

Yongda Zhu

Steward Observatory, University of Arizona,
933 N Cherry Ave, Tucson, AZ 85721
yongdaz@arizona.edu | ydzhuaastro.github.io

RESEARCH INTERESTS

Galaxy formation and evolution; Reionization; Intergalactic medium; Quasars; Dark Matter

EDUCATION

- Mar. 2024 Ph.D. in Physics
University of California, Riverside
dissertation:
Constraining the IGM during the Later Stages of Reionization Using QSO Spectra
Advisor: Prof. George Becker
- Dec. 2019 M.Sc. in Physics
University of California, Riverside
- Jun. 2018 B.Sc. in Astronomy
University of Science and Technology of China
thesis: *Test of Gravity Theories on the Galaxy Scale*. Advisor: Prof. Xiao-Bo Dong

POSITIONS & PROFESSIONAL SERVICE

- Postdoctoral Research Associate, UArizona (Mentors: Profs. Marcia & George Rieke) 2024-
- Graduate Student Researcher (UC Riverside) 2019-2024
- Teaching Assistant (UC Riverside) 2018-2019
- Teaching Assistant (USTC) 2016
- Peer Reviewer: *The Astrophysical Journal*, ALMA proposals, etc.
- Collaborations: JADES (2024-), XQR-30 (2019-).

SELECTED GRANTS & AWARDS

- NSF | NRAO Student Observing Support Award (\$40k) 2023-
- UCR | HEERF Dissertation Year Program Award (\$7.2k) 2022
- Benjamin C. Shen Memorial Award
for Outstanding Achievement by a First Year Graduate Student Researcher, UCR 2019
- Dean's Distinguished Fellowship, UCR 2018
- Xingquan Fund Scholarship, USTC 2017
- Outstanding Student Scholarship, USTC 2015, 2017

- student PI, “Properties of Barred Galaxies in Numerical Simulations” 2017
Chinese Academy of Sciences (CAS)
Innovation Training Programs for Undergraduates (1 yr, CNY 10k)
- First Prize in China Undergraduate Physics Tournament (USTC Competition Area). 2016
- student PI, “Testing Gravity Theories on the Galactic Scale” 2015-2017
- National Natural Science Foundation of China (NSFC)
for Fostering Talented Students in Basic Sciences (2 yr, CNY 20k)
- Chinese Academy of Sciences (CAS)
Innovation Training Programs for Undergraduates (1 yr, CNY 10k)

OBSERVING EXPERIENCE & PROPOSAL INVOLVEMENT

*PI/leading person[†]

Selected projects:

- *ALMA - Cycle 11 – *Galaxy over/under-densities around IGM transmission at $z=5.7$: a robust constraint on reionization*
- *MMT-6.5m/Binospec IFU - 2024B – *Ionization and Enrichment in the Reionization Epoch: A Pilot Study with Binospec IFU*
- *ALMA - Cycle 9 – *The Mean Free Path of Ionizing Photons at $z = 5.6$: A Robust Constraint on Reionization*
- JWST/NIRCam WFSS - Cycle 2 (PI: Becker): *How Does Reionization End? A Search for [O III] Emitters in the Most Transparent Regions of the IGM Near Redshift Six*
- [†]Keck/ESI: [2021B_U036, 2022A_U035, 2022B_U042, 2023B_U049, 2023B_U049, 2024A_U281] *The Mean Free Path at $z = 5.6$: Insights into Ultra-Late Reionization*

Selected previous allocation:

- Keck/ESI: [2019A_U014, 2020A_U121, 2021A_U039] *Giant Ly α Troughs at $z < 6$: A Signature of Very Late Reionization?:* (PI: Becker) **Zhu, Y.**, et al. 2021, ApJ, 923, 223; **Zhu, Y.** et al. 2022, ApJ, 932, 76.
- Keck/LRIS [2019A_U147, 2019B_U147] *The Mean Free Path at $z = 5$: A Key Constraint on Reionization Models* (PI: Becker) Becker, G. D., et al. 2021; **Zhu, Y.** et al. 2023, ApJ, 955, 115

Other allocation includes Keck/ESI [2021A, 2021B], Keck/DEIMOS [2020A], Keck/LRIS [2023B], Subaru/HSC [2020B, 2021A, 2021B, 2023B], etc.

