

# Xinyu Li

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RESEARCH INTERESTS	High Energy Astrophysics, Magnetars, Magnetohydrodynamics, Force-Free Electrodynamics, Plasma Astrophysics, Cosmology, Large Scale Structure, Dark Matter, Galaxy Formation	
EDUCATION	<b>Columbia University</b> , New York, NY, USA Ph.D., Physics, August 2019 <ul style="list-style-type: none"><li>Thesis Topic: <i>Magnetodynamics Inside and Outside Magnetars</i></li><li>Advisor: Prof Andrei Beloborodov</li></ul> <b>University of Waterloo</b> , Waterloo, ON, Canada M.Sc, Theoretical Physics, June 2013 <ul style="list-style-type: none"><li>Thesis Topic: <i>Towards an Investigation of Turbulence in High Dimensions</i></li><li>Advisor: Prof Luis Lehner &amp; Prof Robert Myers</li></ul> <b>The University of Hong Kong</b> , HKSAR, China B.Sc (First Class Honor), Physics and Mathematics (Double Major), June 2012 <b>Tsinghua University</b> , Beijing, China Physics and Mathematics, August 2008 - June 2009	
EXPERIENCES	<ul style="list-style-type: none"><li>Assistant Professor Tsinghua University</li><li>Postdoctoral Fellow Canadian Institute for Theoretical Astrophysics</li><li>Postdoctoral Fellow Perimeter Institute</li></ul>	2023/11- 2019/9-2023/8 2019/9-2022/8
AWARDS	<ul style="list-style-type: none"><li>Jeffrey L. Bishop Fellowship, CITA</li><li>Joseph C. Pfister Fellowship, Columbia University</li><li>Dean's Fellowship, GSAS, Columbia University</li><li>Perimeter Scholars International Scholarship, Perimeter Institute</li></ul>	2021 2018 2013 2012
INVITED TALKS	<ul style="list-style-type: none"><li>YITP, Multi-Messenger Astrophysics in the Dynamic Universe</li><li>PKU PhD student excellence forum</li><li>3rd FRB and Astrophysics Conference</li><li>2nd Shen Kuo Conference of Chinese Astronomical Society</li><li>1st Tsinghua Workshop on Gravitational Physics</li><li>32nd Texas Symposium on Relativistic Astrophysics</li><li>GSI, EMMI+IRENA Workshop "Remnants of neutron-star mergers"</li><li>23rd International Conference on General Relativity and Gravitation</li><li>INT, University of Washington, The r-process workshop</li><li>Colloquium, Department of Astronomy, Tsinghua University</li><li>Colloquium, KIAA, Peking University</li><li>Max Planck Institute for Gravitational Physics</li><li>North American Einstein Toolkit Workshop</li><li>MIAPP High-Energy Plasma Phenomena in Astrophysics</li><li>Department of Astronomy, Columbia University</li></ul>	Feb 2026 Sept 2025 June 2025 Nov 2024 June 2024 Nov 2023 Oct 2022 July 2022 May 2022 Jan 2022 Dec 2021 Sep 2021 July 2021 July 2021 March 2021

	<ul style="list-style-type: none"> <li>• Perimeter Institute</li> <li>• KIAS Workshop on Cosmology and Structure Formation</li> <li>• KIAA, Peking University</li> <li>• Department of Astronomy, Tsinghua University</li> <li>• T.D.Lee Institute</li> <li>• Department of Astronomy, Nanjing University</li> <li>• Department of Astronomy, HUST</li> <li>• Department of Astronomy, Shanghai Jiaotong University</li> <li>• Perimeter Institute</li> <li>• TAC, University of California, Berkeley</li> <li>• KIPAC, Stanford University</li> <li>• TAPIR, California Institute of Technology</li> <li>• CCA, Flatiron Institute</li> <li>• Department of Astrophysical Sciences, Princeton University</li> <li>• Department of Physics, the University of Hong Kong</li> </ul>	<p>March 2021</p> <p>Nov 2020</p> <p>Oct 2020</p> <p>Sep 2020</p> <p>May 2020</p> <p>Jan 2020</p> <p>Jan 2020</p> <p>Sep 2020</p> <p>Nov 2018</p> <p>Oct 2018</p> <p>Oct 2018</p> <p>Oct 2018</p> <p>Oct 2018</p> <p>Sep 2018</p> <p>Aug 2018</p>
SERVICES	<ul style="list-style-type: none"> <li>• Tsinghua DoA Teaching Committee</li> <li>• Tsinghua DoA Colloquium Committee</li> <li>• CITA Visitor Committee</li> <li>• CITA Cosmology Discussion</li> </ul>	
NUMERICAL CODES	<p>Developer: ENZO, FFE-WENO, Einstein Toolkit</p> <p>Experienced user: TRISTAN-MP, RAMSES</p>	
JOURNAL REVIEWER	<p>Physical Review Letters</p> <p>Physical Review D</p> <p>The Astrophysical Journal Letters</p> <p>The Astrophysical Journal</p> <p>Journal of High Energy Physics</p> <p>Journal of Cosmology and Astroparticle Physics</p> <p>Physics of Fluids</p> <p>Astrophysics and Space Science</p> <p>Physical Letter B</p> <p>New Astronomy</p> <p>Geophysical and Astrophysical Fluid Dynamics</p>	

