

# Dr. Yali Shao

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I mainly study the interstellar medium (e.g., dust, [C II], and CO) properties, the gas kinematics, system dynamics, and the coevolution of black hole and its host of far-infrared luminous quasars in the early Universe, and the radio continuum emission of radio quiet-to-loud quasars and radio galaxies at high redshifts.

## Education

Peking University Beijing, China  
Ph.D., Astrophysics  
Sep 2013 – Jul 2019

Shandong University Weihai, Shandong Province, China  
B.S., Space science and technology  
Sep 2009 – Jun 2013

## Employment

Beihang University Beijing, China  
Associate Professor  
Mar 2023 – NOW

Max Planck Institute for Radio Astronomy Bonn, Germany  
Visiting Scholar  
Jan 2023 – Mar 2023

Max Planck Institute for Radio Astronomy Bonn, Germany  
Postdoc Researcher  
Dec 2019 – Dec 2022

National Radio Astronomy Observatory Socorro, New Mexico, America  
Visiting Scholar  
Oct 2016 – Oct 2017

## Honors, Scholarship, Awards

Student Awards — Peking University

- One-year support from China Scholarship Council to study at NRAO 2016–2017
- China Aerospace Science and Technology Corporation (CASC) scholarship 2014–2015
- Merit Student Award 2014–2015
- Merit Student Award 2013–2014

Student Awards — Shandong University

- Merit Student Award 2012–2013
- Merit Student Award 2011–2012
- National Inspirational Scholarship 2011–2012
- Outstanding Young Volunteer Award 2010–2011
- National Inspirational Scholarship 2010–2011
- The Third Prize of Competition of Body-building Exercises 2009–2010
- Wenping Inspirational Scholarship 2009–2010
- Merit Student Award 2009–2010

## Approved Proposals as PI

- ALMA (2018.1.00597.S): Sub-kpc imaging of the star-forming gas in two [C II] luminous quasar host galaxies at  $z \sim 6$ ; 3.04 hrs
- VLA (19A-107): Searching for high-frequency peak of seven radio-detected quasars at  $z > 5$ ; 4.92 hrs
- VLBA (20A-011): On the origin of the radio spectral turnover of 11 radio-loud quasars at  $z > 4$ ; 5 hrs
- JCMT (M20AP001): The star formation and the environments of 11 radio-loud quasars at  $z > 5$ ; 21.809 hrs
- uGMRT (38\_069): Low-frequency radio properties of 11 radio-loud quasars at  $z > 5$ ; 21.17 hrs
- Effelsberg-100m (64-20): Searching for H<sub>2</sub>O megamaser in a distant gravitationally lensed quasar in the early Universe; 8.25 hrs
- Effelsberg-100m (99-20): Searching for H<sub>2</sub>O megamasers in PG quasars; 32 hrs
- VLBA (21A-084): On the origin of the radio spectral turnover of 6 radio-loud quasars at  $z > 5$ ; 28 hrs
- EVN (E21A016): High-resolution radio observations of 7 radio galaxies at  $z > 4$ ; 14 hrs
- IRAM (083-21): The star formation and the environments of radio galaxies at  $z > 4$ ; 15 hrs
- VLA (22A-138): On the origin of the two radio spectral peaks of a radio-loud quasar at  $z = 5$ ; 1 hr
- VLA (22A-307): The radio continuum emission from FIR luminous quasars in the early Universe; 18 hrs
- ALMA (2022.1.01178.S): The ISM distribution, gas kinematics and system dynamics of five rotation-dominated quasar-starburst systems at  $z > 6$ ; 24 hrs
- VLA (VLA-23A-183): The radio continuum emission from FIR luminous quasars in the early Universe; 24 hrs

## Relevant Experience

### Observing Experience

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|-------------------------------------|------------------------------------|
| • IRAM for 2 days                   | Remote in Bonn (Germany), Oct 2021 |
| • Effelsberg-100m for 3 nights      | Bonn (Germany), Jan 2020           |
| • Bok 2.3 m telescope for 10 nights | Arizona (USA), Jul 2018            |
| • JCMT for 5 nights                 | Hawaii (USA), Mar 2018             |
| • JCMT for 5 nights (JINGLE)        | Hawaii (USA), Jun 2016             |
| • JCMT for 5 nights                 | Hawaii (USA), Apr 2016             |
| • Bok 2.3 m telescope for 12 nights | Arizona (USA), Apr 2016            |
| • JCMT for 6 nights                 | Hawaii (USA), Sep 2015             |
| • 2.16m telescope for 10 nights     | Xinglong (China), Feb 2014         |

