

Rui LUO

Email: rui.luo@csiro.au ◊ Tel: +61 2-93724434 ◊ Web: <https://ruiluoastro.github.io/>

Postal Address: PO Box 76, Epping, NSW 1710, Australia

EDUCATION

Peking University

Sep 2013 – Jul 2019

Department of Astronomy, School of Physics

Doctor of Philosophy, Astrophysics

Dissertation: *Measurement of the luminosity function of Fast Radio Bursts*

Advisor: Prof. Kejia Lee (KIAA-PKU)

Huazhong University of Science and Technology

Sep 2009 – Jun 2013

School of Physics

Bachelor of Science, Applied Physics

EMPLOYMENT

CSIRO Space and Astronomy

Aug 2019 – Nov 2022

Australia Telescope National Facility

Research Plus Postdoctoral Fellow

Supervisor: Dr. George Hobbs (CSIRO-ATNF)

RESEARCH INTERESTS

Radio Astronomy: Fast Radio Bursts, Pulsars, Radio Frequency Interference, the unknown unknowns

Statistics: Bayesian inference, Markov Chain Monte Carlo

Machine Learning: Convolutional Neural Network, Out-of-Distribution detection

AWARDS AND HONOURS

Ranking No.1, Top 10 Research Progresses, Chinese Astronomy (Team Award) 2020

Vela Prize for oral presentations, FAST/Future Pulsar Symposium 8 2019

Kwang-Hua Scholarship, Peking University 2016

Second Prize of Chen Hu-Xiong Scholarship, Peking University 2015

Annual Scholarship, National Astronomical Observatories, Chinese Academy of Sciences 2013

OBSERVING EXPERIENCE

Five-hundred-meter Aperture Spherical radio Telescope

PI: *Monitoring a short gamma-ray burst with possible radio transient*, 9 hours 2022

PI: *Observing the candidate repeating sources from the CHIME/FRB Catalog*, 6 hours 2022

PI: *Searching for fast radio transients from short gamma-ray bursts*, 9 hours 2021

PI: *Monitoring the repeating FRB candidates*, 12 hours 2019

Instrumentation: *Configuring ROACH2 and monitoring the real-time bandpass* Apr 2016

Parkes 64-m radio telescope (Murriyang)

PI: *Observing a candidate repeating FRB source with the Parkes UWL*, 16 hours 2022OCTS

PI: *Searching for fast radio bursts from short gamma-ray bursts*, 22 hours 2021OCTS

PI: *Observing the repeating FRB 180301 with the Parkes UWL*, 32.5 hours 2020OCTS

PI: *Monitoring the repeating FRB candidates in the Southern Sky*, 16 hours 2020APRS

Contributions: Parkes Pulsar Timing Array, 120+ hours 2020 – present

Australia Telescope Compact Array

PI: *Observing CU Virginis at 16cm wavelength using the Green Time*, 9 hours 2019OCTS

Kunming 40-m radio telescope

Instrumentation: *Installing the FRB backend and configuring its searching software* Aug 2017

Instrumentation: *Calibration for two polarization channels from the feed* Oct 2014

Miyun 50-m radio telescope

Instrumentation: *Testing ROACH2 and observing pulsars* Aug 2015

INVITED TALKS FOR COLLOQUIA AND SEMINARS

(Notes: * – in virtual; Others – in person; Blue hyperlink – video recording)

Colloquium*, Department of Astronomy, Guangzhou University, China Jul 2022

CSIRO S&A Co-learnium*, Marsfield, NSW, Australia May 2022

Seminar*, Yukawa Institute for Theoretical Physics, Kyoto University, Japan Apr 2022

AUS-NZ-PSR Australasia (Orange) Pulsar Meeting*, Australia and New Zealand Apr 2022

Colloquium*, Department of Astronomy, Xiamen University, China Feb 2022

MQ AAstroseminar, Macquarie University, Sydney, Australia May 2021

ASKAP-CRAFT Group Meeting*, ATNF-Swinburne-Curtin, Australia Mar 2021

Pulsar Group Meeting*, MPIfR, Germany Feb 2021

Colloquium*, Curtin Institute of Radio Astronomy, Australia Jan 2021

Colloquium*, Department of Astrophysics, University of Radboud, Netherlands Dec 2020

Lunch Talk*, Kavli IPMU, University of Tokyo, Japan Dec 2020

CSIRO S&A Co-learnium*, Marsfield, NSW, Australia Dec 2020

CHIME/FRB Journal Club*, Canada Dec 2020

AUS-NZ-PSR Australasia (Orange) Pulsar Meeting*, Australia and New Zealand Nov 2020