PUBLICATIONS

1. Hong-Xuan Jiang, **Xinyu Li**, Yosuke Mizuno, Ziri Younsi, Christian M. Fromm, *Electromagnetic Signatures of Supermassive Binary Black Holes. I. Thermal Synchrotron, Self-Lensing Flares, and Jet Precession* arXiv:2603.10792 (2026)
2. Jixuan Yang, Lile Wang, **Xinyu Li**, Meng Sun, Long Wang and Rainer Spurzem, *The effects of star-gas interactions on binary evolution in open clusters*, arXiv:2601.01597 (2026)
3. **Xinyu Li**, Houyi, Sun, Yuan-Chuan Zou, and Huan Yang, *Micro-Tidal Disruption Events at Galactic Centers*, The Astrophysical Journal, 996, 2, 120 (2026)
4. Sean M. Ressler, Luciano Combi, Bart Ripperda, **Xinyu Li**, *Black Hole Collisions With Thin Accretion Disks: OJ 287 and Small-Mass-Ratio Supermassive Black Hole Binary Candidates*, The Astrophysical Journal Letters, 993, 1, L22 (2025)
5. Ge, M., Ji, L., Taverna, R., et al., *Physics of strong magnetism with eXTP*, Science China Physics, Mechanics, and Astronomy, 68, 11, 119505 (2025)
6. Jens F. Mahlmann, Miguel Á. Aloy, **Xinyu Li**, *Force-free wave interaction in magnetar magnetospheres: Computational modeling in axisymmetry*, The Astrophysical Journal, 972, 2, 139 (2024)
7. Sean M. Ressler, Luciano Combi, **Xinyu Li**, Bart Ripperda, and Huan Yang, *Black Hole-Disk Interactions in Magnetically Arrested Active Galactic Nuclei: General Relativistic Magnetohydrodynamic Simulations Using A Time-Dependent, Binary Metric*, The Astrophysical Journal 967, 1, 70 (2024)
8. Axel Widmark, Tomer D. Yavetz and **Xinyu Li**, *Fuzzy dark matter dynamics in tidally perturbed dwarf spheroidal galaxy satellites*, Journal of Cosmology and Astroparticle Physics, 03, 052 (2024)
9. Jie-Shuang Wang, **Xinyu Li**, Zigao Dai and Xuefeng Wu, *An Intermediate-field Fast Radio Burst Model and the Quasi-periodic Oscillation*, Research in Astronomy and Astrophysics, 23, 3 (2023)
10. Alexander Y. Chen, Yajie Yuan, **Xinyu Li** and Jens F. Mahlmann, *Propagation of a Strong Fast Magnetosonic Wave in the Magnetosphere of a Neutron Star*, arXiv:2210.13506 (2022)
11. Mihir Kulkarni, Eli Visbal, Greg L. Bryan, and **Xinyu Li**, *If dark matter is fuzzy, the first stars form in massive pancakes*, The Astrophysical Journal Letters, 941, 1 (2022)
12. Alexander Laroche, Daniel Gilman, **Xinyu Li**, Jo Bovy and Xiaolong Du, *Quantum fluctuations masquerade as halos: Bounds on ultra-light dark matter from quadruply-imaged quasars*, Monthly Notices of the Royal Astronomical Society, 517, 2 (2022)
13. Lile Wang, **Xinyu Li**, *Dynamical Effects of Colliding Outflows in Binary Systems*, The Astrophysical Journal, 932, 108 (2022)
14. Alexander Y. Chen, Yajie Yuan, Andrei M. Beloborodov and **Xinyu Li**, *Relativistic Alfvén Waves Entering Charge Starvation in the Magnetospheres of Neutron Stars*, The Astrophysical Journal, 929, 1, 31
15. Tomer D. Yavetz, **Xinyu Li**, Lam Hui, *Construction of Wave Dark Matter Halos: Numerical Algorithm and Analytical Constraints*, Physical Review D, 105, 023512 (2022)

