

# Siwei Zou

## National Astronomical Observatories, Chinese Academy of Science

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## RESEARCH INTERESTS

Quasar emission and absorptions lines, cosmic chemical enrichment, interstellar medium, circumgalactic medium, first stars and galaxies, nucleosynthesis, galaxy clusters and groups, all-sky survey

## EDUCATION

**Ph. D. Astrophysics**, Sorbonne Université, France 2015-2018

Institut d'Astrophysique de Paris

Thesis: *Using Quasar Absorption Lines to Study Cold Gas at High Redshift*

Supervisors: Prof. Patrick Petitjean and Dr. Pasquier Noterdaeme

**M. S. Physics**, University of Bristol, UK 2013-2015

Thesis: *X-ray Scaling Relations of the 400d Low-mass Galaxy Clusters*

Supervisor: Prof. Ben Maughan

**B. S. Physics**, Liaoning University, China 2009-2013

## EMPLOYMENT

**Research Professor** 2025-present

CAS South America Center for Astronomy (CASSACA), NAOC, China/Chile

**Associated Research Professor** 2024

CAS South America Center for Astronomy (CASSACA), NAOC, China/Chile

**MUST Fellow**, Tsinghua University, China 2022-2024

Host: Prof. Zheng Cai

**BHOLE Fellow**, Peking University, China 2018-2021

Host: Prof. Linhua Jiang

## AWARDS & GRANTS

### P. I.

Chinese Science Academy Youth Talent Program 2025-2027

National Natural Science Foundation of China for Young Scientist (No.12303011) 2024

MUST Postdoctoral Fellowship 2022-2024

KIAA BHOLE Postdoctoral Fellowship 2018-2021

ED127 Ph.D.Fellowship from UPMC, Sorbonne Université 2015-2018

Grant from Kurt Hoeselitz Fund in the 2014-15 academic year bursary 2014

Scholarship at Liaoning University (Top 10%), Excellent Student 2009-2012

### Co-I

National Natural Science Foundation of China for Major Research Plan (No.11890693) 2019-2023

*"The growth history of galaxies and central black holes in the cosmic web"*

Peking University-Tokyo University Strategic Partnership Funds 2019

## APPROVED PROPOSALS

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### P. I.

<b>ALMA:</b> Searching for CO emission around the first complete CI absorber sample	2025
<b>NOEMA:</b> Neutral carbon-bearing cold stream at $z \sim 1.5$ ? Searching for the obscured galaxy counterparts, 6 hours	2024
<b>FAST:</b> Searching for 21-cm absorption in Mg II host galaxies at $z < 0.4$ , 15 hours	2020
<b>Subaru/HDS:</b> A carbon enhanced Lyman limit system: A new window on the first stars? 4 hours	2020
<b>DESI:</b> Association between gas in the ISM/CGM and host galaxies at $1.5 < z < 3.0$ , 5 hours	2019

### Co-I

### JWST:

#### Cycle 4

GO 7436: The Last Neutral Islands at the End of Reionization? Characterizing the Nature of the Longest Dark Gaps in IGM Transmission at  $z \sim 5.3$

GO 7345: The Dragon survey: A Direct Probe of the Early Stellar Luminosity Function and Dark Matter through Multi-cycle Multi-cadence Microlensing at  $z=0.73$

#### Cycle 3

GO 5893: COSMOS-3D: A Legacy Spectroscopic/Imaging Survey of the Early Universe

GO 5645: A 3D view of the first QSOs: A JWST/NIRSpec survey program

GO 4691: Investigating an Extreme [OIII] Outflow Discovered in a Reionization-era Luminous Quasar

GO 5911: Emergence of the Baryon Cycle in the First Billion Years

#### Cycle 2

GO 2883: MAGNIF: Medium-band Astrophysics with the Grism of NIRCам in Frontier Fields

