Wenbin Lu —— Curriculum Vitae (March 8, 2021)

CONTACT INFORMATION

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RESEARCH INTEREST

My research has been focused on understanding the underlying physics behind various high-energy transient phenomena, including **fast radio bursts**, **tidal disruption events**, and **compact object mergers**. My areas of expertise include plasma physics, special/general relativity, hydrodynamics, radiative transfer, and stellar evolution. I have also worked on gamma-ray bursts, formation history of binary black holes/neutron stars, accretion disks, pre-supernova mass loss, and hyper-velocity stars.

EMPLOYMENT

Lyman Spitzer Fellow, *Princeton University*, New Jersey, USA 2021-

Burke Prize Fellow, *California Institute of Technology*, California, USA 2018-2021

EDUCATION

Ph.D. in Astronomy, *University of Texas at Austin*, Texas, USA 2013-2018
Thesis: *Emission Mechanism of Fast Radio Bursts*
Advisor: Prof. Pawan Kumar

B.S. in Physics, *Peking University*, Beijing, China 2009-2013
Advisor: Prof. Zhuo Li

HONORS & AWARDS

Spitzer Fellowship 2021-
Burke Fellowship 2018-2021
David Alan Benfield Memorial Fellowship in Astronomy Spring 2018
Graduate School Named Continuing Fellowship 2016-2017
Graduate School Named Continuing Fellowship 2015-2016
Frank Edmonds Memorial Fellowship in Astronomy Summer 2015
Astronomy Department Second-year Research Defense Award Spring 2015

PROFESSIONAL EXPERIENCES

Services

Referee for *Nature* (2 — number of occurrences), *MNRAS* (5), *ApJ* (3), *ApJL* (2), *Space Science Reviews* (1), *PRL* (1), *PRD* (2)	2016-
Astronomy Colloquium Committee Member, Caltech	2019-2020
Organizer for TAPIR weekly pizza lunch discussion, Caltech	2018-2021
Panel member for group discussion in FRB workshop, Flatiron Institute	02/2020

Teaching and Supervision

Co-Supervision (with Prof. Phinney) of undergraduate student Gauri Batra for her summer project: *General Relativitic Stream Crossing in Tidal Disruption Events* (paper in prep.) — 2020

Guest Lectures to graduate students at Caltech

Title: *Fast Radio Burst Energetics and Models* (taught by Prof. S. R. Kulkarni)	07/2020
Title: *Broad Implications of GW190814* (taught by Prof. S. R. Kulkarni)	02/2021

Teaching Assistants at UT Austin

Course: *Astrophysics* (taught by Prof. S. Weinberg)	Fall 2017
Course: *Extraterrestrial Life* (taught by Prof. N. J. Evans)	Spring 2016
Course: *Extraterrestrial Life* (taught by Prof. N. J. Evans)	Spring 2015

Colloquia (9)

Astronomy Colloquium, Tsinghua University	03/2021
Astronomy Colloquium, University of California Berkeley	02/2021
Institute of Theory and Computation Colloquium Series, Harvard University	10/2020
McGill Space Institute Astrophysics Seminar	09/2020
Carnegie Observatories Colloquium	02/2020
Astronomy Colloquium, California Institute of Technology	01/2020
Physics and Astronomy Colloquium, University of Nevada at Las Vegas	11/2018
Kavli Institute for Astronomy and Astrophysics Colloquium, Peking University	09/2018
Black Hole Initiative Colloquium, Harvard University	04/2017

Seminars (14)

Astroplasmas Seminar, Princeton University, USA	10/2020
Astrophysics Lunch, Cornell University, USA	09/2020
(**Blackboard Presentation**) Carnegie Theory Talks, Pasadena, USA	07/2020
TAPIR Seminar, Caltech, USA	10/2018
(**Blackboard**) Carnegie Theory Talks, Pasadena, USA	09/2018
Astroplasmas Seminar, Princeton University, USA	12/2017
Astronomy Tea Talk, Caltech, USA	10/2017

Transient Lunch, UC Santa Cruz, USA 09/2017

Theoretical Astrophysics Center, UC Berkeley, USA 09/2017

(**Blackboard**) Institute of Theory and Computation, Harvard University, USA 04/2017

Lunch Talk, University of Kentucky, USA 10/2016

Astronomy Seminar, University of Science and Technology of China, China 05/2016

Lunch Talk, KIAA/Peking University, China 05/2016

Lunch Talk, University of Nevada at Las Vegas, USA 05/2015

Invited Conference Talks (7)