16. **Xinyu Li**, Andrei M. Beloborodov, Lorenzo Sironi, *Fast dissipation of Colliding Alfvén Waves in a Magnetically Dominated Plasma*, The Astrophysical Journal, 915, 101 (2021)
17. **Xinyu Li** and Daniel Siegel, *Neutrino Fast Flavor Conversions in Neutron-star Post-Merger Accretion Disks*, Physical Review Letters, 126, 25, 251101 (2021)
18. Neal Dalal, Jo Bovy, Lam Hui, **Xinyu Li** *Don't cross the streams: caustics from Fuzzy Dark Matter*, Journal of Cosmology and Astroparticle Physics, 03, 076 (2021)
19. **Xinyu Li**, Lam Hui, Tomer D. Yavetz, *Oscillations and Random Walk of the Soliton Core in a Fuzzy Dark Matter Halo*, Physical Review D, 103, 023508 (2021)
20. Lam Hui, Austin Joyce, Michael J. Landry, **Xinyu Li** (alphabetical order), *Vortices and waves in light dark matter*, Journal of Cosmology and Astroparticle Physics, 01, 011 (2021).
21. Brummel-Smith, C., Bryan, G., Butsky, I., et al. *ENZO: An Adaptive Mesh Refinement Code for Astrophysics*, Journal of Open Source Software, 4, 1636.
22. **Xinyu Li** , Philip Chang, Yuri Levin, Christopher D. Matzner, Philip J. Armitage, *Simulation of a Compact Object with Outflows Moving Through a Gaseous Background*, Monthly Notices of the Royal Astronomical Society, 494, 2 (2020)
23. F.Y. Wang, **Xinyu Li** , D. O. Chernyshov, C.Y. Hui, G.Q. Zhang and K.S. Cheng, *Consequences of Energetic Magnetar-like Outbursts of Nearby Neutron Stars:  $^{14}\text{C}$  Events and the Cosmic Electron Spectrum*, The Astrophysical Journal, 887, 2, (2019)
24. Lam Hui, Daniel Kabat, **Xinyu Li** , Luca Santoni and Sam S. C. Wong (alphabetical order), *Black hole hair from scalar dark matter*, Journal of Cosmology and Astroparticle Physics, 06, 038 (2019)
25. **Xinyu Li** , Jonathan Zrake and Andrei Beloborodov, *Dissipation of Alfvén Waves in Relativistic Magnetospheres of Magnetars*, The Astrophysical Journal, 881, 1, (2019)
26. **Xinyu Li** , Lam Hui and Greg Bryan, *Numerical and Perturbative Computations of the Fuzzy Dark Matter Model*, Physical Review D, 99, 63509, (2019)
27. **Xinyu Li** , Yuri Levin and Andrei Beloborodov, *Magnetar Outbursts from Avalanches of Hall Waves and Crustal Failures*, The Astrophysical Journal, 189, 12, (2016)
28. Andrei Beloborodov and **Xinyu Li** , *Magnetar Heating*, The Astrophysical Journal, 261, 20, (2016)
29. **Xinyu Li** and Andrei Beloborodov, *Plastic Damping of Alfvén Waves in Magnetar Flares and Delayed Afterglow Emission*, The Astrophysical Journal, 815, 25, (2015)
30. **Xinyu Li** , Fayin Wang and K.S. Cheng, *Gravitational Effects of Condensate Dark Matter on Compact Stellar Objects*, Journal of Cosmology and Astroparticle Physics, 10, 031, (2012)
31. **Xinyu Li** , T. Harko and K.S.Cheng, *Condensate Dark Matter Stars*, Journal of Cosmology and Astroparticle Physics, 06, 001, (2012)