GO 3325: Mapping the Most Extreme Protoclusters in the Epoch of Reionization

**VLT/MUSE:** The cosmic Ecosystem of the first QSOs and Galaxies (Large) 140 hours 2023

**Magellan/MIKE:** A carbon enhanced Lyman limit system: A new window on the first stars? 1 night 2023

**Subaru/HDS:** A carbon enhanced Lyman limit system: A new window on the first stars? 2 nights 2023

**GTC:** The Search and Characterization of the most primitive stars in the Galaxy, 10 hours 2020

## COLLABORATION & SERVICES

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The Dark Energy Spectroscopic Instrument: Absorber Topical Group co-leads	2022-present
The Dark Energy Spectroscopic Instrument: Early Career Scientists Committee	2021-2022
Reviewer of Chilean Fondecyt Grant	2025
Reviewer of A&A, DESI (internal)	2024-present
HST Cycle 31, 32, Bridge program TAC member	2023-2024
EREBUS of high- $z$ quasar JWST project: Member	2022-present
COSMO-3D collaboration: Member	2024-present
Tsinghua University MUST survey project: Member	2022-present
PKU-KIAA Black Hole-Host Lifecycle Evolution: Member	2018-2021
PKU-KIAA Innovation NSFC Group: Member	2018-2021
PKU-KIAA Postdoc Representative	2019
Organizer, Tsinghua DoA Lunch talk in DoA, Beijing, China	2023
Organizer, PKU-KIAA Postdoc science day, Beijing, China	2019
Organizer, IAP YMCA weekly seminar, France	2015-2016

## SELECTED CONFERENCES & SEMINARS

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<b>SOC &amp; LOC</b> , The Baryon Cycle from Reionization to the Cosmic Noon, Puerto Varas, Chile	2025
<b>SOC &amp; LOC</b> , KIAA Forum on Gas in Galaxies for ECS, online (> 200 participants)	2021
<b>Invited</b> talk, 7th China-Chile Bilateral Conference for Astronomy, Hong Kong, China	2026
<b>Invited</b> seminar, UNAB, Santiago, Chile	2025
<b>Invited</b> seminar, Joint meeting of ICTP, SISSA and INAF, Trieste, Italy	2024

<b>Invited</b> seminar, COSMIB group in University of Milano-Bicocca, Milan, Italy	2024
<b>Invited</b> talk, MPIA galaxy coffee, Heidelberg, Germany	2022
<b>Invited</b> talk, Ringberg JWST meeting, Ringberg, Germany	2022
<b>Invited</b> seminar, IAP galaxy seminar, Paris, France	2022
<b>Invited</b> seminar, ZAH Heidelberg University, Heidelberg, Germany	2022
<b>Invited</b> Plenary talk, DESI collaboration meeting, online	2021
<b>Invited</b> seminar, Yunnan University, Kunming, China	2019, 2020
<b>Invited</b> colloquium, Beijing Planetarium, Beijing, China	2020
<b>Invited</b> colloquium, Tianjin Normal University, Tianjin, China	2020
<b>Invited</b> talk, Cosmic shadow 2018, Ishigaki, Japan	2018
Seminar, Universidad de Concepcion, Concepción, Chile	2025
Talk, The First Gigayear(s), Hilo, US	2024
Talk, COSMOS collaboration meeting, IPMU, Japan	2024
Talk, Baryons in the Universe 2024, IPMU, Japan	2024
Talk, Observation and Physics of AGN feedback, Hangzhou, China	2023
Talk, Shedding new light on the first billion years of the Universe, France	2023
Talk, What Matters Around Galaxies 2022, Champoluc, Italy	2022
Talk, European Astronomical Society Annual Meeting, online	2021
Talk, Cosmic Evolution of quasars, Beijing, China	2019
Talk, Chinese Astronomical Society General Assembly, Delhi, China	2019
Talk, DESI collaboration meeting, Berkeley, US	2019
Talk, Extremely Big Eyes on the Early Universe, Tokyo, Japan	2019
Talk, Galaxies in Absorption, Pune, India	2017
Talk, European Week of Astronomy and Space Science, Prague, Czech Republic	2017
Talk, Conférence Elbereth, Paris, France	2016
Talk, Probing Baryons in the Universe, Paris, France	2016
Talk, GOTOQ 2016, Pittsburgh, US	2016
Poster, IAUS358, Astronomy for Equity, Diversity and Inclusion	2019