Towards Understanding of Fast Radio Bursts 02/2021

FRB workshop, Yukawa Institute for Theoretical Physics, Kyoto University

General Constraints on the Emission Mechanisms of Fast Radio Bursts 02/2020

FRB workshop, CCA Flatiron Institute, New York

Implications of Stream Self-Crossing in Tidal Disruption Events 01/2020

TDE workshop, Yukawa Institute for Theoretical Physics, Kyoto University

Accretion Disks in Binary Neutron Star Mergers 09/2019

ZTF Theory Network Meeting, San Luis Obispo, USA

Statistical and Polarization Properties of Fast Radio Bursts 09/2019

Toronto FRB Day, CITA and University of Toronto

Energetics and Polarization Properties of Fast Radio Bursts 01/2019

T. D. Lee Institute mini-workshop, Shanghai, China

Understanding the Polarization of Fast Radio Bursts 07/2018

ZTF Theory Network Meeting, Santa Barbara, USA

Contributed Conference Talks

A Unified Picture of Galactic and Cosmological Fast Radio Bursts 07/2020

FRB 2020 Zoom Virtual Meeting, USA

The Radiation Mechanism of Fast Radio Bursts 12/2017

Deciphering the Violent Universe, Playa del Carmen, Mexico

Public Talks

Stories from supermassive black holes tearing apart stars at galactic centers 02/2017

McDonald Observatory & Department of Astronomy Board of Visitors Meeting

General relativity and black holes 04/2016

Planetary Organization for Space Science and Exploration in Jackson School of Geosciences of the University of Texas at Austin

TECHNICAL SKILLS

Languages: Python, C++

My Numerical Code: `Jedi` (hydrodynamics of relativistic jets and GRB afterglow)

Experiences with Other Codes: `MESA` (stellar evolution), `PLUTO` (relativistic hydrodynamics), `Cloudy` (spectral modeling), `Skynet` (nuclear network), `KORAL` (radiation-GRMHD), `rebound` (fewbody dynamics), `Visit` (data visualization), `GYRE` (stellar oscillation)

REFERENCES

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Ramesh Narayan
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Cambridge, MA 02138

PULICATION LIST ADS link to all my peer-reviewed publications Google Scholar link

Published (1st-author 17, 2nd-author 13, *h*-index 14, citations 580+, ⋆ marks my favorite)

32. Kremer, K., **Lu, W.**, Piro, A. L., Chatterjee, S., Rasio, F. A., Ye, C. S., 2020, *Fast optical transients from stellar-mass black hole tidal disruption events in young stellar clusters*, MNRAS submitted PDF

31. **Lu, W.**, Fuller, J., Raveh, Y., Perets, H. B., Li, T. S., Hosek, M. W., & Do, T., 2020, *The former companion of the hyper-velocity star S5-HVS1*, MNRAS accepted PDF

⋆ 30. Bonnerot, C., **Lu, W.**, Hopkins, P. F. 2020, *First light from tidal disruption events*, MNRAS accepted PDF

⋆ 29. **Lu, W.**, Bemiamini, P., & Bonnerot, C., 2020, *On the formation of GW190814*, MNRAS, 500, 1817 PDF

⋆ 28. **Lu, W.**, Kumar, P., & Zhang, B., 2020, *A unified picture of Galactic and cosmological fast radio bursts*, MNRAS, 498, 1397 PDF

27. **Lu, W.**, Piro, A.L., & Waxman, E., 2020, *Implications of CHIME repeating fast radio bursts*, MNRAS, 498, 1973 PDF

26. Chen, G., Ravi V. & **Lu, W.**, 2020, *The multiwavelength counterparts of fast radio bursts*, ApJ, 897, 146 PDF

⋆ 25. **Lu, W.**, & Phinney, E. S., 2020, *Imprint of local environment on fast radio burst observations*, MNRAS, 496, 3308 PDF

24. Andreoni, I., **Lu, W.**, Smith, R. M., Masci, F. J. et al., 2020, *Zwicky Transient Facility constraints on the optical emission from the nearby repeating FRB 180916.J0158+65*, ApJL, 896L, 2 PDF

⋆ 23. Bonnerot, C. & **Lu, W.**, 2020, *Simulating realistic disc formation in tidal disruption events*, MNRAS, 495, 1374 PDF

22. Piro, A. L. & **Lu, W.**, 2020, *Wind-reprocessed Transients*, ApJ, 894, 2 PDF

21. Kumar, P. & **Lu, W.**, 2020, *Radiation Forces Constrain the FRB Mechanism*, MNRAS, 494, 1217 PDF

20. De Colle, F. & **Lu, W.**, 2020, *Jets from Tidal Disruption Events*, New Astronomy Reviews, 89, 101538 PDF

⋆ 19. **Lu, W.** & Bonnerot, C., 2020, *Self-intersection of the Fallback Stream in Tidal Disruption Events*, MNRAS, 492, 686 PDF

⋆ 18. **Lu, W.** & Piro, A. L., 2019, *Implications from ASKAP Fast Radio Burst Statistics*, ApJ, 883, 40 PDF

17. Kremer, K., **Lu, W.**, Rodriguez, C. L., Lachat, M., & Rasio, F., 2019, *Tidal Disruptions of Stars by Black Hole Remnants in Dense Star Clusters*, ApJ, 881, 75 PDF

16. **Lu, W.** & Kumar, P., 2019, *The Maximum Luminosity of Fast Radio Bursts*, MNRAS Letters, 483, L93 PDF

⋆ 15. **Lu, W.**, Kumar, P., & Narayan, R., 2019, *Fast Radio Burst Source Properties from Polarization Measurements*, MNRAS, 483, 359 PDF

14. **Lu, W.**, & Kumar, P., 2018, *On the Missing Energy Puzzle of Tidal Disruption Events*, ApJ, 865, 128 PDF

13. Carballo-Rubio, R., Kumar, P. & **Lu, W.**, 2018, *Seeking Observational Evidence for the Formation of Trapping Horizons in Astrophysical Black Holes*, PRD, 97, 123012 PDF

⋆ 12. **Lu, W.**, & Kumar, P., 2018, *On the Radiation Mechanism of Repeating Fast Radio Bursts*, MNRAS, 477, 2470 PDF

11. Bhattacharya, M., **Lu, W.**, Santana, R., & Kumar, P., 2018, *Monte Carlo Simulations of Photospheric Emission in Relativistic Outflows*, ApJ, 852, 24 PDF

10. De Colle, F., **Lu, W.**, Kumar, P., Remirez-Ruiz, E., & Smoot, G., 2018, *Thermal and Non-thermal Emission from the Cocoon of a Gamma-Ray Burst Jet*, MNRAS, 478, 4553 PDF

9. Dai, L., **Lu, W.**, 2017, *Probing Motion of Fast Radio Burst Sources by Timing Strongly Lensed Repeaters*, ApJ, 847, 19 PDF

8. **Lu, W.**, Krolik, J., Crumley, P., & Kumar, P., 2017, *Radiative Interaction between the Relativistic Jet and Optically Thick Envelope in Tidal Disruption Events*, MNRAS, 471, 1141 PDF

⋆ 7. Kumar, P., **Lu, W.**, & Bhattacharya, M., 2017, *Constraints on Fast Radio Bursts Source Properties*, MNRAS, 468, 2726 PDF

6. **Lu, W.**, Kumar, P. & Narayan, R., 2017, *Stellar Disruption Events Support the Existence of the Black Hole Event Horizon*, MNRAS, 468, 910 PDF

5. **Lu, W.** & Kumar, P., 2016, *A Universal Energy Distribution Function for Repeating Fast Radio Bursts?*, MNRAS Letters, 461, L122 PDF

4. Crumley, P. , **Lu, W.**, Hernández, R. A., Santana, R., Markoff, S., & Kumar, P., 2016, *Swift J1644+57: an Ideal Test Bed of Radiation Mechanisms in a Relativistic Super-Eddington Jet*, MNRAS, 460, 396 PDF

3. **Lu, W.** & Kumar, P., 2016, *External Inverse-Compton emission from Jetted Tidal Disruption Events*, MNRAS, 458, 1071 PDF

2. **Lu, W.**, Kumar, P. & Evans, N. J., 2016, *Infrared emission from tidal disruption events — probing the pc-scale dust content around galactic nuclei*, MNRAS, 458, 575 PDF

1. **Lu, W.**, Kumar, P. & Smoot, G. F., 2015, *Probing Massive Stars Around Gamma-Ray Burst Progenitors*, MNRAS, 453, 1458 PDF

Submitted (citations 4)

⋆ 1. **Lu, W.**, Beniamini, P., & McDowell, A., 2020, *Deceleration of relativistic jets with lateral expansion*, MNRAS submitted PDF

Minor Contributions

3. Connor, L., Shila, K. A., Kulkarni, S. R., et al. (**Lu, W.**), 2021, *Galactic Radio Explorer: an all-sky monitor for bright radio bursts*, PASP submitted PDF

2. Makhathini, S., Mooley, K. P., Brightman, M., et al. (**Lu, W.**), 2020, *The Panchromatic Afterglow of GW170817: The full uniform dataset, modeling, comparison with previous results and implications*, ApJ submitted PDF

1. Kool, E. C., Reynolds, T. M., Mattila, S., et al. (**Lu, W.**), 2020, *AT 2017gbl: a dust obscured TDE candidate in a luminous infrared galaxy*, MNRAS, 498, 2167 PDF