FREDERICK B. DAVIES

PERSONAL INFORMATION

Email	davies@physics.ucsb.edu
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EDUCATION

PhD in Astronomy

2010-2015 University of California, Los Angeles

Advisor: Dr. Steven Furlanetto
Thesis title: "Self-consistent Modeling of the Intergalactic Ionizing Radiation Field Across Cosmic Time"
Degree conferred: 11 Sep 2015

Bachelor of Science in Physics

2006-2010 New Mexico Institute of Mining & Technology

Astrophysics Concentration · Summa Cum Laude

ACADEMIC POSITIONS

Postdoctoral Scholar

2019-present Lawrence Berkeley National Laboratory

Computational Research Division
Berkeley, California, USA

Postdoctoral Scholar

2017-2019 University of California, Santa Barbara

Physics Department
Santa Barbara, California, USA

Postdoctoral Fellow

2015-2017 Max-Planck-Institut für Astronomie

Galaxies & Cosmology Department
Heidelberg, Baden-Württemberg, Germany

PUBLICATIONS

First Author Publications

1. **Davies, F. B.**, "Ionization bias and the ghost proximity effect near $z \gtrsim 6$ quasars in the shadow of proximate absorption systems", MNRAS, in press [arXiv:1904.10459]

2. **Davies, F. B.**, Hennawi, J. F., Eilers, A.-C., "Time-dependent behaviour of quasar proximity zones at $z \sim 6$", 2020, MNRAS, 493, 1330

3. **Davies, F. B.**, Hennawi, J. F., Eilers, A.-C., "Evidence for Low Radiative Efficiency or Highly Obscured Growth of $z > 7$ Quasars", 2019, ApJL, 884, L19

4. **Davies, F. B.** et al., "Quantitative Constraints on the Reionization History from the IGM Damping Wing Signature in Two Quasars at $z > 7$", 2018, ApJ, 864, 142

5. **Davies, F. B.** et al., "Predicting Quasar Continua Near Lyman-α with Principal Component Analysis", 2018, ApJ, 864, 143

6. **Davies, F. B.**, Becker, G. D., Furlanetto, S. R., "Determining The Nature of Late Gunn-Peterson Troughs with Galaxy Surveys", 2018, ApJ, 860, 155

7. **Davies, F. B.**, Hennawi, J. F., Eilers, A.-C., Lukić, Z., "A New Method to Measure the Post-Reionization Ionizing Background from the Joint Distribution of Lyman-α and Lyman-β Forest Transmission", 2018, ApJ, 855, 106

8. **Davies, F. B.**, Furlanetto, S. R., Dixon, K. L., "A self-consistent 3D model of fluctuations in the helium-ionizing background", 2017, MNRAS, 465, 2886

9. **Davies, F. B.**, Furlanetto, S. R., "Large fluctuations in the hydrogen-ionizing background and mean free path following the epoch of reionization", 2016, MNRAS, 460, 1328

First Author Publications (continued)

10. **Davies, F. B.**, Furlanetto, S. R., McQuinn, M., "Quasar ionization front Lyα emission in an inhomogeneous intergalactic medium", 2016, MNRAS, 457, 3006

11. **Davies, F. B.**, Furlanetto, S. R., "The effect of fluctuations on the helium-ionizing background", 2014, MNRAS, 437, 1141

Co-author Publications

12. Eilers, A.-C., ... **Davies, F. B.** et al., "Multi-Wavelength Approach for Detecting and Characterizing Young Quasars I: Systemic Redshifts and Proximity Zones Measurements", 2020, submitted to ApJ (arXiv:2002.01811)

13. Wang, F., **Davies, F. B.** et al., "A Significantly Neutral Intergalactic Medium Around the Luminous $z = 7$ Quasar J0252–0503", 2020, ApJ, in press (arXiv:2004.10877)

14. Ďurovčíková, D., Katz, H., Bosman, S. E. I., **Davies, F. B.**, Devriendt, J., Slyz, A., "Reionization history constraints from neural network based predictions of high-redshift quasar continua", 2020, MNRAS, 493, 4256

15. Farina, E. P., ... **Davies, F. B.** et al., "The *REQUIEM* Survey I: A Search for Extended Ly-Alpha Nebular Emission Around 31 $z > 5.7$ Quasars", 2019, ApJ, 887, 196

16. Bañados, E., ... **Davies, F. B.** et al., "A Metal-Poor Damped Lyα System at Redshift 6.4", 2019, ApJ, 885, 59

17. Wang, F., ... **Davies, F. B.** et al., " Exploring Reionization-Era Quasars III: Discovery of 16 Quasars at $6.4 \lesssim z \lesssim 6.9$ with DESI Legacy Imaging Surveys and UKIRT Hemisphere Survey and Quasar Luminosity Function at $z \sim 6.7$", 2019, ApJ, 884, 30

18. Eilers, A.-C., Hennawi, J. F., **Davies, F. B.**, Oñorbe, J., "Anomaly in the Opacity of the Post-Reionization Intergalactic Medium in the Lyα and Lyβ Forest", 2019, ApJ, 881, 23

19. Oñorbe, J., **Davies, F. B.**, Lukić, Z., Hennawi, J. F., Sorini, D., "Inhomogeneous Reionization Models in Cosmological Hydrodynamical Simulations", 2019, MNRAS, 486, 4075

20. Worseck, G., **Davies, F. B.**, Hennawi, J. F., Prochaska, J. X., "The Evolution of the HeII-Ionizing Background at Redshifts $2.3 < z < 3.8$ Inferred from a Statistical Sample of 24 HST/COS HeII Lyα Absorption Spectra", 2019, ApJ, 875, 111

