

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 (binary) 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

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| Assistant Professor , <i>University of California Berkeley</i> , California, USA | 2022- |
| Lyman Spitzer Fellow , <i>Princeton University</i> , New Jersey, USA | 2021- |
| Burke Fellow , <i>California Institute of Technology</i> , California, USA | 2018-2021 |

EDUCATION

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| Ph.D. in Astronomy, <i>University of Texas at Austin</i> , Texas, USA Advisor: Prof. Pawan Kumar | 2013-2018 |
| B.S. in Physics, <i>Peking University</i> , Beijing, China Advisor: Prof. Zhuo Li | 2009-2013 |

HONORS & AWARDS

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| 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

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| Referee (total ~30) for <i>Nature</i> , <i>MNRAS</i> , <i>ApJ</i> , <i>ApJL</i> , <i>PRL</i> , <i>PRD</i> , <i>Space Science Reviews</i> , <i>JHEAP</i> , <i>Universe</i> | 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 |

Teaching and Supervision

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| Co-Supervision (w/ Prof. E. S. Phinney) of undergraduate student Gauri Batra for her summer project: <i>General Relativistic Stream Crossing in Tidal Disruption Events</i> (paper submitted) | 2020 |
| Guest Lectures to graduate students at Caltech | |
| Title: <i>Fast Radio Burst Energetics and Models</i> (taught by Prof. S. R. Kulkarni) | 07/2020 |
| Title: <i>Broad Implications of GW190814</i> (taught by Prof. S. R. Kulkarni) | 02/2021 |
| Teaching Assistants at UT Austin | |
| Course: <i>Astrophysics</i> (taught by Prof. S. Weinberg) | Fall 2017 |
| Course: <i>Extraterrestrial Life</i> (taught by Prof. N. J. Evans) | Spring 2016 |
| Course: <i>Extraterrestrial Life</i> (taught by Prof. N. J. Evans) | Spring 2015 |

Colloquia (9)

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| 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)

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| Astroplasma Seminar, Princeton University, USA | 02/2022 |
| High-Energy Astrophysics Seminar, Hebrew University of Jerusalem, Israel | 12/2021 |

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| 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)

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| <i>Towards Understanding of Fast Radio Bursts</i> | 02/2021 |
| FRB workshop, Yukawa Institute for Theoretical Physics, Kyoto University | |
| <i>General Constraints on the Emission Mechanisms of Fast Radio Bursts</i> | 02/2020 |
| FRB workshop, CCA Flatiron Institute, New York | |
| <i>Implications of Stream Self-Crossing in Tidal Disruption Events</i> | 01/2020 |
| TDE workshop, Yukawa Institute for Theoretical Physics, Kyoto University | |
| <i>Accretion Disks in Binary Neutron Star Mergers</i> | 09/2019 |
| ZTF Theory Network Meeting, San Luis Obispo, USA | |
| <i>Statistical and Polarization Properties of Fast Radio Bursts</i> | 09/2019 |
| Toronto FRB Day, CITA and University of Toronto | |
| <i>Energetics and Polarization Properties of Fast Radio Bursts</i> | 01/2019 |
| T. D. Lee Institute mini-workshop, Shanghai, China | |
| <i>Understanding the Polarization of Fast Radio Bursts</i> | 07/2018 |
| ZTF Theory Network Meeting, Santa Barbara, USA | |

Contributed Conference Talks

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| <i>Aftermath of white dwarf tidal capture</i> | 01/2022 |
| Aspen Winter Conference, Aspen Center for Physics, USA | |

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| <i>Implications of a rapidly varying FRB in a globular cluster of M81</i> | 08/2021 |
| FRB2021 Conference, University of Amsterdam, the Netherlands | |
| <i>A Unified Picture of Galactic and Cosmological Fast Radio Bursts</i> | 07/2020 |
| FRB2020 Conference, West Virginia University, USA | |
| <i>The Radiation Mechanism of Fast Radio Bursts</i> | 12/2017 |
| Deciphering the Violent Universe, Playa del Carmen, Mexico | |
| <u>Public Talks</u> | |
| <i>Endless hunt for black holes</i> | 04/2021 |
| Caltech Stargazing Lecture Series | |
| <i>Stories from supermassive black holes tearing apart stars at galactic centers</i> | 02/2017 |
| McDonald Observatory & DoA Board of Visitors Meeting, UT Austin | |
| <i>General relativity and black holes</i> | 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+)

46. Patra, K., **Lu, W.**, Brink, T., Yang, Y., Filippenko, A., et al., 2022, *Spectropolarimetry of the tidal disruption event AT 2019qiz: a quasispherical reprocessing layer*, MNRAS, [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. 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](#)
43. Bonnerot, C., **Lu, W.**, 2022, *The nozzle shock in tidal disruption events*, MNRAS, 511, 2, [PDF](#)
42. Fuller, J., **Lu, W.**, 2022, *The spins of compact objects born from helium stars in binary systems*, MNRAS, 511, 3, [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. 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](#)
35. Beniamini, P., **Lu, W.**, 2021, *Survival Times of Supramassive Neutron Stars Resulting from Binary Neutron Star Mergers*, ApJ, 920, 2, [PDF](#)
34. Bonnerot, C., **Lu, W.**, Hopkins, P., 2021, *First light from tidal disruption events*, MNRAS, 504, 4, [PDF](#)
33. 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](#)
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. **Lu, W.**, Kumar, P., Zhang, B., 2020, *A unified picture of Galactic and cosmological fast radio bursts*, MNRAS, 498, 1, [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. 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](#)
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. 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](#)
22. Bonnerot, C., **Lu, W.**, 2020, *Simulating disc formation in tidal disruption events*, MNRAS, 495, 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. **Lu, W.**, Kumar, P., 2018, *On the radiation mechanism of repeating fast radio bursts*, MNRAS, 477, 2, [PDF](#)

11. 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](#)
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. 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](#)
6. **Lu, W.**, Fuller, J., Quataert, E., Bonnerot, C., 2022, *On rapid binary mass transfer – I. Physical model*, submitted, arXiv: 2204.00847, [PDF](#)
5. 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*, submitted, arXiv: 2201.12368, [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. 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](#)
2. 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](#)

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