## STUDENTS & POSTDOCS MENTORING

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Antonia Fernandez Figueroa, postdoc in CASSACA, NAOC  
Zijian Li, graduate student in CASSACA, NAOC, 1 publication  
Xiaojing Lin, graduate student in Tsinghua U, 1 publication  
Xuanyi Wu, graduate student in Tsinghua U, 1 publication → Postdoc in Pengcheng Lab  
Anning Gao, undergraduate student in Tsinghua U, 1 publication → Graduate student in Ohio State U

## OUTREACH

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DESI planetarium movie: “5000 eyes: Mapping the Universe with DESI ”	2023
Public talk, “Introduction of modern astronomy”, Huaihua 2 <sup>nd</sup> Railway Middle School	2020
Public talk, “What do we see from black hole images?”, Peking University	2019

## SELECTED PUBLICATIONS (48 in total, citation > 2000, h-index = 20, \*as mentoring students)

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### Primary author papers

S. Zou, et al., in prep, “COSMOS-3D: Overview of the CGM-galaxy-structure connection

\*Z. Li, S. Zou, J. Lyu et al., “COSMOS-3D: Two obscured X-ray AGNs with hot dust and He II 10830 absorption at  $z \sim 3$ ”, submitted

S. Zou, R. Simcoe, P. Petitjean et al., “Disturbed cold gas in the galaxy and structure formation”, 2025ApJL.994.L53

- S. Zou**, Z. Cai, F. Wang et al., “*ASPIRE: Impact of galaxies on the CGM metal enrichment at  $z > 6$  using JWST and VLT*”, 2024ApJL.963.L28
- S. Zou**, L. Jiang, Z. Cai et al., “*DESI survey validation data in the COSMOS/HSC field: Cool gas trace main sequence star-forming galaxies at the cosmic noon*”, 2024ApJ.960.34
- S. Zou**, L. Jiang, Y. Shen, et al., “*Strong Mg II and Fe II absorbers at  $2.2 < z < 6.0$* ” 2021ApJ.906.32
- S. Zou**, P. Petitjean, P. Noterdaeme et al., “*A carbon-enhanced Lyman Limit System: signature of the first generation of stars?*” 2020ApJ.901.105Z
- S. Zou**, P. Petitjean, P. Noterdaeme et al., “*Near Infrared spectroscopic observations of high redshift C-I absorbers*” 2018A&A.616A.158Z
- S. Zou**, B. J. Maughan, P. A. Giles et al., “*The X-ray luminosity-temperature relation of a complete sample of low-mass galaxy clusters*” 2016MNRAS.463.820Z
- P. Noterdaeme, C. Ledoux, **S. Zou** et al., “*Spotting high- $z$  molecular absorbers using neutral carbon results from a complete spectroscopic survey with the VLT*” 2018A&A.612A.58N
- H. Fathivavsari, P. Petitjean, **S. Zou** et al., “*A ghostly damped Ly $\alpha$  system revealed by metal absorption lines*” 2017MNRAS.466L.58F
- \*X. Lin, Z. Cai, **S. Zou** et al., “*Metal-Enriched Neutral Gas Reservoir around a Strongly-lensed, Low-mass Galaxy at  $z = 4$  Identified by JWST/NIRISS and VLT/MUSE*” 2023ApJ.944L.59L
- \*A. Gao, J. X. Prochaska, Z. Cai, **S. Zou** et al., “*Measuring the Mean Free Path of HI Ionizing Photons at  $3.2 \leq z \leq 4.6$  using DESI Year 1 Quasars*”, 2025ApJL.981.L27
- \*X. Wu, Z. Cai, T-W Lan, **S. Zou** et al., “*Tracing the evolution of the cool gas in CGM and IGM environments through Mg II absorption from 5 redshift  $z=0.75$  to  $z=1.65$  using DESI-Y1 data*”, 2025ApJ.983.186W
- Z. Chen, E. Wang, H. Zou, **S. Zou** et al., “*The circumgalactic medium traced by Mg II absorption with DESI: dependence on galaxy stellar mass, star formation rate and azimuthal angle*”, 2025ApJ.981.81C

