Wenbin Lu —— Curriculum Vitae (August 18, 2022)

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, tidal capture, and hyper-velocity stars.

EMPLOYMENT

Assistant Professor, *University of California Berkeley*, California, USA	2022-
Lyman Spitzer Fellow, *Princeton University*, New Jersey, USA	2021-
Burke Fellow, *California Institute of Technology*, California, USA	2018-2021

EDUCATION

Ph.D. in Astronomy, *University of Texas at Austin*, Texas, USA	2013-2018
B.S. in Physics, *Peking University*, Beijing, China	2009-2013

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

PROFESSIONAL EXPERIENCES

Teaching and Supervision

Graduate Course: Radiative Processes (Fall 2022)

Supervision of undergrad student Hao-Tse Huang 2022

for summer project: *TDEs by the most massive black holes* (paper in prep)

Co-Supervision (w/ Prof. E. S. Phinney) of undergrad student Gauri Batra 2020
for summer project: *General Relativitic Stream Crossing in TDEs* (submitted)

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

Services

Referee (total ∼30) for *Nature*, *MNRAS*, *ApJ*, *ApJL*, *PRL*, *PRD*, *Space Science Reviews*, *JHEAP*, *Universe*	2016-
Astronomy Colloquium Committee Member, Caltech	2019-2020
Reviewer for observing proposals to Five-hundred-meter Aperture Spherical Telescope (FAST)	2021
Reviewer for consolidated grant application to the Science & Technology Facilities Council (STFC) of the UK	2021
Local Organizing Committee for FRB2021 Conference, University of Amsterdam	2021
Organizer for TAPIR weekly pizza lunch discussion, Caltech	2018-2021
Panel member for group discussion in FRB2020 Workshop, Flatiron Institute	02/2020

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 (18)

Astroplasma Seminar, Princeton University, USA	02/2022
High-Energy Astrophysics Seminar, Hebrew University of Jerusalem, Israel	12/2021
Brown Bag Lunch, Massachusetts Institute of Technology, USA	05/2021
Theoretical Astrophysics Seminar, University of Florida, USA	10/2020
Astroplasmas Seminar, Princeton University, USA	10/2020
Astrophysics Lunch, Cornell University, USA	09/2020

(**Blackboard**) 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

Aftermath of white dwarf tidal capture 01/2022

Aspen Winter Conference, Aspen Center for Physics, USA

Implications of a rapidly varying FRB in a globular cluster of M81 08/2021

FRB2021 Conference, University of Amsterdam, the Netherlands

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

FRB2020 Conference, West Virginia University, USA

The Radiation Mechanism of Fast Radio Bursts 12/2017

Deciphering the Violent Universe, Playa del Carmen, Mexico

Public Talks

Endless hunt for black holes 04/2021

Caltech Stargazing Lecture Series

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

McDonald Observatory & DoA Board of Visitors Meeting, UT Austin

General relativity and black holes 04/2016

Planetary Organization for Space Science and Exploration in Jackson School of Geosciences, UT Austin

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

Published (h-index 18, citations 1000+)

47. Patra, K., **Lu, W.**, Brink, T., Yang, Y., Filippenko, A., et al., 2022, *Spectropolarimetry of the tidal disruption event AT 2019qiz: a quasi-spherical reprocessing layer*, MNRAS, 515, 1, PDF

46. Kremer, K., Lombardi, J., **Lu, W.**, Piro, A., Rasio, F., et al., 2022, *Hydrodynamics of Collisions and Close Encounters between Stellar Black Holes and Main-sequence Stars*, ApJ, 933, 2, PDF

45. Bonnerot, C., Pessah, M., **Lu, W.**, 2022, *From Pericenter and Back: Full Debris Stream Evolution in Tidal Disruption Events*, ApJL, 931, 1, PDF

44. Fuller, J., **Lu, W.**, 2022, *The spins of compact objects born from helium stars in binary systems*, MNRAS, 511, 3, PDF

43. Bonnerot, C., **Lu, W.**, 2022, *The nozzle shock in tidal disruption events*, MNRAS, 511, 2, PDF

42. Somalwar, J., Ravi, V., Dong, D., Graham, M., Hallinan, G., et al. **(Lu, W.)**, 2022, *The Nascent Milliquasar VT J154843.06+220812.6: Tidal Disruption Event or Extreme Accretion State Change?*, ApJ, 929, 2, PDF

41. Yang, Y., **Lu, W.**, Feng, Y., Zhang, B., Li, D., et al., 2022, *Temporal Scattering, Depolarization, and Persistent Radio Emission from Magnetized Inhomogeneous Environments near Repeating Fast Radio Burst Sources*, ApJL, 928, 2, PDF

