

Rui Luo

Curriculum Vitae

CSIRO Astronomy and Space Science
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Education

- 2013 - 2019 **Ph.D., Astrophysics**, *Department of Astronomy, School of Physics*, Peking University, Beijing, China.
Thesis: Measurement of the luminosity function of Fast Radio Bursts
Supervisor: Prof. K.J. Lee (KIAA-PKU&NAOC)
2009 - 2013 **B.Sc., Applied Physics**, *School of Physics*, Huazhong University of Science and Technology, Wuhan, China.

Employment

- 2019 - present **Research Plus Postdoctoral Fellow**, Australia Telescope National Facility, CSIRO Astronomy and Space Science, Marsfield, NSW, Australia.
Supervisor: Dr. George Hobbs (CASS-ATNF)

Research Interests

- Radio Astronomy: Fast Radio Bursts (FRBs), Pulsars, Radio Frequency Interference (RFI), the Unknown Unknowns (X)
Advanced Statistics: Bayesian Inference, Markov Chain Monte Carlo
Machine Learning: Convolutional Neural Network, Active Learning, Unsupervised Learning

Awards and Prizes

- 2019 Vela Prize in FAST/Future Pulsar Symposium 8, China
2013 - 2018 Second Academic Scholarship, Peking University
2016 Kwang-Hua Scholarship, Peking University
2015 Second Prize of Chen Huxiong Scholarship, Peking University
2013 Annual Scholarship of National Astronomical Observatories, Chinese Academy of Sciences

Publications

(Short summary: 15 in total, including one in Nature as the first author.
H-index: 7, – Feb 2021)

First-author papers:

- 3 **Luo, R.**, Wang, B. J., Men, Y. P., Zhang, C. F., Jiang, J. C., Xu, H., Wang, W. Y., Lee, K. J., Han, J. L., Zhang, B., et al., *Diverse polarization angle swings from a repeating fast radio burst source*, 2020, [Nature](#), **586**, 693
- 2 **Luo, R.**, Men, Y. P., Lee, K. J., Wang, W. Y., Lorimer, D. R., & Zhang, B., *On the FRB luminosity function - II. Event rate density*, 2020, [MNRAS](#), **494**, 665
- 1 **Luo, R.**, Lee, K. J., Lorimer, D. R., & Zhang, B., *On the normalised FRB luminosity function*, 2018, [MNRAS](#), **481**, 2320

Second/Third-author papers:

- 7 Niu, C.-H., Li, D., **Luo, R.**, Wang, W.-Y., Yao, J., Zhang, B., Zhu, W.-W., et al. *CRAFTS for Fast Radio Bursts – II. Extending the dispersion-fluence relation with new FRBs detected by FAST*, 2021, [ApJL](#), *accepted*
- 6 Zhu, W., Li, D., **Luo, R.**, Miao, C., Zhang, B., Spitler, L., Lorimer, D.; Kramer, M., Champion, D., Yue, Y., Cameron, A., Cruces, M., Duan, R., Feng, Y., Han, J., Hobbs, G., Niu, C., et al., *A Fast Radio Burst discovered in FAST drift scan survey*, 2020, [ApJ](#), **895**, L6
- 5 Jiang, J. C., Wang, W. Y., **Luo, R.**, Du, S., Chen, X. L., Lee, K. J., & Xu, R. X., *FRB 171019: An event of binary neutron star merger?*, 2020, [RAA](#), **20**, 4, 56
- 4 Men, Y. P., **Luo, R.**, Chen, M. Z., Hao, L. F., Lee K. J., Li, J., Li Z. X., Liu, Z. Y., Pei, X., Wen, Z. G., Wu, J. J., Xu, Y. H., Xu, R. X., Yuan, J. P., & Zhang, C. F., *Piggyback searching for fast radio bursts using Nanshan 26m and Kunming 40m radio telescopes – I. Observing and data analysis systems, discovery of a mysterious peryton*, 2019, [MNRAS](#), **488**, 3957
- 3 Yi, S.-X., Cheng, K. S., & **Luo, R.**, *Clumpy jets from black hole-massive star binaries as engines of Fast Radio Bursts*, 2019, [MNRAS](#), **483**, 4197
- 2 Wang, W. Y., **Luo R.**, Yue, H., Chen, X. L., Lee, K. J., & Xu, R. X., *FRB 121102: A Starquake-induced Repeater?*, 2018, [ApJ](#), **852**, 140
- 1 Yang, Y.-P., **Luo, R.**, Li, Z., & Zhang, B., *Large Host-galaxy Dispersion Measure of Fast Radio Bursts*, 2017, [ApJ](#), **839**, L25

Other co-author papers:

- 5 Zhang, C. F., Xu, J. W., Men, Y. P., Deng, X. H., Xu, H., Jiang, J. C., Wang, B. J., Lee, K. J., Li, J., Yuan, J. P., Liu, Z. Y., Huang, Y. X., Xu, Y. H., Li, Z. X., Hao, L. F., Luo, J. T., Dai, S., **Luo, R.**, Zakie, H., & Ma, Z. Y., *Fast radio burst detection in the presence of coloured noise*, 2021, MNRAS, submitted
- 4 Dai, S., Lu, J. G., Wang, C., Wang, W. Y., Xu, R. X., Yang, Y.-P., Zhang, S.-B., Hobbs, G., Li, D., & **Luo, R.**, *On the Non-detection of Circular Polarisation from Repeating Fast Radio Bursts*, 2020, [ApJ](#), submitted
- 3 Zhang, S.-B., Hobbs, G., Russell, C. J., Toomey, L., Dai, S., Dempsey, J., Manchester, R. N., Johnston, S., Staveley-Smith, L., Wu, X.-F., Li, D., Yang, Y.-Y., Wang, S.-Q., Qiu, H., **Luo, R.**, Wang, C., Zhang, C., Zhang, L., & Mandow, R., *Parkes transient events: I. Database of single pulses, initial results and missing FRBs*, 2020, [ApJS](#), 249, 14
- 2 Men, Y. P., Aggarwal, K., Li, Y., Palaniswamy, D., Burke-Spolaor, S., Lee, K. J., **Luo, R.**, Demorest, P., Tendulkar, S., Agarwal, D., Young, O., & Zhang, B., *Non-detection of fast radio bursts from six gamma-rayburst remnants with a possible magnetar engine*, 2019, [MNRAS](#), 489, 3643
- 1 Wang, W. Y., Lu, J. G., Zhang, S. B., Chen, X. L., **Luo, R.**, & Xu, R. X., *Pulsar giant pulse: coherent instability near light cylinder*, 2019, [SCPMA](#), 62(7), 979511

Conferences, Seminars, & Talks

- Feb 2021 Seminar in the pulsar group at Max-Planck institut für Radioastronomie (MPIfR), Bonn, Germany, Feb. 02, 2021
Invited remote talk: *Diverse polarization angle swings from a repeating fast radio burst source*
- Jan 2021 Colloquium at the Curtin Institute of Radio Astronomy (CIRA), Perth, WA, Australia, Jan. 28, 2021
Invited remote talk: *Diverse polarization angle swings from a repeating fast radio burst source*
- Dec 2020 Colloquium at Department of Astrophysics, University of Radboud, Netherlands, Dec. 15, 2020
Invited remote talk: *Diverse polarization angle swings from a repeating fast radio burst source*
- Dec 2020 Lunch Talk at Kavli IPMU, University of Tokyo, Japan, Dec. 15, 2020
Invited remote talk: *Diverse polarization angle swings from a repeating fast radio burst source*
- Dec 2020 CASS Co-learnium, Marsfield, NSW, Australia, Dec. 10, 2020

- Contributed remote talk: *Life changes of the local residents around the FAST site*
- Dec 2020 CHIME/FRB Journal Club, Canada, Dec. 03, 2020
Invited remote talk: *Diverse polarization angle swings from a repeating fast radio burst source*
- Nov 2020 AUS-NZ-PSR Group Meeting, Australasia, Nov. 11, 2020
Contributed remote talk: *Diverse polarization angle swings from a repeating fast radio burst source*
- Jul 2020 FRB2020 International Meeting, Zoom Webinar, Jul. 06-10, 2020
Contributed remote talk: *Measurement of the luminosity function of Fast Radio Bursts*
- Mar 2020 ATNF Bolton Symposium, ARRC Building Lecture Theatre, Kensington, Perth, Australia, Mar. 10, 2020
Contributed talk: *A new repeating FRB discovered by the FAST telescope*
- Dec 2019 CASS Co-learnium, Marsfield, NSW, Australia, Dec. 05, 2019
Contributed talk: *A beginner's guide to Bayesian inference*
- Sep 2019 CASS Colloquium, Marsfield, NSW, Australia, Sep. 04, 2019
Invited talk: *Measurement of the luminosity function of Fast Radio Bursts*
- Jun 2019 FAST/Future Pulsar Symposium 8, Xi'an, China, Jun. 26-28, 2019
Contributed talk: *Measurement of the luminosity function of Fast Radio Bursts*
- Mar 2019 Cosmology Group Meeting at NAOC, Beijing, China, Mar. 27, 2019
Invited talk: *Measurements on the FRB luminosity function*
- Dec 2018 KIAA Graduate Dinner Talk, Beijing, China, Dec. 18, 2018
Invited talk: *An Overview on Fast Radio Bursts and FRB luminosity function*
- Jul 2018 FAST/Future Pulsar Symposium 7, Guangzhou, China, Jul. 04-06, 2018
- Apr 2018 NAOC Graduate Student Seminar, Beijing, China, Apr. 23, 2018
Invited talk: *A Review of Fast Radio Bursts and FRB luminosity function*
- Sep 2017 Radio Astronomy Forum 2017, Pingtang, China, Sep. 24-27, 2017
Poster: *Simulating DM of host galaxies to derive FRB luminosity function*
- Jun 2017 FAST/Future Pulsar Symposium 6, Wuhan, China, Jun. 28-30, 2017
Contributed talk: *Simulating DM of host galaxies to derive FRB luminosity function*
- May 2017 Pulsar Timing Array in China, Beijing, China, May 30-31, 2017
Contributed as LOC member
- Nov 2016 Chinese Astronomical Society 2016 Annual Meeting, Wuhan, China, Nov. 01-03, 2016

- Contributed talk: *Simulating the dispersion measure of host galaxies*
- Jul 2016 Jing-Guang-Xia Astrophysics Meeting, Xiamen, China, July 21-23, 2016
Contributed talk: *Simulating the dispersion measure of host galaxies*
- Jul 2016 QTT Colloquium Series 2016, Zunyi, China, July 03-04, 2016
Contributed talk: *Simulating the dispersion measure of FRB host galaxies*
- Jun 2016 PKU-XAO Bilateral Meeting, Urumqi, China, Jun. 10-13, 2015
Contributed talk: *Simulating the dispersion measure of FRB host galaxies*
- Oct 2015 Chinese Astronomical Society 2015 Annual Meeting, Beijing, China, Oct. 19-21, 2015
Contributed talk: *Consideration of Research on FRBs*
- Jul 2015 International Pulsar Timing Array 2015 Meeting, Parkes&Leura, Australia, July 19-31, 2015
- Jul 2015 QTT Colloquium Series 2015, Ming'antu, China, July 02-03, 2015
Contributed talk: *Consideration of Research on FRBs*
- May 2015 KIAA-SHAO Bilateral Workshop, Beijing, China, May 18-19, 2015
Contributed talk: *Consideration of FRB searching*

Observing Experience

- 2020OCTS Parkes Pulsar Timing Array
Regular observing contribution: 30+ hours
- 2020OCTS Parkes 64-m radio telescope
Approved proposal: Observing the repeating FRB 180301 with the Parkes UWL (32.5 hours)
- 2020APRS Parkes 64-m radio telescope
Approved proposal: Monitoring the repeating FRB candidates in the Southern Sky (16 hours)
- Nov 2019 Australia Telescope Compact Array
Observations: ATCA Duty Astronomer and observing CU Virginis at 16cm wavelength (9 hours)
- Jul 2019 Five-hundred-meter Aperture Spherical radio Telescope
Approved Proposal: Monitoring the repeating FRB candidates in the FAST "Shared-Risk" observations.
- Aug 2017 Kunming 40-m radio telescope
Contributions: Helping install FRB backend and configure FRB searching software.
- Apr 2016 Five-hundred-meter Aperture Spherical radio Telescope
Contributions: Helping configure ROACH2 and monitor frequency spectrum.

- Aug 2015 Miyun 50-m radio telescope
Contributions: Helping install ROACH2 and observing pulsars.
- Oct 2014 Kunming 40-m radio telescope
Contributions: Assisting calibration for polarization of backend and observing pulsars.

Students Advised

- 2020-present Lunhua Shang: Joint-PhD student at NJUST and CSIRO; will graduate in 2023 as expected
Research projects: Radio observations on the pulsed variable stars
- 2017-2020 [Weiyang Wang](#): PhD student at UCAS-NAOC; graduated in the end of 2020
Research projects: Theoretical studies on Fast Radio Bursts

Teaching and Outreach

- 2020 [PULSE@Parkes](#): Remote session for high-school students in Australia
- 2017 Teaching Assistant of GENERAL PHYSICS for non-physics schools, Peking University
- 2015 Teaching Assistant of ATOMIC PHYSICS, School of Physics, Peking University

Supports and Services

- 2019-present The CASS [Co-learnia](#): One of main organisers
Duties: Seeking the speakers, scheduling the slots, sending email reminders, hosting the talks and maintaining the resources on the Co-learnium website

Technical Skills

- Programming PYTHON (Proficient), C, C++, UNIX
- Softwares MATLAB, MATHEMATICA, QT
- Tools GIT, WIKI, HTML
- Writing L^AT_EX, MARKDOWN

Language

Chinese

Native language

English

Full professional proficiency

Japanese

Basic words and phrases only