### Contributed author papers

- Y. Fudamoto, F. Sun, J. M. Diego, Jose M. et al., “*JWST Discovery of 40+ Microlensed Stars in a Magnified Galaxy, the “Dragon” behind Abell 370*”, 2025NatAs.9.428F
- Z. Li, Z. Cai, X. Wang et al., “*A 13 Billion Year View of Galaxy Growth: Metallicity Gradient Evolution from the Local Universe to  $z = 9$  with JWST and Archival Surveys*”, 2025ApJS.280.62L
- F. Sun, F. Wang, J. Yang et al., “*A SPectroscopic survey of biased halos In the Reionization Era (ASPIRE): Spectroscopically Complete Census of Obscured Cosmic Star Formation Rate Density at  $z=4-6$* ”, 2025ApJ.980.12S
- J. Champagne, F. Wang, H. Zhang et al., “*A Quasar-Anchored Protocluster at  $z=6.6$  in the ASPIRE Survey: I. Properties of [OIII] Emitters in a 10 Mpc Overdensity Structure*”, 2025ApJ.981.113

X. Jin, J. Yang, X. Fan et al., “*A SPECTROSCOPIC survey of biased halos In the Reionization Era (ASPIRE): JWST Supports Earlier Reionization around [O III] Emitters*”, 2024ApJ.976.93

R. Decarli, F. Loiacono, E. P. Farina et al., “*A quasar-galaxy merger at  $z \sim 6.2$ : Rapid host growth via accretion of two massive satellite galaxies*”, 2024A&A.689A.219D

Y. Wu, F. Wang, Z. Cai et al., “*A SPECTROSCOPIC survey of biased halos In the Reionization Era (ASPIRE): JWST Discoveries A Metal Absorption-selected Galaxy at  $z \sim 5.5$* ” 2023ApJ.956L.40W

J. Yang, F. Wang, X. Fan et al., “*A SPECTROSCOPIC Survey of Biased Halos in the Reionization Era (ASPIRE): A First Look at the Rest-frame Optical Spectra of  $z > 6.5$  Quasars Using JWST*” 2023ApJ.951L.5Y

F. Wang, J. Yang, J. Hennawi et al., “*A SPECTROSCOPIC Survey of Biased Halos in the Reionization Era (ASPIRE): JWST Reveals a Filamentary Structure around a  $z = 6.61$  Quasar*” 2023ApJ.951L.4W

M. Li, Z. Cai, F. Bian et al., “*The Mass-Metallicity Relation of Dwarf Galaxies at the Cosmic Noon in the JWST Era*”, 2023ApJ.955L.18L

S. Wang, L. Jiang, Y. Shen et al., “*Metallicity in Quasar Broad-line Regions at Redshift 6*” 2022ApJ.925.121W

## **DESI related**

DESI collaboration, “*Data Release 1 of the Dark Energy Spectroscopic Instrument*”, arXiv:2503.14745

DESI collaboration, “*Overview of the Instrumentation for the Dark Energy Spectroscopic Instrument*” 2022AJ.164.207A

DESI collaboration, “*Validation of the Scientific Program for the Dark Energy Spectroscopic Instrument*” 2024AJ.167.62A

DESI collaboration, “*The Early Data Release of the Dark Energy Spectroscopic Instrument*” 2024AJ.168.58D

Brodzeller, A., Wolfson, M, Santos, D. M. “*Construction of the Damped Ly $\alpha$  Absorber Catalog for DESI DR2 Ly $\alpha$  BAO*”, arXiv:2503.14740

Napolitano. L, Pandey. A, Myers, A et al., “*Detecting and Characterizing Mg II absorption in DESI Survey Validation Quasar Spectra*” 2023AJ.166.99N

Allende Prieto. C, Aguado, David S, González Hernández, J et al., “*GTC Follow-up Observations of Very Metal-Poor Star Candidates from DESI*” 2023ApJ.957.76A

D. Alexander, T. M. Davis, E. Chaussidon, et al. “*The DESI Survey Validation: Results from Visual Inspection of the Quasar Survey Spectra*” 2023AJ.165.124A

H. Zou, J. Sui, A. Saintonge et al., “*A Large Sample of Extremely Metal-poor Galaxies at  $z < 1$  Identified from the DESI Early Data*” 2024ApJ.961.173Z