40. Feng, Y., Li, D., Yang, Y., Zhang, Y., Zhu, W., et al. **(Lu, W.)**, 2022, *Frequency-dependent polarization of repeating fast radio bursts—implications for their origin*, Science, 375, 6586, PDF

39. **Lu, W.**, Beniamini, P., Kumar, P., 2022, *Implications of a rapidly varying FRB in a globular cluster of M81*, MNRAS, 510, 2, PDF

38. Makhathini, S., Mooley, K., Brightman, M., Hotokezaka, K., Nayana, A., et al. **(Lu, W.)**, 2021, *The Panchromatic Afterglow of GW170817: The Full Uniform Data Set, Modeling, Comparison with Previous Results, and Implications*, ApJ, 922, 2, PDF

37. **Lu, W.**, McKee, C., Mooley, K., 2021, *Infrared dust echoes from neutron star mergers*, MNRAS, 507, 3, PDF

36. Beniamini, P., **Lu, W.**, 2021, *Survival Times of Supramassive Neutron Stars Resulting from Binary Neutron Star Mergers*, ApJ, 920, 2, PDF

35. Bij, A., Lin, H., Li, D., van Kerkwijk, M., Pen, U., et al. **(Lu, W.)**, 2021, *Kinematics of Crab Giant Pulses*, ApJ, 920, 1, PDF

34. Connor, L., Shila, K., Kulkarni, S., Flygare, J., Hallinan, G., et al. **(Lu, W.)**, 2021, *Galactic Radio Explorer: An All-sky Monitor for Bright Radio Bursts*, pasp, 133, 1025, PDF

33. Bonnerot, C., **Lu, W.**, Hopkins, P., 2021, *First light from tidal disruption events*, MNRAS, 504, 4, PDF

32. **Lu, W.**, Fuller, J., Raveh, Y., Perets, H., Li, T., et al., 2021, *The former companion of hyper-velocity star S5-HVS1*, MNRAS, 503, 1, PDF

31. Kremer, K., **Lu, W.**, Piro, A., Chatterjee, S., Rasio, F., et al., 2021, *Fast Optical Transients from Stellar-mass Black Hole Tidal Disruption Events in Young Star Clusters*, ApJ, 911, 2, PDF

30. **Lu, W.**, Beniamini, P., Bonnerot, C., 2021, *On the formation of GW190814*, MNRAS, 500, 2, PDF

29. Kool, E., Reynolds, T., Mattila, S., Kankare, E., Pérez-Torres, M., et al. **(Lu, W.)**, 2020, *AT 2017gbl: a dust obscured TDE candidate in a luminous infrared galaxy*, MNRAS, 498, 2, PDF

28. **Lu, W.**, Piro, A., Waxman, E., 2020, *Implications of Canadian Hydrogen Intensity Mapping Experiment repeating fast radio bursts*, MNRAS, 498, 2, PDF

27. **Lu, W.**, Kumar, P., Zhang, B., 2020, *A unified picture of Galactic and cosmological fast radio bursts*, MNRAS, 498, 1, PDF

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

25. **Lu, W.**, Phinney, E., 2020, *Imprint of local environment on fast radio burst observations*, MNRAS, 496, 3, PDF

24. Chen, G., Ravi, V., **Lu, W.**, 2020, *The Multiwavelength Counterparts of Fast Radio Bursts*, ApJ, 897, 2, PDF

23. Bonnerot, C., **Lu, W.**, 2020, *Simulating disc formation in tidal disruption events*, MNRAS, 495, 1, PDF

22. Andreoni, I., **Lu, W.**, Smith, R., Masci, F., Bellm, E., et al., 2020, *Zwicky Transient Facility Constraints on the Optical Emission from the Nearby Repeating FRB 180916.J0158+65*, ApJL, 896, 1, PDF

21. Kumar, P., **Lu, W.**, 2020, *Radiation forces constrain the FRB mechanism*, MNRAS, 494, 1, PDF

20. Piro, A., **Lu, W.**, 2020, *Wind-reprocessed Transients*, ApJ, 894, 1, PDF

19. **Lu, W.**, Bonnerot, C., 2020, *Self-intersection of the fallback stream in tidal disruption events*, MNRAS, 492, 1, PDF

18. **Lu, W.**, Piro, A., 2019, *Implications from ASKAP Fast Radio Burst Statistics*, ApJ, 883, 1, PDF

