAP* (2024) [2402.18009]

3. H. K. Herrera-Alcantar, A. Muñoz-Gutiérrez ... **A. Bault** ... et al. "Synthetic Spectra for Lyman-α Forest Analysis in the Dark Energy Spectroscopic Instrument" *submitted to JCAP* (2024) [2401.00303]

4. S. Filbert, P. Martini ... **A. Bault**... et al. "Broad Absorption Line Quasars in the Dark Energy Spectroscopic Instrument Early Data Release" *submitted to MNRAS* (2023) [2309.03434]

5. C. Gordon, A. Cuceu ... **A. Bault**... et al. "3D Correlations in the Lyman-alpha Forest from Early DESI Data" *JCAP* (2023) [2308.10950]

6. A. Brodzeller, K. Dawson, S. Bailey, ... **A. Bault** ... et al. "Performance of the Quasar Spectral Templates for the Dark Energy Spectroscopic Instrument" *AJ* **166** (2023) [2305.10426]

7. DESI Collaboration et al. "The Early Data Release of the Dark Energy Spectroscopic Instrument" *submitted to AJ* (2023) [2306.06308]

8. DESI Collaboration et al. "Validation of the Scientific Program for the Dark Energy Spectroscopic Instrument" *AJ* (2023) [2306.06307]

9. I. Moskowitz, E. Gawiser ... **A. Bault** ... et al. "Improved Tomographic Binning of 3x2pt Lens Samples: Neural Network Classifiers and Optimal Bin Assignments" *ApJ* **905** (2023) [2212.06754]

10. DESI Collaboration et al. "Overview of the Instrumentation for the Dark Energy Spectroscopic Instrument" *AJ* **164** 207 (2022) [2205.10939]

11. J. Zuntz ... **A.Bault** ... et al. "The LSST-DESC 3x2pt Tomography Optimization Challenge" *The Open Journal of Astrophysics* (2021) [2108.13418]