

Nicholas S. Kern

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| CONTACT INFORMATION | Department of Astronomy University of California, Berkeley 501 Campbell Hall Berkeley, CA, 94720 | <i>E-mail:</i> nkern@mit.edu <i>Web:</i> nkern.github.io |
| EMPLOYMENT | Pappalardo Fellow Department of Physics & MIT Kavli Institute for Astrophysics and Space Research Massachusetts Institute of Technology, Cambridge, MA, USA | September 2020 – present |
| EDUCATION | Ph.D., Astrophysics, University of California, Berkeley Advisor: Aaron R. Parsons | August 2020 |
| | M.A., Astrophysics, University of California, Berkeley | May 2017 |
| | B.S., Physics, Astrophysics, University of Michigan, Ann Arbor Advisor: Christopher Miller | May 2015 |
| RESEARCH FOCUS | My research explores the frontiers of the distant universe through radio frequency observations of primordial hydrogen. I design novel data analysis techniques for processing large quantities of radio data and identifying weak signals from instrumental contaminants, and then connect them to cosmological models to understand how the first generation of stars and galaxies formed. | |
| HONORS & AWARDS | Pappalardo Fellow, MIT, Department of Physics Mary Elizabeth Uhl Dissertation Prize, UC Berkeley, Department of Astronomy Teaching Effectiveness Award, UC Berkeley Outstanding Graduate Student Instructor Award, UC Berkeley Graduated with Highest Honors and Distinction, University of Michigan Excellence in Astrophysics Research Award, University of Michigan Foreign Language & Area Studies (FLAS) Fellow, University of Michigan International Institute Fellow, University of Michigan Upper-Level Writing Prize in the Natural Sciences, University of Michigan | 2020 – 2023 2020 2017 2017 2015 2015 2014 2014 2014 |
| PUBLICATIONS LED OR CO-LED | <ol style="list-style-type: none">6. Kern, N., Dillon, J. S., Parsons, A. R., Carilli, C., Bernardi, G. et al. 2020, <i>Absolute Calibration Strategies for the Hydrogen Epoch of Reionization Array and Their Impact on the 21 cm Power Spectrum</i>, ApJ 890 1225. Kern, N., Parsons, A. R., Dillon, J. S., Lanman, A. E., et al. 2020, <i>Mitigating Internal Instrument Coupling for 21cm Cosmology. II. A Method Demonstration with the Hydrogen Epoch of Reionization Array</i>, ApJ 888 704. Kern, N., Parsons, A. R., Dillon, J. S., Lanman, A. E., Fagnoni, N. and de Lera Acedo, E. 2019, <i>Mitigating Internal Instrument Coupling for 21cm Cosmology. I. Temporal and Spectral Modeling in Simulations</i>, ApJ 884 1053. Kern, N., Liu, A., Parsons, A. R., Mesinger, A., & Greig, B. 2017, <i>Emulating Simulations of Cosmic Dawn for 21 cm Power Spectrum Constraints on Cosmology, Reionization and X-ray Heating</i>, ApJ 848 232. Gifford, D., Kern, N., & Miller, C. 2016, <i>Stacking Caustic Masses from Galaxy Clusters</i>, ApJ 834 204 | |

1. **Kern, N. S.**, Keown, J. A., Tobin, J. J., Mead, A., & Gutermuth, R. 2016, *Radio Properties of Young Stellar Objects in the Serpens South Infrared Dark Cloud*, [AJ 151 42](#)

OTHER

PUBLICATIONS AS A CONTRIBUTING AUTHOR

13. Nunhokee, C. D., Parsons, A. R., **Kern, N.**, et al. 2020, *Measuring HERA’s primary beam in-situ: methodology and first results*, [arXiv:2005.12174](#)
12. Thyagarajan, N., Carilli, C., Nikolic, B., ..., **Kern, N.**, et al. 2020, *Detection of Cosmic Structures using the Bispectrum Phase. II. First Results from Application to Cosmic Reionization Using the Hydrogen Epoch of Reionization Array*,
11. Ewall-Wice, A., **Kern, N.**, Dillon, J. S., et al. 2020, *DAYENU: A Simple Filter of Smooth Foregrounds for Intensity Mapping Power Spectra*, [arXiv:2004.11397](#)
10. Dillon, J. S., Lee, M., Ali, Z. S., ..., **Kern, N.**, et al. 2020, *Redundant-Baseline Calibration of the Hydrogen Epoch of Reionization Array*, [arXiv:2003.08399](#)
9. Ghosh, A., Mertens, F., Bernardi, G., ..., **Kern, N.**, et al. 2020, *Foreground modelling via Gaussian process regression: an application to HERA data*, [arXiv:2004.06041](#)
8. Carilli, C., Thyagarajan, N., Kent, J., ..., **Kern, N.**, et al. 2020, *Imaging and Modeling Data from the Hydrogen Epoch of Reionization Array*, [ApJS 247 67](#)
7. Lanman, A. E., Poher, J. C., **Kern, N.**, et al. 2019, *Quantifying EoR delay spectrum contamination from diffuse radio emission*, [arxiv:1910.10573](#)
6. Monsalve, R. A., Greig, B., Bowman, J. D., ..., **Kern, N.**, et al. 2018, *Results from EDGES High-Band: II. Constraints on Parameters of Early Galaxies*, [ApJ 863 11](#)
5. Kohn, S. A., Aguirre, J. E., La Plante, P., ..., **Kern, N.**, et al. 2018, *The HERA-19 Commissioning Array: Direction Dependent Effects*, [ApJ 882 58K](#)
4. Dillon, J. S., Kohn, S. A., Parsons, A. R., ..., **Kern, N.**, et al. 2017, *Polarized redundant-baseline calibration for 21 cm cosmology without adding spectral structure*, [MNRAS 477 5670](#)
3. Miller, C. J., Stark, A., Gifford D., & **Kern, N.** 2016, *Inferring Gravitational Potentials from Mass Densities in Cluster-Sized Halos*, [ApJ 822 41](#)
2. Stark, A., Miller, C. J., **Kern, N.**, Gifford, D., et al. 2016, *Probing Theories of Gravity with Phase Space-Inferred Potentials of Galaxy Clusters*, [Phys. Rev. D 93, 084036](#)
1. Gifford, D., Miller, C. J., & **Kern, N.** 2013, *A Systematic Analysis of Caustic Methods for Galaxy Cluster Masses*, [ApJ 773 116](#)

COLLABORATION PUBLICATIONS

2. Fagnoni, N., de Lera Acedo, E., ..., **Kern, N.**, et al. 2019, *Electrical and electromagnetic co-simulations of the HERA Phase I receiver system including the effects of mutual coupling, and impact on the EoR window*, In Review, [ApJ, arxiv:1908.02383](#)
1. Kerrigan, J., La Plante, P., ..., **Kern, N.**, et al. 2019, *Optimizing sparse RFI prediction using deep learning*, [MNRAS 488 2605](#)

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| TEACHING EXPERIENCE | At the University of California, Berkeley, Department of Astronomy: | |
| | As a Head Instructor | |
| | • Astro 9: Python Programming in Astronomy | Summer 2017 |
| | As a Graduate Student Instructor | |
| | • Astro 7A: Introduction to Astrophysics | Fall 2016 |
| | • Astro 160: Stellar Structure & Evolution | Fall 2015 |
| | At the University of Michigan, Ann Arbor, Department of Physics: | |
| | As an Undergraduate Learning Assistant | |
| | • Physics 140: Introduction to Mechanics | Spring 2015 |
| TALKS AND PRESENTATIONS | Observing the First Billion Years, Invited Talk | January 2020 |
| | IIT Indore, Indore, India | |
| | Science at Low Frequencies VI, Contributed Talk | December 2019 |
| | Arizona State University, Tempe, AZ | |
| | Observational Cosmology Seminar, Contributed Talk | December 2019 |
| | California Institute of Technology, Pasadena, CA | |
| | Center for Astrophysics SMA Seminar, Contributed Talk | November 2019 |
| | Center for Astrophysics, Cambridge, MA | |
| | MIT Kavli Institute Brown Bag Lunch Talks, Contributed Talk | November 2019 |
| | Massachusetts Institute of Technology, Cambridge, MA | |
| | Intergalactic Medium 2018, Contributed Talk | September 2018 |
| | University of Tokyo, Tokyo, Japan | |
| | BCCP Cosmology Workshop, Invited Talk | January 2018 |
| | University of California, Berkeley, CA | |
| | JILA Astrophysics Seminar, Invited Talk | October 2017 |
| | University of Colorado, Boulder, CO | |
| | NASA Machine Learning Workshop, Invited Talk | August 2017 |
| | NASA Ames, Mountain View, CA | |
| | Science at Low Frequencies III, Contributed Talk | December 2016 |
| | California Institute of Technology, Pasadena, CA | |
| | 225th American Astronomical Society Meeting, Contributed Poster | January 2015 |
| | Seattle, WA | |
| | 223rd American Astronomical Society Meeting, Contributed Poster | January 2014 |
| | Washington, D.C. | |
| | Cyber Infrastructure Days, Contributed Poster | November 2013 |
| | University of Michigan, Ann Arbor, MI | |
| SERVICE | To the Astrophysics Community: | |
| | • Referee, Radio Science | 2020 – present |
| | • Referee, Monthly Notices of the Royal Astronomical Society | 2019 – present |
| | • Referee, Astrophysical Journal | 2018 – present |
| | At the University of California, Berkeley | |
| | • Graduate Representative, UC Berkeley Faculty Search Committee | 2020 |
| | • Instructor & Mentor, HERA Undergraduate Summer Research Bootcamp | 2017 – 2019 |

- Organizer, Astronomy Career Development Seminar 2016 – 2017
- Organizer, Graduate Student Colloquium Speaker Seminar 2015 – 2016