[†] The PI of Keck proposals cannot be a UC student.

SELECTED INVITED TALKS / CONFERENCE / SEMINAR

- Steward / NOIRLab Galaxy Group Talk, UArizona Mar. 2024
- Galaxy Seminar Talk, University of Michigan Nov, 2023
- Galaxy Formation and Evolution in Southern California - GalFRESCA 2023 Sep, 2023
- Special Kashiwa-Mitaka Meeting (KMM) Seminar, University of Tokyo Aug, 2023
- Lightning talk at First Light Conference, MIT Jun, 2023
- Reionisation in the Summer Conference, MPIA, Heidelberg Jun, 2023

- Talk at Northwestern/CIERA Galaxy Formation Group Dec, 2022
- Friday Lunch Time Astrophysics Seminar, UC Santa Cruz Nov, 2022
- Astronomy Lunch Talk, UC Los Angeles Oct, 2022
- Astro Lunch Talk, UC Santa Barbara Sep, 2022
- Reionization on a Blackboard Workshop, CCA Sep, 2022
- Special arXiv Coffee Meeting, UC Davis May 2022
- Physics & Astronomy Student Seminar, UC Riverside Apr. 2022
- Talk at Tsinghua High-z Group, Tsinghua University Apr. 2022
- Reionization and Cosmic Dawn: Looking Forward To the Past, UC Berkeley Mar. 2022
- European Astronomical Annual Meeting (EAS2021) Jul. 2021
- Summer All Zoom Epoch of Reionization Astronomy Conference (SAZERAC2) Jun. 2021
- EURECA seminar (ft. G. Becker, H. Christenson), University of Arizona Feb. 2021

TEACHING & MENTORING & DEI in STEM

- Graduate comprehensive exam preparation program: 2022
 - *Cosmology and Galaxy Formation* (graduate level)
 - *Electromagnetism* (graduate level)
 - *Classical Mechanics* (graduate level)
- Undergraduate student mentored: Ms. Hernandez 2021
- UCR International Students & Scholar Office: 2021-
 - 14 international mentees from diverse backgrounds
- Graduate Student Mentorship Program: 2020
 - 2 mentees from underrepresented groups (finished their MSc, now pursuing PhD)
- *General Physics Laboratory* (undergraduate level) 2018-2019
- *Computer Programming A* (undergraduate level) 2016

SERVICE & PUBLIC OUTREACH

- Stargazing outreach events at Home Gardens Library, Corona, CA Oct. 2023
- Co-organizer: UCR Physics & Astronomy Student Seminar 2022-
- UCR Camp Highlander instructor Summer 2022
- Outreach courses designed for K-12 students: 2022
 - *Multiwavelength Universe*
 - *Gravity Simulator*
- Virtual Stargazing (UCR & Riverside Astronomical Society) 2020-2021
 - monthly live public outreach on Youtube
- Serving for the Riverside County Science and Engineering Fair as judge 2021-
- UCR Astronomy Public Outreach: Mercury Transit Nov. 2019

TECHNICAL PROFICIENCIES

Programming	C/C++ (MKL, MPI), Python, Julia, GDL/IDL, CUDA
Software	CASA, Gadget-2, GALAXY, FreeFem++, etc.
Hardware	Raspberry Pi, Arduino
Languages	English, Chinese (native)

YONGDA ZHU - PUBLICATION LIST

ADS Link/ORCID: 0000-0003-3307-7525

As of August 2024: ~ 800 citations (ADS) | h -index: 15

First-author:

5. **Zhu, Y.**, Becker, G.D., Bosman, S. E. I., Cain, C., Keating, L. C., Nasir, F., D’Odorico, V., Bañados, E., Bian, F., Bischetti, M., Bolton, J. S., Chen, H., D’Aloisio, A., Davies, F. B., Davies, R. L., Eilers, A.-C., Fan, X., Gaikwad, P., Greig, B., Haehnelt, M. G., Kulkarni, G., Lai, S., Puchwein, E., Qin, Y., Ryan-Weber, E. V., Satyavolu, S., Spina, B., Walter, F., Wang, F., Wolfson, M., and Yang, J., 2024. Damping Wing-Like Features in the Stacked Ly α Forest: Potential Neutral Hydrogen Islands at $z < 6$. *Monthly Notices of the Royal Astronomical Society: Letters*, 533, L49
Link to the preprint — doi: [10.5281/zenodo.10202616](https://doi.org/10.5281/zenodo.10202616)
4. **Zhu, Y.**, Becker, G.D., Christenson, H.M., D’Aloisio, A., Bosman, S.E.I., Bakx, T., D’Odorico, V., Bischetti, M., Cain, C., Davies, F.B., Davies, R.L., Eilers, A.-C., Fan, X., Gaikwad, P., Haehnelt, M.G., Keating, L.C., Kulkarni, G., Lai, S., Ma, H.-X., Mesinger, A., Qin, Y., Satyavolu, S., Takeuchi, T.T., Umehata, H., and Yang, J., 2023. Probing Ultra-late Reionization: Direct Measurements of the Mean Free Path over $5 < z < 6$. *The Astrophysical Journal*, 955, 115
3. **Zhu, Y.**, Ma, H.-X. (co-first author), Dong, X.-B., Huang, Y., Mistele, T., Peng, B., Long, Q., Wang T., Chang L., and Jin X., 2023. How Close Dark Matter Halos and MOND Are to Each Other: Three-Dimensional Tests Based on Gaia DR2. *Monthly Notices of the Royal Astronomical Society*, 519, 4479
2. **Zhu, Y.**, Becker G.D., Bosman S.E.I., Keating L.C., D’Odorico V., Davies R.L., Christenson H.M., Bañados E., Bian F., Bischetti M., Chen H., Davies F.B., Eilers A.-C., Fan X., Gaikwad P., Greig B., Haehnelt M.G., Kulkarni G., Lai S., Pallottini A., Qin Y., Ryan-Weber E.V., Walter F., Wang F., and Yang J., 2022. Long Dark Gaps in the Ly β Forest at $z < 6$: Evidence of Ultra Late Reionization from XQR-30 Spectra. *The Astrophysical Journal*, 932 76.
Highlighted by AASnova & Astrobites
1. **Zhu, Y.**, Becker, G.D., Bosman, S.E.I., Keating, L.C., Christenson, H.M., Bañados, E., Bian, F., Davies, F.B., D’Odorico, V., Eilers, A.-C., Fan, X., Haehnelt, M.G., Kulkarni, G., Pallottini, A., Qin, Y., Wang, F., Yang, J., 2021. Chasing the Tail of Cosmic Reionization with Dark Gap Statistics in the Ly α Forest over $5 < z < 6$. *The Astrophysical Journal* 923, 223.

Co-author:

29. Jiang, D., Onoue, M., Jiang, L., Lai, S., Bañados, E., Bosman, S. E. I., Davies, R. L., D’Odorico, V., Farina, E. P., Haenelt, M. G., Mazzucchelli, C., Schindler, J-T., Walter, F., **Zhu, Y.**, 2023. No Redshift Evolution in Fe II/Mg II Flux Ratios of Quasars across Cosmic Time, submitted to ApJ

28. Wolfson, M., Hennawi, J. F., Bosman, S. E. I., Davies, F. B., Lukić, Z., Becker, G. D., Chen, H., Cupani, G., D’Odorico, V., Eilers, A.-C., Haehnelt, M. G., Keating, L. C., Kulkarni, G., Lai, S., Mesinger, A., Walter, F., and **Zhu, Y.**, 2024. Measurements of the $z \lesssim 5$ Lyman- α forest flux autocorrelation functions from the extended XQR-30 data set, *Monthly Notices of the Royal Astronomical Society*, 531, 3069.
27. Roth, J. T., D’Aloisio, A., Cain, C., Wilson, B., **Zhu, Y.**, and Becker, G. D., 2024. The effect of reionization on direct measurements of the mean free path, *Monthly Notices of the Royal Astronomical Society*, 530, 5209.
26. Stone, M. A., Alberts, S., Rieke, G. H., Bunker, A. J., Lyu, J., Pérez-González, P. G., Shivaiei, I., and **Zhu, Y.**, 2024. 5-25 μm Galaxy Number Counts from Deep JWST Data, arXiv e-prints, arXiv:2405.18470.
25. Helton, J. M., Rieke, G. H., Alberts, S., Wu, Z., Eisenstein, D. J., Hainline, K. N., Carniani, S., Ji, Z., Baker, W. M., Bhatawdekar, R., Bunker, A. J., Cargile, P. A., Charlot, S., Chevillard, J., D’Eugenio, F., Egami, E., Johnson, B. D., Jones, G. C., Lyu, J., Maiolino, R., Pérez-González, P. G., Rieke, M. J., Robertson, B., Saxena, A., Scholtz, J., Shivaiei, I., Sun, F., Tacchella, S., Whitler, L., Williams, C. C., Willmer, C. N. A., Willott, C., Witstok, J., and **Zhu, Y.**, 2024. JWST/MIRI photometric detection at 7.7 μm of the stellar continuum and nebular emission in a galaxy at $z > 14$, arXiv e-prints, arXiv:2405.18462.
24. Alberts, S., Lyu, J., Shivaiei, I., Rieke, G. H., Perez-Gonzalez, P. G., Bonventura, N., **Zhu, Y.**, Helton, J. M., Ji, Z., Morrison, J., Robertson, B. E., Stone, M. A., Sun, Y., Williams, C. C., and Willmer, C. N. A., 2024. SMILES Initial Data Release: Unveiling the Obscured Universe with MIRI Multi-band Imaging, arXiv e-prints, arXiv:2405.15972.
23. Spina, B., Bosman, S. E. I., Davies, F. B., Gaikwad, P., and **Zhu, Y.**, 2024. Damping wings in the Lyman- α forest: a model-independent measurement of the neutral fraction at 5.4 $z \lesssim 6.1$, arXiv e-prints, arXiv:2405.12273.
22. Ma, H.-X., Takeuchi, T. T., Cooray, S., and **Zhu, Y.**, 2024. Density-based clustering algorithm for galaxy group/cluster identification, arXiv e-prints, arXiv:2405.09855.
21. Becker, G. D., Bolton, J. S., **Zhu, Y.**, and Hashemi, S., 2024. Damping wing absorption associated with a giant Ly α trough at $z < 6$: direct evidence for late-ending reionization, arXiv e-prints, arXiv:2405.08885.
20. Greig, B., Mesinger, A., Bañados, E., Becker, G. D., Bosman, S. E. I., Chen, H., Davies, F. B., D’Odorico, V., Eilers, A.-C., Gallerani, S., Haehnelt, M. G., Keating, L., Lai, S., Qin, Y., Ryan-Weber, E., Satyavolu, S., Wang, F., Yang, J., and **Zhu, Y.**, 2024. IGM damping wing constraints on the tail end of reionization from the enlarged XQR-30 sample, *Monthly Notices of the Royal Astronomical Society*, 530, 3208.
19. Bischetti, M., Choi, H., Fiore, F., Feruglio, C., Carniani, S., D’Odorico, V., Bañados, E., Chen, H., Decarli, R., Gallerani, S., Hlavacek-Larrondo, J., Lai, S., Leighly, K. M., Mazzucchelli, C., Perreault-Levasseur, L., Tripodi, R., Walter, F., Wang, F., Yang, J., Vittoria Zanchettin, M., and **Zhu, Y.**, 2024. Multi-phase black-hole feedback and a bright [CII] halo in a Lo-BAL quasar at $z \sim 6.6$, arXiv e-prints, arXiv:2404.12443.
18. Fudamoto, Y., Sun, F., Diego, J. M., Dai, L., Oguri, M., Zitrin, A., Zackrisson, E., Jauzac, M., Lagattuta, D. J., Egami, E., Iani, E., Windhorst, R. A., Abe, K. T., Bauer, F. E., Bian, F., Bhatawdekar, R., Broadhurst, T. J., Cai, Z., Chen, C.-C., Chen, W., Cohen, S. H., Conselice, C. J., Espada, D., Foo, N., Frye, B. L., Fujimoto, S., Furtak, L. J., Golubchik, M., Hsiao, T. Y.-Y., Jolly, J.-B., Kawai, H., Kelly, P. L., Koekemoer, A. M., Kohno, K., Kokorev, V., Li, M., Li, Z., Lin,

- X., Magdis, G. E., Meena, A. K., Nabizadeh, A., Richard, J., Steinhardt, C. L., Wu, Y., **Zhu, Y.**, and Zou, S., 2024. JWST Discovery of 40+ Microlensed Stars in a Magnified Galaxy, the "Dragon" behind Abell 370, arXiv e-prints, arXiv:2404.08045.
17. D'Eugenio, F., Cameron, A. J., Scholtz, J., Carniani, S., Willott, C. J., Curtis-Lake, E., Bunker, A. J., Parlanti, E., Maiolino, R., Willmer, C. N. A., Jakobsen, P., Robertson, B. E., Johnson, B. D., Tacchella, S., Cargile, P. A., Rawle, T., Arribas, S., Chevallard, J., Curti, M., Egami, E., Eisenstein, D. J., Kumari, N., Looser, T. J., Rieke, M. J., Rodríguez Del Pino, B., Saxena, A., Übler, H., Venturi, G., Witstok, J., Baker, W. M., Bhatawdekar, R., Bonaventura, N., Boyett, K., Charlot, S., Danhaive, A. L., Hainline, K. N., Hausen, R., Helton, J. M., Ji, X., Ji, Z., Jones, G. C., Joudžbalis, I., Maseda, M. V., Pérez-González, P. G., Perna, M., Puskás, D., Shivaee, I., Silcock, M. S., Simmonds, C., Smit, R., Sun, F., Villanueva, N. C., Williams, C. C., and **Zhu, Y.**, 2024. JADES Data Release 3 – NIRSpect/MSA spectroscopy for 4,000 galaxies in the GOODS fields, arXiv e-prints, arXiv:2404.06531.
 16. Davies, F. B., Bosman, S. E. I., Gaikwad, P., Nasir, F., Hennawi, J. F., Becker, G. D., Haehnelt, M. G., D'Odorico, V., Bischetti, M., Eilers, A.-C., Keating, L. C., Kulkarni, G., Lai, S., Mazzucchelli, C., Qin, Y., Satyavolu, S., Wang, F., Yang, J., and **Zhu, Y.**, 2024. Constraints on the Evolution of the Ionizing Background and Ionizing Photon Mean Free Path at the End of Reionization, *The Astrophysical Journal*, 965, 134.
 15. Shivaee, I., Alberts, S., Florian, M., Rieke, G., Wuyts, S., Bodansky, S., Bunker, A. J., Cameron, A. J., Curti, M., D'Eugenio, F., Dudzeviciute, U., Kramarenko, I., Ji, Z., Johnson, B. D., Lyu, J., Matthee, J., Morrison, J., Naidu, R., Reddy, N., Robertson, B., Pérez-González, P. G., Sun, Y., Tacchella, S., Whitaker, K., Williams, C. C., Willmer, C. N. A., Witstok, J., Xiao, M., and **Zhu, Y.**, 2024. A new census of dust and PAHs at $z=0.7-2$ with JWST MIRI, arXiv e-prints, arXiv:2402.07989.
 14. Gaikwad, P., Haehnelt, M. G., Davies, F. B., Bosman, S. E. I., Molaro, M., Kulkarni, G., D'Odorico, V., Becker, G. D., Davies, R. L., Nasir, F., Bolton, J. S., Keating, L. C., Iršič, V., Puchwein, E., **Zhu, Y.**, Asthana, S., Yang, J., Lai, S., and Eilers, A.-C., 2023. Measuring the photoionization rate, neutral fraction, and mean free path of H I ionizing photons at $4.9 \leq z \leq 6.0$ from a large sample of XShooter and ESI spectra, *Monthly Notices of the Royal Astronomical Society*, 525, 4093.
 13. Christenson, H. M., Becker, G. D., D'Aloisio, A., Davies, F. B., **Zhu, Y.**, Boera, E., Nasir, F., Furlanetto, S. R., and Malkan, M. A., 2023. The Relationship between IGM Ly α Opacity and Galaxy Density near the End of Reionization, *The Astrophysical Journal*, 955, 138.
 12. Mazzucchelli, C., Bischetti, M., D'Odorico, V., Feruglio, C., Schindler, J.-T., Onoue, M., Bañados, E., Becker, G. D., Bian, F., Carniani, S., Decarli, R., Eilers, A.-C., Farina, E. P., Gallerani, S., Lai, S., Meyer, R. A., Rojas-Ruiz, S., Satyavolu, S., Venemans, B. P., Wang, F., Yang, J., and **Zhu, Y.**, 2023. XQR-30: Black hole masses and accretion rates of 42 $z \gtrsim 6$ quasars, *Astronomy and Astrophysics*, 676, A71.
 11. D'Odorico, V., Bañados, E., Becker, G. D., Bischetti, M., Bosman, S. E. I., Cupani, G., Davies, R., Farina, E. P., Ferrara, A., Feruglio, C., Mazzucchelli, C., Ryan-Weber, E., Schindler, J.-T., Sodini, A., Venemans, B. P., Walter, F., Chen, H., Lai, S., **Zhu, Y.**, Bian, F., Campo, S., Carniani, S., Cristiani, S., Davies, F., Decarli, R., Drake, A., Eilers, A.-C., Fan, X., Gaikwad, P., Gallerani, S., Greig, B., Haehnelt, M. G., Hennawi, J., Keating, L., Kulkarni, G., Mesinger, A., Meyer, R. A., Neeleman, M., Onoue, M., Pallottini, A., Qin, Y., Rojas-Ruiz, S., Satyavolu, S., Sebastian, A., Tripodi, R., Wang, F., Wolfson, M., Yang, J., and Zanchettin, M. V., 2023. XQR-30: The ultimate XSHOOTER quasar sample at the reionization epoch, *Monthly Notices of the Royal Astronomical Society*, 523, 1399.

10. Bischetti, M., Fiore, F., Feruglio, C., D’Odorico, V., Arav, N., Costa, T., Zubovas, K., Becker, G., Bosman, S. E. I., Cupani, G., Davies, R., Eilers, A.-C., Farina, E. P., Ferrara, A., Gaspari, M., Mazzucchelli, C., Onoue, M., Piconcelli, E., Zanchettin, M. V., and **Zhu, Y.**, 2023. The Fraction and Kinematics of Broad Absorption Line Quasars across Cosmic Time, *The Astrophysical Journal*, 952, 44.
9. Bischetti, M., Feruglio, C., D’Odorico, V., Arav, N., Banados, E., Becker, G., Bosman, S. E. I., Carniani, S., Cristiani, S., Cupani, G., Davies, R., Eilers, A. C., Farina, E. P., Ferrara, A., Maiolino, R., Mazzucchelli, C., Mesinger, A., Meyer, R. A., Onoue, M., Piconcelli, E., Ryan-Weber, E., Schindler, J.-T., Wang, F., Yang, J., **Zhu, Y.**, and Fiore, F., 2023. VizieR Online Data Catalog: XQR-30 quasars sample (Bischetti+, 2022), VizieR Online Data Catalog (other), 0380, J/other/Nat/605.
8. Becker, G. D., Christenson, H., D’Aloisio, A., Endsley, R., Mason, C., and **Zhu, Y.**, 2023. How Does Reionization End? A Search for [O III] Emitters in the Most Transparent Regions of the IGM Near Redshift Six, *JWST Proposal. Cycle 2*, 4092.
7. Davies, R. L., Ryan-Weber, E., D’Odorico, V., Bosman, S. E. I., Meyer, R. A., Becker, G. D., Cupani, G., Keating, L. C., Bischetti, M., Davies, F. B., Eilers, A.-C., Farina, E. P., Haehnelt, M. G., Pallottini, A., and **Zhu, Y.**, 2023. Examining the decline in the C IV content of the Universe over $4.3 \lesssim z \lesssim 6.3$ using the E-XQR-30 sample, *Monthly Notices of the Royal Astronomical Society*, 521, 314.
6. Davies, R. L., Ryan-Weber, E., D’Odorico, V., Bosman, S. E. I., Meyer, R. A., Becker, G. D., Cupani, G., Bischetti, M., Sebastian, A. M., Eilers, A.-C., Farina, E. P., Wang, F., Yang, J., and **Zhu, Y.**, 2023. The XQR-30 metal absorber catalogue: 778 absorption systems spanning $2 \lesssim z \lesssim 6.5$, *Monthly Notices of the Royal Astronomical Society*, 521, 289.
5. Bosman, S. E. I., Davies, F. B., Becker, G. D., Keating, L. C., Davies, R. L., **Zhu, Y.**, Eilers, A.-C., D’Odorico, V., Bian, F., Bischetti, M., Cristiani, S. V., Fan, X., Farina, E. P., Haehnelt, M. G., Hennawi, J. F., Kulkarni, G., Mesinger, A., Meyer, R. A., Onoue, M., Pallottini, A., Qin, Y., Ryan-Weber, E., Schindler, J.-T., Walter, F., Wang, F., and Yang, J., 2022. Hydrogen reionization ends by $z = 5.3$: Lyman- α optical depth measured by the XQR-30 sample, *Monthly Notices of the Royal Astronomical Society*, 514, 55.
4. Lai, S., Bian, F., Onken, C. A., Wolf, C., Mazzucchelli, C., Bañados, E., Bischetti, M., Bosman, S. E. I., Becker, G., Cupani, G., D’Odorico, V., Eilers, A.-C., Fan, X., Farina, E. P., Onoue, M., Schindler, J.-T., Walter, F., Wang, F., Yang, J., and **Zhu, Y.**, 2022. Chemical abundance of $z \sim 6$ quasar broad-line regions in the XQR-30 sample, *Monthly Notices of the Royal Astronomical Society*, 513, 1801.
3. Bischetti, M., Feruglio, C., D’Odorico, V., Arav, N., Bañados, E., Becker, G., Bosman, S. E. I., Carniani, S., Cristiani, S., Cupani, G., Davies, R., Eilers, A. C., Farina, E. P., Ferrara, A., Maiolino, R., Mazzucchelli, C., Mesinger, A., Meyer, R. A., Onoue, M., Piconcelli, E., Ryan-Weber, E., Schindler, J.-T., Wang, F., Yang, J., **Zhu, Y.**, and Fiore, F., 2022. Suppression of black-hole growth by strong outflows at redshifts 5.8-6.6, *Nature*, 605, 244.
2. Becker, G. D., D’Aloisio, A., Christenson, H. M., **Zhu, Y.**, Worseck, G., and Bolton, J. S., 2021. The mean free path of ionizing photons at $5 < z < 6$: evidence for rapid evolution near reionization, *Monthly Notices of the Royal Astronomical Society*, 508, 1853.
1. Christenson, H. M., Becker, G. D., Furlanetto, S. R., Davies, F. B., Malkan, M. A., **Zhu, Y.**, Boera, E., and Trapp, A., 2021. Constraints on the End of Reionization from the Density Fields Surrounding Two Highly Opaque Quasar Sightlines, *The Astrophysical Journal*, 923, 87.