21. D'Aloisio, A., McQuinn, M., Maupin, O., **Davies, F. B.**, Trac, H., Fuller, S., Upton Sanderbeck, P., "Heating of the Intergalactic Medium by Hydrogen Reionization", 2019, ApJ, 874, 154

22. Wang, F., ... **Davies, F. B.** et al., "The Discovery of A Luminous Broad Absorption Line Quasar at A Redshift of 7.02", 2018, ApJL, 869, L9

23. Eilers, A.-C., Hennawi, J. F., **Davies, F. B.**, "First Spectroscopic Study of a Young Quasar", 2018, ApJ, 867, 30

24. Eilers, A.-C., **Davies, F. B.**, Hennawi, J. F., "The Opacity of the Intergalactic Medium Measured Along Quasar Sightlines at $z \sim 6$", 2018, ApJ, 864, 53

25. Becker, G. D., **Davies, F. B.**, Furlanetto, S. R., Malkan, M. A., Boera, E., Douglass, C., "Evidence for Large-scale Fluctuations in the Metagalactic Ionizing Background Near Redshift Six", 2018, ApJ, 863, 92

26. Schmidt, T., Hennawi, J. F., Worseck, G., **Davies, F. B.**, Lukiċ, Z., Oñorbe, J., "Modeling the HeII Transverse Proximity Effect: Constraints on Quasar Lifetime and Obscuration", 2018, ApJ, 861, 122

27. Walker, R. C., Hardee, P. E., **Davies, F. B.**, Ly, C., Junor, William, "The Structure and Dynamics of the Subparsec Jet in M87 Based on 50 VLBA Observations over 17 Years at 43 GHz", 2018, ApJ, 855, 128

28. Bañados, E., ... **Davies, F. B.** et al., "An 800 million solar mass black hole in a significantly neutral universe at redshift 7.5", 2018, Nature, 553, 473

29. D'Aloisio, A., McQuinn, M., **Davies, F. B.**, Furlanetto, S. R., "Large Fluctuations in the High-Redshift Metagalactic Ionizing Background", 2018, MNRAS, 473, 560

Co-author Publications (continued)

30. Mas-Ribas, L., Hennawi, J. F., Dijkstra, M., **Davies, F. B.**, Stern, J., Rix, H.-W., "Small-scale Intensity Mapping: Extended Halos as a Probe of the Ionizing Escape Fraction and Faint Galaxy Populations during Reionization", 2017, ApJ, 846, 11

31. Eilers, A.-C., **Davies, F. B.**, Hennawi, J. F., Prochaska, J. X., Lukiċ, Z., Mazzucchelli, C., "Implications of $z \sim 6$ Quasar Proximity Zones for the Epoch of Reionization and Quasar Lifetimes", 2017, ApJ, 840, 24

32. Muñoz, J. A., Peng, S. O., **Davies, F. B.**, Furlanetto, S. R., "The flatness and sudden evolution of the intergalactic ionizing background", 2016, MNRAS, 455, 1385

33. Abramowski, A., ... **Davies, F.** et al., "The 2010 Very High Energy γ-ray Flare and 10 Years of Multi-wavelength Observations of M 87", 2012, ApJ, 746, 151

34. Acciari, A., ... **Davies, F.** et al., "Radio Imaging of the Very-High-Energy γ-Ray Emission Region in the Central Engine of a Radio Galaxy", 2009, Science, 325, 444

ADDITIONAL INFORMATION

Grant Awards

2018 · Co-I of NSF grant AST-1816006 ($482k)

2017 · PI of HST-AR-15014 ($185k)

Fellowship Awards

2017 · Humboldt Research Fellowship – Declined

2014-2015 · UCLA Dissertation Year Fellowship

2010-2011 · UCLA Graduate Division Chancellor's Prize

Computing Allocations

2020 · Co-I of INCITE award "Decoding the physics of the Intergalactic Medium" (500k node hours on Summit, PI: Zarija Lukić)

Observing

Co-I of several successful HST, VLT, Keck, Gemini, ALMA, NOEMA proposals. Observed in person at Subaru (HSC) and Keck (DEIMOS/NIRES).

2019 · PI of GN-2019A-FT-114/GN-2019B-FT-107, 3.8 hr (Gemini North), "Pilot GRACES Study of Metals in a Proximate DLA at $z \sim 6$"

Teaching (UCLA)

Winter 2014 · ASTR 6 TA "Cosmology: Our Changing Concepts of Universe"

Spring 2013 · ASTR 82 TA "Stellar Evolution, Galaxies, and Cosmology"

Invited Talks

Jan 2020 · Next-Generation Cosmology with Next-Generation Ratio Telescopes: II Sesto, Italy

Jan 2020 · 235th AAS Meeting Special Session: The Scientific Quest for High-angular Resolution, Honolulu, HI

Jun 2019 · What Matter(s) Between Galaxies, Abbazia di Spineto, Italy

Oct 2018 · Berkeley Cosmology Seminar, University of California, Berkeley

Sep 2018 · IGM2018, Kavli IPMU

Sep 2016 · IMPRS Summer School 2016, University of Heidelberg

Public Outreach

Feb 2018 · Presentation at Astronomy on Tap, Santa Barbara "How Fast Can You Grow a Supermassive Black Hole?"

2010-2014 · UCLA Exploring Your Universe – Volunteer

Other Service

External Reviewer for NAOC Telescope Access Program

Referee for several ApJ and MNRAS articles

Hubble Space Telescope Cycle 27 TAC Member

Contributor to PypeIt; an open source spectrographic data reduction pipeline

April 27, 2020