17. Kremer, K., **Lu, W.**, Rodriguez, C., Lachat, M., Rasio, F., et al., 2019, *Tidal Disruptions of Stars by Black Hole Remnants in Dense Star Clusters*, ApJ, 881, 1, PDF

16. **Lu, W.**, Kumar, P., 2019, *The maximum luminosity of fast radio bursts*, MNRAS, 483, 1, PDF

15. **Lu, W.**, Kumar, P., Narayan, R., 2019, *Fast radio burst source properties from polarization measurements*, MNRAS, 483, 1, PDF

14. **Lu, W.**, Kumar, P., 2018, *On the Missing Energy Puzzle of Tidal Disruption Events*, ApJ, 865, 2, PDF

13. De Colle, F., **Lu, W.**, Kumar, P., Ramirez-Ruiz, E., Smoot, G., et al., 2018, *Thermal and non-thermal emission from the cocoon of a gamma-ray burst jet*, MNRAS, 478, 4, PDF

12. Carballo-Rubio, R., Kumar, P., **Lu, W.**, 2018, *Seeking observational evidence for the formation of trapping horizons in astrophysical black holes*, Phys. Rev. D, 97, 12, PDF

11. **Lu, W.**, Kumar, P., 2018, *On the radiation mechanism of repeating fast radio bursts*, MNRAS, 477, 2, PDF

10. Bhattacharya, M., **Lu, W.**, Kumar, P., Santana, R., 2018, *Monte Carlo Simulations of Photospheric Emission in Relativistic Outflows*, ApJ, 852, 1, PDF

9. **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, 1, PDF

8. Dai, L., **Lu, W.**, 2017, *Probing Motion of Fast Radio Burst Sources by Timing Strongly Lensed Repeaters*, ApJ, 847, 1, PDF

7. Kumar, P., **Lu, W.**, Bhattacharya, M., 2017, *Fast radio burst source properties and curvature radiation model*, MNRAS, 468, 3, PDF

6. **Lu, W.**, Kumar, P., Narayan, R., 2017, *Stellar disruption events support the existence of the black hole event horizon*, MNRAS, 468, 1, PDF

5. **Lu, W.**, Kumar, P., 2016, *A universal EDF for repeating fast radio bursts?*, MNRAS, 461, 1, PDF

4. Crumley, P., **Lu, W.**, Santana, R., Hernández, R., Kumar, P., et al., 2016, *Swift J1644+57: an ideal test bed of radiation mechanisms in a relativistic super-Eddington jet*, MNRAS, 460, 1, PDF

3. **Lu, W.**, Kumar, P., 2016, *External inverse-Compton emission from jetted tidal disruption events*, MNRAS, 458, 1, PDF

2. **Lu, W.**, Kumar, P., Evans, N., 2016, *Infrared emission from tidal disruption events - probing the pc-scale dust content around galactic nuclei*, MNRAS, 458, 1, PDF

1. **Lu, W.**, Kumar, P., Smoot, G., 2015, *Probing massive stars around gamma-ray burst progenitors*, MNRAS, 453, 2, PDF

Submitted

7. **Lu, W.**, Quataert, E., 2022, *Late-time accretion in neutron star mergers: implications for short gamma-ray bursts and kilonovae*, submitted, arXiv: 2208.04293, PDF

6. Yao, Y., **Lu, W.**, Guolo, M., Pasham, D., Gezari, S., et al., 2022, *The Tidal Disruption Event AT2021ehb: Evidence of Relativistic Disk Reflection, and Rapid Evolution of the Disk-Corona System*, submitted, arXiv: 2206.12713, PDF

5. **Lu, W.**, Fuller, J., Quataert, E., Bonnerot, C., 2022, *On rapid binary mass transfer – I. Physical model*, submitted, arXiv: 2204.00847, PDF

4. Batra, G., **Lu, W.**, Bonnerot, C., Phinney, E., 2021, *General Relativistic Stream Crossing in Tidal Disruption Events*, submitted, arXiv: 2112.03918, PDF

3. Kulkarni, S., Harrison, F., Grefenstette, B., Earnshaw, H., Andreoni, I., et al. **(Lu, W.)**, 2021, *Science with the Ultraviolet Explorer (UVEX)*, submitted, arXiv: 2111.15608, PDF

2. Xu, H., Niu, J., Chen, P., Lee, K., Zhu, W., et al. **(Lu, W.)**, 2021, *A fast radio burst source at a complex magnetised site in a barred galaxy*, submitted, arXiv: 2111.11764, PDF

1. **Lu, W.**, Beniamini, P., McDowell, A., 2020, *Deceleration of relativistic jets with lateral expansion*, submitted, arXiv: 2005.10313, PDF