

# Wei-Xiang Feng, Ph.D.



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## Education

- 2023 **Ph.D. University of California, Riverside** in Physics  
Dissertation: *Probing Dark Matter Physics With Supermassive Black Holes*.
- 2014 **M.S. National Tsing Hua University** in Physics.
- 2012 **B.S. National Kaohsiung Normal University** in Physics (major), Math (minor).

## Distinction



- 2022 **Dissertation Year Program Award.** University of California, Riverside
- Anne Kernan Award.** University of California, Riverside
- 2015 **President's Scholarship.** National Tsing Hua University, Hsinchu
- 2012 **Academic Excellence Award.** National Kaohsiung Normal University, Kaohsiung

## Research Experience

- 2023– **Shuimu Postdoc Fellow.** Tsinghua University, Beijing
- 2017–23 **Graduate Student Researcher.** University of California, Riverside (2018–23)
- Visiting Scholar.** Academia Sinica, Taipei (2020–21)
- 2015–17 **Research Assistant.** National Tsing Hua University, Hsinchu







## Publications

- W.-X. Feng**, S. Bird, and H.-B. Yu, “Gravitational Waves from Primordial Black Hole Dark Matter Spikes,” Nov. 2024. arXiv: 2411.05065 [astro-ph.CO].
- W.-X. Feng**, “On the Dynamical Instability of Monatomic Fluid Spheres in  $(N + 1)$ -Dimensional Spacetime,” *Astronomy*, vol. 2, no. 1, pp. 22–46, 2023. DOI: 10.3390/astronomy2010004. arXiv: 2111.05341 [gr-qc].
- G. B. Huxtable, N. Eltawil, **W.-X. Feng**, *et al.*, “Signatures of wakefield acceleration in astrophysical jets via gamma-rays and UHECRs,” *Monthly Notices of the Royal Astronomical Society*, vol. 522, no. 4, pp. 5402–5414, 2023, ISSN: 0035-8711. DOI: 10.1093/mnras/stad1303. arXiv: 2009.12333 [astro-ph.HE].
- W.-X. Feng**, “Gravothermal phase transition, black holes and space dimensionality,” *Phys. Rev. D*, vol. 106, no. 4, p. L041501, 2022. DOI: 10.1103/PhysRevD.106.L041501. arXiv: 2207.14317 [gr-qc].
- W.-X. Feng**, A. Parisi, C.-S. Chen, and F.-L. Lin, “Self-interacting dark scalar spikes around black holes via relativistic Bondi accretion,” *JCAP*, vol. 08, no. 08, p. 032, 2022. DOI: 10.1088/1475-7516/2022/08/032. arXiv: 2112.05160 [astro-ph.HE].
- W.-X. Feng**, H.-B. Yu, and Y.-M. Zhong, “Dynamical instability of collapsed dark matter halos,” *JCAP*, vol. 05, no. 05, p. 036, 2022. DOI: 10.1088/1475-7516/2022/05/036. arXiv: 2108.11967 [astro-ph.CO].
- W.-X. Feng**, H.-B. Yu, and Y.-M. Zhong, “Seeding Supermassive Black Holes with Self-interacting Dark Matter: A Unified Scenario with Baryons,” *Astrophys. J. Lett.*, vol. 914, no. 2, p. L26, 2021. DOI: 10.3847/2041-8213/ac04b0. arXiv: 2010.15132 [astro-ph.CO].

- 8 **W.-X. Feng**, C.-Q. Geng, and L.-W. Luo, “The Buchdahl stability bound in Eddington-inspired Born-Infeld gravity,” *Chin. Phys. C*, vol. 43, no. 8, p. 083107, 2019.  DOI: 10.1088/1674-1137/43/8/083107. arXiv: 1810.06753 [gr-qc].
- 9 **W.-X. Feng**, C.-Q. Geng, W. F. Kao, and L.-W. Luo, “Equation of State of Neutron Stars with Junction Conditions in the Starobinsky Model,” *Int. J. Mod. Phys. D*, vol. 27, no. 01, p. 1750186, 2017.  DOI: 10.1142/S0218271817501863. arXiv: 1702.05936 [gr-qc].