### Talks & Posters

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|---|-----------------------------------|
| • Lunch colloquium                            | MPIfR (German), Feb 2020 [REPORT] |
| • Lunch talk                                  | UA (America), Oct 2017 [REPORT]   |
| • Black Hole workshop                         | KIAA (China), Sep 2016 [REPORT]   |
| • Chinese Astronomical Society Annual Meeting | KIAA (China), Oct 2015 [REPORT]   |

### Teaching Experience

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|---|---------------------|
| • Teaching assistant on Astronomical Spectroscopy | Mar 2016 – Jun 2016 |
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## Publications

### A complete ADS list

- **Shao, Yali**; Wang, Ran; Weiss, Axel; Wagg, Jeff; Carilli, Chris L.; Strauss, Michael; Walter, Fabian; Cox, Pierre; Fan, Xiaohui; Menten, Karl M.; Narayanan, Desika; Riechers, Dominik A.; Bertoldi, Frank; Omont, Alain; Jiang, Linhua, 2022, The interstellar medium distribution,

gas kinematics, and system dynamics of the far-infrared luminous quasar SDSS J2310+1855 at  $z = 6.0$ . *Astronomy & Astrophysics*, 668, A121.

- **Shao, Yali**; Wagg, Jeff; Wang, Ran; Momjian, Emmanuel; Carilli, Chris L.; Walter, Fabian; Riechers, Dominik A.; Intema, Huib T.; Weiss, Axel; Brunthaler, Andreas; Menten, Karl M.. 2022, The radio spectral turnover of radio-loud quasars at  $z > 5$ . *Astronomy & Astrophysics*, 659, A159.
- **Shao, Yali**; Wagg, Jeff; Wang, Ran; Carilli, Chris L.; Riechers, Dominik A. Intema, Huib T.; Weiss, Axel; Menten, Karl M.. 2020 Observations by GMRT at 323 MHz of radio-loud quasars at  $z > 5$ . *Astronomy & Astrophysics*, 641, A85.
- **Shao, Yali**; Wang, Ran; Carilli, Chris L.; Wagg, Jeff; Walter, Fabian; Li, Jianan; Fan, Xiaohui; Jiang, Linhua; Riechers, Dominik A.; Bertoldi, Frank; Strauss, Michael A.; Cox, Pierre; Omont, Alain; Menten, Karl M.. 2019 Star formation and ISM properties in host galaxies of three far-infrared luminous quasars at  $z \sim 6$ . *The Astrophysical Journal*, 876, 99.
- **Shao, Yali**; Wang, Ran; Jones, Gareth C.; Carilli, Chris L.; Walter, Fabian; Fan, Xiaohui; Riechers, Dominik A.; Bertoldi, Frank; Wagg, Jeff; Strauss, Michael A.; Omont, Alain; Cox, Pierre; Jiang, Linhua; Narayanan, Desika; Menten, Karl M., 2017, Gas Dynamics of a Luminous  $z = 6.13$  Quasar ULAS J1319+0950 Revealed by ALMA High-resolution Observations. *The Astrophysical Journal*, 845, 138.