CSIRO S&A Co-learnium, Marsfield, NSW, Australia Dec 2019

CSIRO ATNF Colloquium, Marsfield, NSW, Australia Sep 2019

KIAA Graduate-Student Dinner Talk, Peking University, Beijing, China Dec 2018

NAOC Graduate Student Seminar, NAOC, Beijing, China Apr 2018

CONTRIBUTED TALKS AT CONFERENCES AND WORKSHOPS

(Notes: * – in virtual; Others – in person; Blue hyperlink – video recording; † – poster)

Australasian (Orange) Pulsar Workshop 2022, Parkes, NSW, Australia Nov 2022

Cross-Strait Forum on Radio Astronomy*, Taiwan and Mainland China Oct 2022

ACAMAR 8*: Australia-China Workshop on Astrophysics Oct 2022

The 2022 ASA's Annual Scientific Meeting†, Hobart, Australia Jun 2022

ACAMAR 7*: Australia-China Workshop on Astrophysics Nov 2021

ACAMAR Fast Radio Bursts Virtual Workshop* Oct 2021

FRB 2021 International Meeting*: [\[Plenary 3A\]](#) and [\[Plenary 3B\]](#) Jul – Aug 2021

C3DIS 2021 Conference*, Australia Jul 2021

FRB 2020 International Meeting* Jul 2020

ATNF Bolton Symposium, Kensington, WA, Australia Mar 2020

FAST/Future Pulsar Symposium 8, Xi'an, China Jun 2019

Radio Astronomy Forum 2017†, Pingtang, China Sep 2017

FAST/Future Pulsar Symposium 6, Wuhan, China, Jun 2017

Chinese Astronomical Society Annual Meeting 2016, Wuhan, China Nov 2016

Jing-Guang-Xia Astrophysics Meeting, Xiamen, China Jul 2016

QTT Colloquium Series 2016, Zunyi, China Jul 2016

PKU-XAO Bilateral Meeting, Urumqi, China Jun 2016

Chinese Astronomical Society Annual Meeting 2015, Beijing, China Oct 2015

STUDENT MENTORING

Tommy Marshman: Co-advised. Joint-PhD student at MQ Uni. and CSIRO <i>Research projects: Search for Fast Radio Bursts in the Parkes Baades' Window Survey</i>	2021 – present
Lunhua Shang: Co-advised. PhD at NJUST, now a lecturer at GZNU <i>Research projects: Observing on pulsed variable stars with radio telescopes</i>	2020 – 2021
Jinchen Jiang: Co-advised. PhD at PKU, now a postdoc at NAOC <i>Research projects: Fast Radio Bursts modelling and polarization</i>	2019 – 2020
Weiyang Wang: Co-advised. PhD at UCAS, now a postdoc at PKU <i>Research projects: Theoretical studies on Fast Radio Bursts</i>	2017 – 2020

TEACHING AND OUTREACH

Seek Out Nature Mysteries: A public Chinese science documentary series Narrative in Episode 4 Season 2: <i>Fast Radio Bursts</i>	2022
Mr Science · Astronomy: A Chinese special column for public sciences Article: Hunting for fast radio bursts with the FAST telescope (Chinese)	Nov 2020
PULSE@Parkes: An educational program for high-school students to use the CSIRO Parkes radio telescope to observe pulsars Special session on the National Youth Science Forum	2019 – present Jan 2022
TA: GENERAL PHYSICS, School of Earth and Space Sciences, Peking University	2017
TA: ATOMIC PHYSICS, School of Physics, Peking University	2015

PROFESSIONAL SERVICE

Journal Referee <i>Monthly Notices of the Royal Astronomical Society</i> <i>The Astrophysical Journal</i>	2021 – present 2021 – present
Proposal Reviewer <i>Call for FAST Science Observing Proposals</i> <i>Call for FAST Science Observing Proposals</i>	2022 2021

DUTIES AND SUPPORT

ACAMAR Fast Radio Bursts Virtual Workshop: Served as SOC member	Oct 2021
Commissioning the Parkes Cryogenic PAF Receiver: Data benchmark	2021 – 2022
Updates on the ATNF-PSRCAT	2020 – 2022
The CSIRO-ATNF Co-learnia: Main chair	2019 – 2021
The ATCA Duty Astronomer: On duty for every semester	2019 – 2022
The first Chinese Pulsar Timing Array Meeting: Served as LOC member	May 2017

TECHNICAL SKILLS

Programming	PYTHON (Proficient), C, C++, UNIX
Softwares	MATLAB, MATHEMATICA, PRESTO, TEMPO2, PSRCHIVE, MULTINEST
Tools	GIT, LATEX, WIKI, HTML

CODES DEVELOPMENT

- [SIMULATESEARCH](#): A software for simulating high-time resolution radio data.
- [BAYESWEIB](#): A Python package for calculating the repeating burst rate under the Weibull distribution.
- [FRBLFERD](#): A Bayesian code for inferring the event rate density of FRB luminosity function.
- [FRBNORMLF](#): An FRB mock data simulator and a Bayesian code to measure the normalized FRB luminosity function.
- [DMHOST](#): A package of Monte Carlo simulations on the dispersion measure of FRB host galaxies in the nearby universe.

LANGUAGES

Chinese	Native
English	Fluent
Japanese	Elementary

REFERENCES

Ronald Ekers

CSIRO Fellow & Fellow of the Australian Academy of Science
CSIRO Space and Astronomy, Australia National Telescope Facility
PO Box 76, Epping, NSW 1710, Australia
Tel: +61 2-9372-4100
Email: ron.ekers@csiro.au

George Hobbs

Research Scientist & Group Leader
CSIRO Space and Astronomy, Australia National Telescope Facility
PO Box 76, Epping, NSW 1710, Australia
Tel: +61 2-9372-4652
Email: george.hobbs@csiro.au

Kejia Lee

Associate Professor
Kavli Institute for Astronomy and Astrophysics, Peking University
No.5 YiHeYuan Rd, Haidian District, Beijing 100871, China
Tel: +86 10-62766380
Email: kjlee@pku.edu.cn

Duncan Lorimer

Professor & Associate Dean for Research
Department of Physics and Astronomy, West Virginia University
White Hall, PO Box 6315, Morgantown, WV 26506, USA
Tel: +1 304-293-4867
Email: duncan.lorimer@mail.wvu.edu

Richard N. Manchester

CSIRO Fellow & Fellow of the Australian Academy of Science
CSIRO Space and Astronomy, Australia National Telescope Facility
PO Box 76, Epping, NSW 1710, Australia
Tel: +61 2-9372-4313
Email: dick.manchester@csiro.au

Bing Zhang

Distinguished Professor
Department of Physics and Astronomy, University of Nevada, Las Vegas
MPE-A 129, UNLV, Las Vegas, NV 89154, USA
Tel: +1 702-895-3170
Email: zhang@physics.unlv.edu

PUBLICATIONS

Summary: 4 first-author papers, including **one article published in Nature**. 11 leading-author papers, 26 publications in total.

Citations: 707 (380 from leading-author papers); H-index: 13 (as of Oct 2022).

(Notes: * – corresponding author, † – student co-advised)

First/Corresponding-author papers:

4. **Luo, R.***, Hobbs, G.*, Yong, S. Y., Zic, A., Tommey, L., Dai, S., Dunning, A., Li, D., Marshman, T., Wang, C., Wang, P., Wang, S. Q., & Zhang, S. B., *Simulating high-time resolution radio-telescope observations*, 2022, [MNRAS](#), **513**, 5881
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 normalized 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., Wang, P., Ye, H., Niu, J.-R., et al., *CRAFTS for Fast Radio Bursts: Extending the dispersion-fluence relation with new FRBs detected by FAST*, 2021, [ApJ](#), **909**, L8
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**, 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:

15. Niu, J.-R., Zhu, W.-W., Zhang, B., Yuan, M., Zhou, D.-J., Zhang, Y.-K., Jiang, J.-C., Han, J. L., Li, D., Lee, K.-J., Wang, P., Feng, Y., Li, D.-Z., **Luo, R.**, Wang, F.-Y., Dai, Z.-G., Miao, C.-C., Niu, C.-H., et al., *FAST observations of an extremely active episode of FRB 20211124A: IV. Spin Period Search*, 2022, [RAA](#), *accepted*
14. Jiang, J.-C., Wang, W.-Y., Xu, H., Xu, J.-W., Zhang, C.-F., Wang, B.-J., Zhou, D.-J., Zhang, Y.-K., Niu, J.-R., Lee, K.-J., Zhang, B., Han, J.-L., Li, D., Zhu, W.-W., Dai, Z.-D., Feng, Y.,

- Jing, W.-C., Li, D.-Z., **Luo, R.**, et al., *FAST observations of an extremely active episode of FRB 20211124A: III. Polarimetry*, 2022, [RAA, accepted](#)
13. Zhang, Y.-K., Wang, P., Feng, Y., Zhang, B., Li, D., Tsai, C.-W., Niu, C.-H., **Luo, R.**, Yao, J.-M., Zhu, W.-W., Han, J. L., Lee, K.-J., Zhou, D.-J., Niu, J.-R., Jiang, J.-C., Wang, W.-Y., Zhang, C.-F., Xu, H., Wang, B.-J., Xu, J.-W., *FAST observations of an extremely active episode of FRB 20211124A: II. Energy Distribution*, 2022, [RAA, accepted](#)
 12. Zhou, D. J., Han, J. L., Zhang, B., Lee, K. J., Zhu, W. W., Li, D., Jing, W. C., Wang, W.-Y., Zhang, Y. K., Jiang, J. C., Niu, J. R., **Luo, R.**, Xu, H., Zhang, C. F., Wang, B. J., Xu, J. W., Wang, P., Yang, Z. L., Feng, Y., *FAST observations of an extremely active episode of FRB 20211124A: I. Burst Morphology*, 2022, [RAA, accepted](#)
 11. Yong, S. Y., Hobbs, G., Huynh, M. T., Rolland, V., Petersson, L., Norris, R. P., Dai, S., **Luo, R.**, Zic, A., *SPARKESX: Single-dish PARKES data sets for finding the unexpected — A Data Challenge*, 2022, [MNRAS, 516, 5832](#)
 10. Xu, H., Niu, J. R., Chen, P., Lee, K. J., Zhu, W. W., Dong, S., Zhang, B., Jiang, J. C., Wang, B. J., Xu, J. W., Zhang, C. F., Fu, H., Filippenko, A. V., Peng, E. W., Zhou, D. J., Zhang, Y. K., Wang, P., Feng, Y., Li, Y., Brink, T. G., Li, D. Z., Lu, W., Yang, Y. P., Caballero, R. N., Cai, C., Chen, M. Z., Dai, Z. G., Djorgovski, S. G., Esamdin, A., Gan, H. Q., Guhathakurta, P., Han, J. L., Hao, L. F., Huang, Y. X., Jiang, P., Li, C. K., Li, D., Li, H., Li, X. Q., Li, Z. X., Liu, Z. Y., **Luo, R.**, et al., *A fast radio burst source at a complex magnetised site in a barred galaxy*, 2021, [Nature, 609, 685](#)
 9. Niu, C.-H., Aggarwal, K., Li, D., Zhang, X., Chatterjee, S., Tsai, C.-W., Yu, W., Law, C. J., Burke-Spolaor, S., Cordes, J. M., Zhang, Y.-K., Ocker, S., Yao, J.-M., Wang, P., Feng, Y., Niino, Y., Bochenek, C., Cruces, M., Connor, L., Jiang, J.-A., Dai, S., **Luo, R.**, et al., *A repeating fast radio burst associated with a persistent radio source*, 2022, [Nature, 606, 873](#)
 8. Bhandari, S., Heintz, K. E., Aggarwal, K., Marnoch, L., Day, C. K., Sydnor, J., Burke-Spolaor, S., Law, C. J., Prochaska, J. X., Tejos, N., Bannister, K. W., Butler, B. J., Deller, A. T., Ekers, R. D., Flynn, C., Fong, W.-F., James, C. W., Lazio, T. J. W., **Luo, R.**, et al., *Characterizing the FRB host galaxy population and its connection to transients in the local and extragalactic Universe*, 2021, [AJ, 163, 69](#)
 7. Yang, X., Zhang, S.-B., Wang, J.-S., Hobbs, G., Sun, T.-R., Manchester, R. N., Geng, J.-J., Russell, C. J., **Luo, R.**, Tang, Z.-F., Wang, C., Wei, J.-J., Staveley-Smith, L., Dai, S., Li, Y., Yang, Y.-Y., & Wu, X.-F., *81 New Candidate Fast Radio Bursts in Parkes Archive*, 2021, [MNRAS, 507, 3238](#)
 6. Goncharov, B., Shannon, R. M., Reardon, D. J., Hobbs, G., Zic, A., Bailes, M., Curylo, M., Dai, S., Kerr, M., Lower, M. E., Manchester, R. N., Mandow, R., Middleton, H., Miles, M. T., Parthasarathy, A., Thrane, E., Thyagarajan, N., Xue, X., Zhu, X.-J., Cameron, A. D., Feng, Y., **Luo, R.**, et al., *On the evidence for a common-spectrum process in the search for the nanohertz gravitational wave background with the Parkes Pulsar Timing Array*, 2021, [ApJ, 917, L19](#)
 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, 503, 5223](#)
 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.**, Filipovic, M., & Jiang, J. C., *On the Circular Polarization of Repeating Fast Radio Bursts*, 2021, [ApJ, 920, 46](#)
 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-ray burst 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, 979511](#)