## Presentations

### Seminars



- 2024  **Gravitational Waves from Primordial Black Hole Dark Matter Spikes?**  
Dept. of Physics, City University of Hong Kong, Hong Kong (Nov. 15, 24)  
Purple Mountain Observatory, CAS, Nanjing, China (Nov. 12, 24)
- 2022–23  **Supermassive Black Holes, Dark Matter, and the Relativistic Instability**  
Dept. of Physics, Tsinghua University (online), Beijing, China (Feb. 23, 23)
-  **Gravothermal Phase Transition, Black Holes and Space Dimensionality**  
Dept. of Physics, National Tsing Hua University, Hsinchu, Taiwan (Sept. 29, 22)  
Inst. of Physics, Academia Sinica, Taipei, Taiwan (Sept. 21, 22)
- 2020–21  **Supermassive Black Holes:**  
**Direct Collapse Scenario from Self-interacting Dark Matter**  
Dept. of Physics and Astronomy, University of California, Riverside, USA (Feb. 17, 21)  
Inst. of Physics, Academia Sinica, Taipei, Taiwan (Oct. 16, 20)  
Dept. of Physics, National Taiwan Normal University, Taipei, Taiwan (Aug. 31, 20)
-  **Why 3+1? From the Viewpoint of Dynamical Instability**  
Inst. of Physics, Academia Sinica, Taipei, Taiwan (Mar. 17, 21)  
Dept. of Physics, National Taiwan Normal University, Taipei, Taiwan (Dec. 22, 20)
- 2018  **On the Existence of Buchdahl’s Stability in EiBI Gravity**  
National Center for Theoretical Sciences, Hsinchu, Taiwan (Aug. 29, 18)


### Conferences


- 2023–24  **Gravothermal Phase Transition, Black Holes and Space Dimensionality**  
*International Symposium on Cosmology and Particle Astrophysics 2024 (CosPA 2024)*  
Ningbo University & Intercontinental Ningbo, Ningbo, China (Jun. 16, 24)
-  **Relativistic Bondi Accretion and the BEC Dark Matter Spike**  
*The 32nd Texas Symposium on Relativistic Astrophysics*  
Tsung-Dao Lee Institute & Everbright International Hotel, Shanghai, China (Dec. 12, 23)  
*The 32nd Workshop on General Relativity and Gravitation in Japan*  
(as the 23rd International Conference of Graduate School of Mathematics)  
Nagoya University, Nagoya, Japan (Nov. 30, 23)
-  **Seeding Supermassive Black Holes**  
*Pollica Summer Workshop on Self-Interacting Dark Matter: Models, Simulations and Signals*  
Pollica Physics Centre, Castello dei Principi Capano, Pollica, Italy (Jun. 20, 23)
-  **Supermassive Black Holes, Dark Matter, and the Relativistic Instability**  
*SoCal Grad Strings & Fields 2023*  
University of California, Los Angeles, California, USA (Mar. 25, 23)
- 2021–22  **Seeding Supermassive Black Holes with Self-interacting Dark Matter**  
*Theoretical Advanced Study Institute in Particle Theory (TASI) 2022*  
University of Colorado, Boulder, Colorado, USA (Jun. 13, 22)


## Presentations (continued)


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-  **Dynamical instability and the Space Dimensionality**  
*31st Midwest Relativity Meeting*  
University of Illinois, Urbana-Champaign, Illinois, USA (Nov. 13, 21)
-  **Seeding Supermassive Black Holes: A Unified Scenario with Baryons**  
*COSMOS'21 (hybrid)*  
University of Illinois, Urbana-Champaign, Illinois, USA (Aug. 03, 21)
- 2019–20


 **Seeding Supermassive Black Holes**  
*NCTS Dark Physics Workshop*  
National Center for Theoretical Sciences, Hsinchu, Taiwan (Jan. 09, 20)

 **Self-interacting Dark Matter and the Early Formation of Supermassive Black Hole**  
*NCTS annual theory meeting 2019: particle, cosmology and strings*  
National Center for Theoretical Sciences, Hsinchu, Taiwan (Dec. 13, 19)
- 2017–18

 **Buchdahl's stability bound in EiBI gravity**  
*The 5 th International Workshop on Dark Matter, Dark Energy and Matter-antimatter Asymmetry*  
Fo-Guang-Shan, Kaohsiung, Taiwan (Dec. 30, 18)  
*NCTS annual theory meeting 2018: particle, cosmology and stringy*  
National Center for Theoretical Sciences, Hsinchu, Taiwan (Dec. 18, 18)




 **On the existence of Buchdahl's stability bound in EiBI gravity**  
*Math Connections 2018*  
University of California, Riverside, California, USA (May 19, 18)
- 2014–15

 **EoS of Neutron Stars with Junction Condition Approach in the  $R^2$  Model**  
*Workshop on Dark Physics of the Universe*  
National Center for Theoretical Sciences, Hsinchu, Taiwan (Dec. 20, 15)

 **Modified Gravity on Neutron Star: Numerical Study**  
*7 th Joint NCTS/FGCPA-LeCosPA Meeting on Dark Energy*  
National Center for Theoretical Sciences, Hsinchu, Taiwan (May 28, 14)

## Skills

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| Languages |  Native Taiwanese, Chinese (Mandarin), Fluent English.                    |
| Programs  |  Python, Fortran, Mathematica, Gnuplot                                    |
| Misc.     |  Academic research, teaching, $\text{\LaTeX}$ typesetting and publishing. |

## References

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Available on Request