<Highlighted by AAS Nova> | [AAS Nova news link](#) |

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- Wang, Ran; **Shao, Yali**; Carilli, Chris L.; Jones, Gareth C.; Walter, Fabian; Fan, Xiaohui; Riechers, Dominik A.; Decarli Roberto; Bertoldi, Frank; Wagg, Jeff; Strauss, Michael A.; Omont, Alain; Cox, Pierre; Jiang, Linhua; Narayanan, Desika; Menten, Karl M.; Venemans, Bram P. 2019, Resolving the interstellar medium in the nuclear region of two  $z = 5.78$  quasar host galaxies with ALMA. *The Astrophysical Journal* 887, 40W.
  - Carilli, Chris L.; **Shao, Yali** 2018, Imaging Molecular Gas at High Redshift. *ASPC*, 517, 535C.
  - Jones, Gareth C.; Carilli, Chris L.; **Shao, Yali**; Wang, Ran; Capak, Peter L.; Pavesi, Riccardo; Riechers, Dominik A.; Karim, Alexander; Neeleman, Marcel; Walter, Fabian. 2017, Dynamical Characterization of Galaxies at  $z \sim 4-6$  via Tilted Ring Fitting to ALMA [C II] observations. *The Astrophysical Journal*, 850, 180.
  - Sun, Ning-Chen; Maund, Justyn R.; **Shao, Yali**; Janiak, Ida A. 2022, An environmental analysis of the fast transient AT2018cow and implications for its progenitor and late-time brightness. *Monthly Notices of the Royal Astronomical Society*, submitted.
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- Li, Qiong; Wang, Ran; Fan, Xiaohui; Wu, Xue-Bing; Jiang, Linhua; Banados, Eduardo; Venemans, Bram; **Shao, Yali**; Li, Jianan; Wagg, Jeff; Decarli, Roberto; Mazzucchelli, Chiara; Omont, Alain; Bertoldi, Frank; and Johnson, Sean. 2022, (SHERRY) JCMT-SCUBA2 High redshift bRight quasar survey - II: the environment of  $z \sim 6$  quasars at sub-millimeter band. *The Astrophysical Journal*, submitted.
  - Liu, Yuanqi; Wang, Ran; Momjian, Emmanuel; Wagg, Jeff ; Yang, Xiaolong; An, Tao; **Shao, Yali**; Carilli, Chris L.; Wu, Xue-Bing; Fan, Xiaohui; Walter, Fabian; Jiang, Linhua; Li, Qiong; Li, Jianan; Fei, Qinyue ; Xu, Fuxiang. 2022, Exploring the Radio Spectral Energy Distribution of the Ultraluminous Radio-quiet Quasar SDSS J0100+2802 at Redshift 6.3. *Astrophysical Journal*, 929, 69L.
  - Carilli, Chris L.; Walter, Fabian; Decarli, Roberto; Aravena, M.; Riechers, Dominik A.; Gonzalez-Lopez, J.; **Shao, Yali**; Boogaard, L.; Bouwens, R.; Neeleman, M. 2021, Dense Gas History of the Universe: From ASPECS to the ngVLA. *URSI Radio Science Letters*, vol. 3.
  - Molina, Juan; Wang, Ran; Shangguan, Jinyi; Ho, Luis C.; Bauer, Franz E.; Treister, Ezequiel; **Shao, Yali**. 2021, Compact Molecular Gas Distribution in Quasar Host Galaxies. *The Astrophysical Journal*, 908, 231M.
  - Liu, Yuanqi; Wang, Ran; Momjian, Emmanuel; Bañados, Eduardo; Zeimann, Greg; Willott,

