YIMING ZHONG

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PROFESSIONAL APPOINTMENTS

Kavli Institute for Cosmological Physics, University of Chicago 2019–
KICP Fellow

Research on primordial non-Gaussianities, particle dark matter, galactic dynamics, supermassive black holes, and the Galactic center gamma-ray excess.

Department of Physics, Boston University 2016–2019
Postdoctoral Associate

Research on experimental design for dark sector and dark matter searches, collider phenomenology, dark matter self-interactions and novel properties of dark matter halos.

Shanghai Institute of Technical Physics, Chinese Academy of Sciences 2007
Research Assistant

Simulating semiconductor-based infrared devices.

EDUCATION

C.N. Yang Institute for Theoretical Physics, Stony Brook University 2010–2016
Ph.D. Physics

Thesis title: "Searching for Dark Sectors", Advisor: Rouven Essig

Perimeter Institute for Theoretical Physics & University of Waterloo 2009–2010
M.S. Physics

Master project: The Tree-level Britto-Cachazo-Feng-Witten Recursion Relation, Advisor: David Skinner

Nankai University 2005-2009
B.S. Physics

Thesis title: Interferometer based on photonic crystal fiber

RESEARCH INTEREST

Astrophysics, cosmology, and their intersections with particle physics.

FELLOWSHIPS & AWARDS

2022 NSF China Excellent Young Scholars Overseas, NSF China

2019 KICP Fellowship, U. Chicago; Leinweber Research Fellowship, U. Michigan (declined); Distinguished Referee of the European Physical Journal

2016 Max Dresden Prize (Best Thesis Prize), Stony Brook University

2015 Rosaline and Milton Sterman Award, Stony Brook University; PITT PACC Travel Award, U. Pittsburgh; Sigma Xi Travel Prize, Stony Brook University

2014 Di Tian Prize, Stony Brook University

2013 Peter B. Kahn Fellowship, Stony Brook University

2009 Perimeter Scholars International Award, Perimeter Institute for Theoretical Physics

2007 National Scholarship, Ministry of Education of China

RESEARCH PAPERS [†] [ADS] [INSPIRE]

1. Samuel D. McDermott, Yi-Ming Zhong, and Ilias Cholis, "A Phantom Menace: On the Morphology of the Galactic Center Excess", submitted to *Phys. Rev. Lett.*, arXiv:2209.00006. (Authorship follows contribution order.)

2. Daniel Gilman, Yi-Ming Zhong, and Jo Bovy, "Constraining resonant dark matter self-interactions with strong gravitational lenses", submitted to *Phys. Rev. D*, arXiv:2207.13111. (Authorship follows contribution order.)

3. Henning Bahl, Wen Han Chiu, Christina Gao, Lian-Tao Wang, and Yi-Ming Zhong, "Tripling down on the W boson mass", *Eur. Phys. J. C* **82**, 944 (2022).

4. Manuel A. Buen-Abad, Rouven Essig, David McKeen, and Yi-Ming Zhong, "Cosmological Constraints on Dark Matter Interactions with Ordinary Matter", *Phys. Rep.* **961**, 1-35 (2022).

5. Wei-Xiang Feng, Hai-Bo Yu, and Yi-Ming Zhong, "Dynamical Instability of Collapsed Dark Matter Halos", *J. Cosmol. Astropart. Phys.* **05**, 036 (2022).

6. Ilias Cholis, Yi-Ming Zhong, Samuel D. McDermott, and Joseph P. Surdutovich*, "The Return of the Templates: Revisiting the Galactic Center Excess with Multi-Messenger Observations", *Phys. Rev. D* **105**, 103023 (2022). (Authorship follows contribution order.)

7. Lian-Tao Wang, Zhong-Zhi Xianyu, and Yi-Ming Zhong, "Precision Calculation of Inflation Correlators at One Loop", *J. High Energy Phys.* **02**, 085 (2022).

8. Wei-Xiang Feng, Hai-Bo Yu, and Yi-Ming Zhong, "Seeding Supermassive Black Holes with Self-interacting Dark Matter: A Unified Scenario with Baryons", *Astrophys. J. Lett.* **914**, L26 (2021).

9. Christina Gao, Jia Liu, Lian-Tao Wang, Xiao-Ping Wang, Wei Xue, and Yi-Ming Zhong, "Re-examining the Solar Axion Explanation for the XENON1T Excess", *Phys. Rev. Lett.* **125**, 131806 (2020).

10. Ran Huo, Hai-Bo Yu, and Yi-Ming Zhong, "The Structure of Dissipative Dark Matter Halos", *J. Cosmol. Astropart. Phys.* **06**, 051 (2020).

11. Yi-Ming Zhong, Samuel McDermott, Ilias Cholis, and Patrick Fox, "Testing the Sensitivity of the Galactic Center Excess to the Point Source Mask", *Phys. Rev. Lett.* **124**, 231103 (2020). (Authorship follows contribution order.)

[†]Author names are listed alphabetically (tradition in particle physics) unless specified.

12. Rouven Essig, Samuel McDermott, Hai-Bo Yu, and Yi-Ming Zhong, "Constraining Dissipative Dark Matter Self-Interactions", *Phys. Rev. Lett.* **123**, 121102 (2019).

13. Martin Schmaltz and Yi-Ming Zhong, "The Leptoquark Hunter's Guide: Large coupling", *J. High Energy Phys.* **01**, 132 (2019).

14. L. Marsicano, M. Battaglieri, A. Celentano, R. De Vita, and Yi-Ming Zhong, "Probing Leptophilic Dark Sectors at Electron Beam Dump Facilities", *Phys. Rev. D* **98**, 115022 (2018).

15. Chien-Yi Chen, Jonathan Kozaczuk, and Yi-Ming Zhong, "Exploring leptophilic dark matter with NA64-μ", *J. High Energy Phys.* **10**, 154 (2018).

16. Rouven Essig, Patrick Meade, Harikrishnan Ramani, and Yi-Ming Zhong, "Higgs-Precision Constraints on Colored Naturalness", *J. High Energy Phys.* **09**, 085 (2017).

17. Bastian Diaz, Martin Schmaltz, and Yi-Ming Zhong, "The leptoquark Hunter's guide: Pair production", *J. High Energy Phys.* **10**, 11 (2017).

18. Chien-Yi Chen, Maxim Pospelov, and Yi-Ming Zhong, "Muon Beam Experiments to Probe the Dark Sector", *Phys. Rev. D* **95**, 115005 (2017).

19. Chien-Yi Chen, Michel Lefebvre, Maxim Pospelov, and Yi-Ming Zhong, "Diphoton Excess through Dark Mediators", *J. High Energy Phys.* **07**, 063 (2016).

20. Chien-Yi Chen, Qi-Shu Yan, Xiaoran Zhao, Zhijie Zhao, and Yi-Ming Zhong, "Probing Triple-Higgs Productions via $4b2\gamma$ at a 100 TeV Hadron Collider", *Phys. Rev. D* **93**, 013007 (2015).

21. David Curtin, Rouven Essig, and Yi-Ming Zhong, "Uncovering Light Scalars with Exotic Higgs Decays to $b\bar{b}\mu^+\mu^-$", *J. High Energy Phys.* **06**, 025 (2015).

22. Bertrand Echenard, Rouven Essig, and Yi-Ming Zhong, "Projections for Dark Photon Searches at Mu3e", *J. High Energy Phys.* **01**, 113 (2014).

23. David Curtin, Rouven Essig, Stefania Gori, Prerit Jaiswal, Andrey Katz, Tao Liu, Zhen Liu, David McKeen, Jessie Shelton, Matthew Strassler, Ze'ev Surujon, Brock Tweedie, and Yi-Ming Zhong, "Exotic Decays of the 125 GeV Higgs Boson", *Phys. Rev. D* **90**, 075004 (2014). (Editor's suggestion)

24. Rouven Essig, Jeremy Mardon, Michele Papucci, Tomer Volansky, and Yi-Ming Zhong, "Constraining light dark matter with low-energy e^+e^- colliders", *J. High Energy Phys.* **11**, 167 (2013).

COMMUNITY WHITE-PAPER REPORTS & OTHER PUBLICATIONS

1. Snowmass 2021 Report: Daniel Green *et al*, "Snowmass Theory Frontier: Astrophysics and Cosmology", arXiv:2209.06854.; Philip Ilten *et al*, "Experiments and Facilities for Accelerator-Based Dark Sector Searches", arXiv:2206.04220.; Arka Banerjee *et al*, "Snowmass2021 Computational Frontier White Paper: Cosmological Simulations and Modeling", arXiv:2203.07347.; Rebecca K. Leane *et al*, "Snowmass2021 Cosmic Frontier White Paper: Puzzling Excesses in Dark Matter Searches and How to Resolve Them", arXiv:2203.06859.; John Arrington *et al*, "Physics Opportunities for the Fermilab Booster Replacement", arXiv:2203.03925.

2. Snowmass 2021 Letter of Interest:, "Cosmological Collider: Precision calculation and probes of new physics", "Novel Properties of Self-Interacting Dark Matter Halos", "Understanding the Galactic Center Gamma-Ray Excess","Rare muon decays and light new physics", "Photon-beam experiments and new light physics", Aug 2020.

3. Roberto Contino *et al*, "US Cosmic Visions: New Ideas in Dark Matter 2017: Community Report", arXiv:1707.04591.

4. J. Alexander *et al*, "Dark Sectors 2016 Workshop: Community Report", arXiv:1608.08632.

5. M. Cepeda *et al*, "Higgs Physics at the HL-LHC and HE-LHC", *CERN Yellow Rep.* **7**, 221-584 (2019).

6. A. Abada *et al*, "FCC Physics Opportunities", *Eur. Phys. J. C* **79**, 6 (2019). A. Abada *et al*, "FCC-ee: The Lepton Collider", "FCC-hh: The Hadron Collider", "HE-LHC: The High-Energy Large Hadron Collider", *Eur. Phys. J. Spec. Top.* **228**, 2, 4, 5 (2019). Roberto Contino *et al*, "Physics at the FCC-hh, a 100 TeV *pp* collider: Higgs and EW symmetry breaking studies", *CERN Yellow Rep.* **3**, 225-440 (2017).

7. The CEPC Study Group, "CEPC Conceptual Design Report", arXiv:1811.10545.

INVITED SEMINARS

1. Nov 2022, University of Oxford, Oxford, UK
2. Nov 2022, King's College London, London, UK
3. Oct 2022, Hong Kong University of Science and Technology, Hong Kong, China
4. Oct 2022, Chinese University of Hong Kong, Hong Kong, China
5. Oct 2022, City University of Hong Kong, Hong Kong, China
6. Jun 2022, City University of Hong Kong, Hong Kong, China (remote)
7. May 2022, University of Cincinnati, OH, USA (remote)
8. Apr 2022, University of Illinois Urbana-Champaign, IL, USA
9. Apr 2022, Fudan University, Shanghai, China (remote)
10. Mar 2022, University of California Riverside, IL, USA
11. Mar 2022, Carnegie Observatories, CA, USA
12. Mar 2022, California Institute of Technology, CA, USA
13. Mar 2022, Tsinghua University, Beijing, China (remote)
14. Feb 2022, Fudan University, Shanghai, China (remote)
15. Nov 2021, University of Wisconsin–Madison, WI, USA
16. Nov 2021, University of Florida, FL, USA (remote)

17. Oct 2021, Argonne National Laboratory, IL, USA (remote)
18. Apr 2021, University of Notre Dame, IN, USA (remote)
19. Mar 2021, Carleton University, ON, Canada (remote)
20. Mar 2021, Brown University, RI, USA (remote)
21. Dec 2020, Peking University, Beijing, China (remote)
22. Nov 2020, University of Minnesota, MN, USA (remote)
23. Oct 2020, Nankai University, Tianjin, China (remote)
24. Jun 2020, Perimeter Institute for Theoretical Physics, ON, Canada (remote)
25. