

Paul La Plante

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Professional Experience

- 2019– **Berkeley Center for Cosmological Physics Fellow**, *University of California, Berkeley*.
- 2016–2019 **Postdoctoral Researcher**, *University of Pennsylvania*.

Education

- 2011–2016 **Ph.D.**, *Carnegie Mellon University*.
thesis topic Large Scale Simulations of Hydrogen and Helium Reionization
- 2007–2011 **B.S.**, *Loyola University Maryland*.
Degrees in Physics and Spanish, *summa cum laude*. Recipient of the Physics Medal. Member of Phi Beta Kappa honors society.

Publications

- 2021 A. Ewall-Wice, N. Kern, J. S. Dillon, A. Liu, A. Parsons, S. Singh, A. Lanman, **P. La Plante**, et al., *DAYENU: A Simple Filter of Smooth Foregrounds for Intensity Mapping Power Spectra*, MNRAS 500 5195.
- 2020 **P. La Plante**, A. Lidz, J. Aguirre, & S. Kohn, *The 21 cm- k SZ- k SZ Bispectrum During the Epoch of Reionization*, ApJ 899 40.
- P. La Plante**, P. K. G. Williams, & J. S. Dillon, *Developing a Real Time Processing system for HERA*, arXiv:2010.11969.
- J. Mirocha, **P. La Plante**, & A. Liu, *The Importance of Galaxy Formation Histories in Models of Reionization*, arXiv:2012.09189.
- J. S. Dillon, M. Lee, Z. S. Ali, A. R. Parsons, N. Orosz, C. D. Nunhokee, **P. La Plante**, et al., *Redundant-Baseline Calibration of the Hydrogen Epoch of Reionization Array*, MNRAS 499 5840.
- N. Thyagarajan, C. L. Carilli, B. Nikolic., ..., **P. La Plante**, et al., *Detection of cosmic structures using the bispectrum phase. II. First results from application to cosmic reionization using the Hydrogen Epoch of Reionization Array*, PhysRevD 102 2.
- N. S. Kern, A. R. Parsons, J. S. Dillon, ..., **P. La Plante**, et al., *Mitigating Internal Instrument Coupling for 21 cm Cosmology. II. A Method Demonstration with the Hydrogen Epoch of Reionization Array*, ApJ 888 70.
- N. S. Kern, J. S. Dillon, A. R. Parsons., ..., **P. La Plante**, et al., *Absolute Calibration Strategies for the Hydrogen Epoch of Reionization Array and Their Impact on the 21 cm Power Spectrum*, ApJ 890 122.
- 2019 **P. La Plante** & M. Ntampaka, *Machine Learning Applied to the Reionization History of the Universe in the 21 cm Signal*, ApJ 880 110.

- J. Kerrigan, **P. La Plante**, S. Kohn, et al., *Optimizing Sparse RFI Prediction Using Deep Learning*, MNRAS 488 2650.
- S. Kohn, J. Aguirre, **P. La Plante**, et al., *The HERA-19 Commissioning Array: Direction Dependent Effects*, ApJ 882 58.
- S. Hassan, A. Liu, S. Kohn, **P. La Plante**, *Identifying Reionization Sources from 21cm Maps using Convolutional Neural Networks*, MNRAS 483 2524.
- 2018 **P. La Plante**, H. Trac, R. A. C. Croft, & R. Cen, *Helium Reionization Simulations. III. The Helium Lyman- α forest*, ApJ 868 106.
- C. Carilli, B. Nikolic, N. Thyagarajan, . . . , **P. La Plante**, et al., *HI 21cm Cosmology and the Bi-Spectrum: Closure Diagnostics in Massively Redundant Interferometric Arrays*, Radio Science 53 5.
- 2017 **P. La Plante**, H. Trac, R. A. C. Croft, & R. Cen, *Helium Reionization Simulations. II. Signatures of Quasar Activity on the IGM*, ApJ 841 87.
- 2016 **P. La Plante** & H. Trac, *Helium Reionization Simulations. I. Modeling Quasars as Ionization Sources*, ApJ 828 90.
- 2014 **P. La Plante**, N. Battaglia, A. Natarajan, J. B. Peterson, H. Trac, R. Cen, & A. Loeb, *Reionization on Large Scales. IV. Predictions for the 21 cm Signal Incorporating the Light Cone Effect*, ApJ 789 31.
- 2012 M. A. Clark, **P. C. La Plante**, & L. J. Greenhill, *Accelerating radio astronomy cross-correlation with graphics processing units*, International Journal of High Performance Computing Applications 27 178.

Grants

- 2018– **XSEDE Allocation**, PI, *Next Generation Hydrogen Reionization Simulations with HERA*, Bridges Large Memory partition, 50,000 TB-hours (\$76,240 estimated value).
- 2019– **XSEDE Allocation**, co-PI, *Machine Learning and Big Data Applications with HERA*, Bridges GPU-AI Partition, 45,000 GPU-hours (\$41,131.50 estimated value).

Collaboration Memberships

- HERA Collaboration, www.reionization.org, Collaborator.
- Simons Observatory, www.simonsobservatory.org, Junior Member.

Service

- Review Panelist for NSF Proposals: AAG Galaxy and Cosmological Simulations Division, CAREER High-Redshift Division.
- Referee for MNRAS.
- Participant in Early Career Focus Session for the Astro 2020 Decadal Survey.
- Co-Principal Author of Science White Paper for the Astro 2020 Decadal Survey, *Mapping Cosmic Dawn and Reionization: Challenges and Synergies*, arXiv:1903.04580.

Teaching Experience

- 2017– **CHAMP Camp Director**
Coordinated curriculum development and taught “Introduction to Computing” lesson as part of the CAMPARE-HERA Astronomy Minority Partnership (CHAMP), a HERA outreach program.

2012 **Physics II for Science Students**

Worked as a TA for a course for first-year undergraduate students learning electricity and magnetism. Lectured at recitation twice a week, led lab demonstrations, and graded homework and exams.

2011 **Introduction to Astronomy**

Worked as a TA for a course for non-science students learning astronomy. Assisted students in telescope observations, led lab activities, and graded homework and exams.

Conference Presentations

2020 **The 235th Meeting of the American Astronomical Society**

Developing a Real Time Processing System for Big Data in Astronomy, talk

2019 **The 233rd Meeting of the American Astronomical Society**

Measuring the kSZ - kSZ -21cm Bispectrum from the Epoch of Reionization, talk

Lines in the Large Scale Structure

Machine Learning Applied to 21cm Cosmology Analysis, talk

2018 **Aspen Center for Physics:**

Cosmological Signals from Cosmic Dawn to the Present

Cross-correlating 21cm and kSZ Signals from the EoR, talk

2016 **Science at Low Frequencies III**

Measuring the Global 21 cm Signal Using Interferometers, talk

The 227th Meeting of the American Astronomical Society

Helium Reionization Simulations: Seeing the Forest for the Trees, talk

2015 **The Olympian Symposium on Cosmology and the Epoch of Reionization**

Understanding the Engines Powering Helium Reionization, poster

Neighborhood Workshop on Astrophysics and Cosmology, Penn State University

Helium Reionization: Source Characterization and Initial Results, talk

2014 **Cosmology on the Beach**

Reionization on Large Scales: The 21 cm power spectrum and light cone effect, talk

Neighborhood Workshop on Astrophysics and Cosmology, Penn State University

Understanding the Role of Quasars in Helium Reionization, talk

2013 **Neighborhood Workshop on Astrophysics and Cosmology, Penn State University**

Reionization on Large Scales: Predictions for the 21 cm Power Spectrum, talk

Public Talks

2018 **University Forum Lecture Series, University of Nevada Las Vegas**

Seeing the Invisible in Space: Non-Optical Measurements in Astronomy

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