- Chris J.; Matsuoka, Yoshiki; Omont, Alain; **Shao, Yali**; Li, Qiong; Li, Jianan. 2021, Constraining the Quasar Radio-loud Fraction at  $z \sim 6$  with Deep Radio Observations. *The Astrophysical Journal*, 908, 124L.
- Li, Qiong; Wang, Ran; Fan, Xiaohui; Wu, Xue-Bing; Jiang, Linhua; Bañados, Eduardo; Venemans, Bram; **Shao, Yali**; Li, Jianan; Zhang, Yunhao; Zhang, Chengpeng; Wagg, Jeff; Decarli, Roberto; Mazzucchelli, Chiara; Omont, Alain; Bertoldi, Frank. 2020, SCUBA2 High Redshift Bright Quasar Survey: Far-infrared Properties and Weak-line Features. *The Astrophysical Journal*, 900, 12L.
  - Li, Jianan; Wang, Ran; Cox, Pierre; Gao, Yu; Walter, Fabian; Wagg, Jeff; Menten, Karl M.; Bertoldi, Frank; **Shao, Yali**; Venemans, Bram P.; Decarli, Roberto; Riechers, Dominik; Neri, Roberto; Fan, Xiaohui; Omont, Alain; Narayanan, Desika. 2020, Ionized and atomic interstellar medium in the  $z = 6.003$  quasar SDSS J2310+1855. *The Astrophysical Journal*, 900, 131L.
  - Li, Jianan; Wang, Ran; Riechers, Dominik; Walter, Fabian; Decarli, Roberto; Venemans, Bram P.; Neri, Roberto; **Shao, Yali**; Fan, Xiaohui; Gao, Yu; Carilli, Chris L.; Omont, Alain; Cox, Pierre; Menten, Karl M.; Wagg, Jeff; Bertoldi, Frank; Narayanan, Desika. 2020, Probing the Full CO Spectral Line Energy Distribution (SLED) in the Nuclear Region of a Quasar-starburst System at  $z = 6.003$ . *The Astrophysical Journal*, 889, 162L.
  - Zou, Hu; Zhou, Xu; Fan, Xiaohui; Zhang, Tianmeng; Zhou, Zhimin; Peng, Xiyan; Nie, Jundun; Jiang, Linhua; McGreer, Ian; Cai, Zheng; Chen, Guangwen; Chen, Xinkai; Dey, Arjun; Fan, Dongwei; Findlay, Joseph R.; Gao, Jinghua; Gu, Yizhou; Guo, Yucheng; He, Boliang; Jiang, Zhaoji; Jin, Junjie; Kong, Xu; Lang, Dustin; Lei, Fengjie; Lesser, Michael; Li, Feng; Li, Zefeng; Lin, Zesen; Ma, Jun; Maxwell, Moe; Meng, Xiaolei; Myers, Adam D.; Ning, Yuanhang; Schlegel, David; **Shao, Yali**; Shi, Dongdong; Sun, Fengwu; Wang, Jiali; Wang, Shu; Wang, Yonghao; Wei, Peng; Wu, Hong; Wu, Jin; Wu, Xiaohan; Yang, Jinyi; Yang, Qian; Yuan, Qirong; Yue, Minghao. 2019, The Third Data Release of the Beijing-Arizona Sky Survey. *The Astrophysical Journal Supplement Series*, 245, 4Z.
  - Saintonge, Amelie; Wilson, Christine D.; Xiao, Ting; Lin, Lihwai; Hwang, Ho Seong; Tosaki, Tomoka; Bureau, Martin; Cigan, Phillip J.; Clark, Christopher J. R.; Clements, David L.; De Looze, Ilse; Dharmawardena, Thavisha; Gao, Yang; Gear, Walter K.; Greenslade, Joshua; Lamperti, Isabella; Lee, Jong Chul; Li, Cheng; Michaowski, Micha J.; Mok, Angus Pan, Hsi-An; Sansom, Anne E.; Sargent, Mark; Smith, Matthew W. L.; Williams, Thomas; Yang, Chentao; Zhu, Ming; Accurso, Gioacchino; Barmby, Pauline; Brinks, Elias; Bourne, Nathan; Brown, Toby; Chung, Aeree; Chung, Eun Jung; Cibinel, Anna; Coppin, Kristen; Davies, Jonathan; Davis, Timothy A.; Eales, Steve; Fanciullo, Lapo; Fang, Taotao; Gao, Yu; Glass, David H. W.; Gomez, Haley L.; Greve, Thomas; He, Jinhua; Ho, Luis C.; Huang, Feng; Jeong, Hyunjin; Jiang, Xuejian; Jiao, Qian; Kemper, Francisca; Kim, Ji Hoon; Kim, Minjin; Kim, Taehyun; Ko, Jongwan; Kong, Xu; Lacaille, Kevin; Lacey, Cedric G.; Lee, Bumhyun; Lee, Joon Hyeop; Lee, Wing-Kit; Masters, Karen; Oh, Se-Heon; Papadopoulos, Padelis; Park, Changbom; Park, Sung-Joon; Parsons, Harriet; Rowlands, Kate; Scicluna, Peter; Scudder, Jillian M.; Sethuram, Ramya; Serjeant, Stephen; **Shao, Yali**; Sheen, Yun-Kyeong; Shi, Yong; Shim, Hyunjin; Smith, Connor M. A.; Spekkens, Kristine; Tsai, An-Li; Verma, Aprajita; Urquhart, Sheona; Violino, Giulio; Viti, Serena; Wake, David; Wang, Junfeng; Wouterloot, Jan; Yang, Yujin; Yim, Kijeong; Yuan, Fangting; Zheng, Zheng 2018, JINGLE, a JCMT legacy survey of dust and gas for galaxy evolution studies - I. Survey overview and first results. *Monthly Notices of the Royal Astronomical Society*, 481, 3497.
  - Wang, Chun; Liu, Xiaowei; Huang, Yang; Xiang, Maosheng; Ren, Juanjuan; Yuan, Haibo; Chen, Bingqiu; Tian, Zhijia; Bai, Jinming; Sun, Ningchen; Zuo, Fang; Zhang, Huawei; Zhang, Yangwei; Fan, Zhou; Luo, Ali; Shi, Jianrong; Li, Ji; **Shao, Yali** 2018, LEMONY—a Library of Empirical Medium-resolution spectra by Observations with the NAOC Xinglong 2.16 m and YNAO Gaomeigu 2.4 m telescopes. *MNRAS*, 480.4766W.

- Zou, Hu; Zhang, Tianmeng; Zhou, Zhimin; Nie, Jundan; Peng, Xiyan; Zhou, Xu; Jiang, Linhua; Cai, Zheng; Dey, Arjun; Fan, Xiaohui; Fan, Dongwei; Guo, Yucheng; He, Boliang; Jiang, Zhaoji; Lang, Dustin; Lesser, Michael; Li, Zefeng; Ma, Jun; Mao, Shude; McGreer, Ian; Schlegel, David; **Shao, Yali**; Wang, Jiali; Wang, Shu; Wu, Jin; Wu, Xiaohan; Yang, Qian; Yue, Minghao 2017, The First Data Release of the Beijing-Arizona Sky Survey. The Astronomical Journal, 153, 276.