## **RUI LUO**

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## **EDUCATION**

## Peking University

Sep 2013 - Jul 2019

Doctor of Philosophy, Astrophysics

Department of Astronomy, School of Physics

Thesis: Measurement of the luminosity function of Fast Radio Bursts

Advisor: Prof. K.J. Lee (KIAA-PKU)

## Huazhong University of Science and Technology

Sep 2009 - Jun 2013

Bachelor of Science, Applied Physics

School of Physics

### **EMPLOYMENT**

## CSIRO Astronomy and Space Science

Aug 2019 – present

2020OCTS

2020ARPS

Research Plus Postdoctoral Fellow

Supervisor: Dr. George Hobbs (CASS-ATNF)

Australia Telescope National Facility

### RESEARCH INTERESTS

Radio Astronomy: Fast Radio Bursts (FRBs), Pulsars, Radio Frequency Interferences (RFIs), the unknown unknowns

Statistics: Bayesian inference, Markov Chain Monte Carlo (MCMC)

Machine Learning: Convolutional Neural Network (CNN), Bayesian Optimization

## AWARDS AND PRIZES

Vela Prize in FAST/Future Pulsar Symposium 8		2019
Second Academic Scholarship, Peking University	2013 -	2018
Kwang-Hua Scholarship, Peking University		2016
Second Prize of Chen Hu-Xiong Scholarship, Peking University		2015
Annual Scholarship of National Astronomical Observatories, Chinese Academy of Sciences	$\mathbf{s}$	2013

### OBSERVING EXPERIENCE

Five-hundred-meter Aperture Spherical radio Telescope	
PI: Monitoring the repeating FRB candidates, 12 hours	Jul – Oct 2019
Engineering: Helped configure ROACH2 and monitor the real-time bandpass	Apr 2016
Parkes 64-m radio telescope	
rarkes 04-in radio telescope	

# PI: Monitoring the repeating FRB candidates in the Southern Sky, 16 hours

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

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

#### Kunming 40-m radio telescope

Australia Telescope Compact Array

Engineering: Installed FRB backend and configured the FRB real-time searching software Aug 2017

Engineering: Assisted calibration for two polarization channels of the digital backend Oct 2014 Miyun 50-m radio telescope Engineering: Tested ROACH2 to observe bright pulsars Aug 2015 STUDENTS ADVISED Lunhua Shang: Joint-PhD student at NJUST and CSIRO 2020 - present Research projects: Studies on the pulsed variable stars with radio observations Weiyang Wang: PhD at UCAS-NAOC, graduated in the end of 2020 2017 - 2020Research projects: Theoretical studies on Fast Radio Bursts TEACHING AND OUTREACH PULSE@Parkes: Remote sessions of pulsar observing for the high-school students in Australia 2020 TA: GENERAL PHYSICS, School of Earth and Space Sciences, Peking University 2017 TA: ATOMIC PHYSICS, School of Physics, Peking University 2015 SUPPORTS AND SERVICES 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 Duty Astronomer (DA): Serving as DA for the ATCA in each semester 2019 - presentTALKS IN CONFERENCES OR SEMINARS Seminar in the pulsar group at MPIfR, Bonn, Germany Feb 2021 Invited remote talk: Diverse polarization angle swings from a repeating fast radio burst source Colloquium at the Curtin Institute of Radio Astronomy (CIRA), Perth, WA, Australia Jan 2021 Invited remote talk: Diverse polarization angle swings from a repeating fast radio burst source Colloquium at Department of Astrophysics, University of Radboud, Netherlands Dec 2020 Invited remote talk: Diverse polarization angle swings from a repeating fast radio burst source Lunch Talk at Kavli IPMU, University of Tokyo, Japan Dec 2020 Invited remote talk: Diverse polarization angle swings from a repeating fast radio burst source CASS Co-learnium, Marsfield, NSW, Australia Dec 2020 Contributed remote talk: Life changes of the local residents around the FAST site CHIME/FRB Journal Club, Canada Dec 2020 Invited remote talk: Diverse polarization angle swings from a repeating fast radio burst source AUS-NZ-PSR Group Meeting, Australasia Nov 2020 Contributed remote talk: Diverse polarization angle swings from a repeating fast radio burst source

ATNF Bolton Symposium, ARRC Building Lecture Theatre, Kensington, Perth, Australia Mar 2020

Contributed remote talk: Measurement of the luminosity function of Fast Radio Bursts

Jul 2020

FRB2020 International Meeting, Zoom Webinar

Contributed talk: A new repeating FRB discovered by the FAS	5T telescope
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CASS Co-learnium, Marsfield, NSW, Australia Contributed talk: A beginner's guide to Bayesian inference				
CASS Colloquium, Marsfield, NSW, Australia Invited talk: Measurement of the luminosity function of Fast Radio Bursts	Sep 2019			
FAST/Future Pulsar Symposium 8, Xi'an, China Contributed talk: Measurement of the luminosity function of Fast Radio Bursts	Jun 2019			
Cosmology Group Meeting at NAOC, Beijing, China Invited talk: Measurements on the FRB luminosity function	Mar 2019			
KIAA Graduate Dinner Talk, Beijing, China Invited talk: An Overview on Fast Radio Bursts and FRB luminosity function	Dec 2018			
NAOC Graduate Student Seminar, Beijing, China Invited talk: A Review of Fast Radio Bursts and FRB luminosity function	Apr 2018			
Radio Astronomy Forum 2017, Pingtang, China Poster talk: Simulating DM of host galaxies to derive FRB luminosity function	Sep 2017			
Chinese Astronomical Society 2016 Annual Meeting, Wuhan, China Contributed talk: Simulating the dispersion measure of host galaxies	Nov 2016			
Jing-Guang-Xia Astrophysics Meeting, Xiamen, China Contributed talk: Simulating the dispersion measure of host galaxies	Jul 2016			
QTT Colloquium Series 2016, Zunyi, China Contributed talk: Simulating the dispersion measure of FRB host galaxies	Jul 2016			
PKU-XAO Bilateral Meeting, Urumqi, China Contributed talk: Simulating the dispersion measure of FRB host galaxies	Jun 2016			
Chinese Astronomical Society 2015 Annual Meeting, Beijing, China Contributed talk: Consideration of Research on FRBs	Oct 2015			
QTT Colloquium Series 2015, Ming'antu, China Contributed talk: Consideration of Research on FRBs	Jul 2015			
KIAA-SHAO Bilateral Workshop, Beijing, China Contributed talk: Consideration of FRB searching				
ECHNICAI SKIIIS				

## TECHNICAL SKILLS

Programming	PYTHON (Proficient), $C, C++$ , UNIX
Softwares	Matlab, Mathematica, presto, tempo2, MultiNest
Tools	GIT, LATEX, WIKI

## LANGUAGES

Chinese NativeEnglish FluentJapanese Elementary

## REFERENCES

## Kejia Lee

Associate Professor

Kavli Institute for Astronomy and Astrophysics, Peking University

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## George Hobbs

Research Scientist and Team Leader

CSIRO Astronomy and Space Science, Australia National Telescope Facility

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## **Duncan Lorimer**

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## R. N. Manchester

Fellow of the Australian Academy of Science

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## Bing Zhang

Distinguished Professor and Associate Dean for Research

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(summary: 15 in total, including one in Nature as the first author. H-index: 6, – Mar 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 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., et al. *CRAFTS* for Fast Radio Bursts II. Extending the dispersion-fluence relation with new FRBs detected by FAST, 2021, ApJ, 909, L8
- 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
- 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:

- 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, accepted
- 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-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(7), 979511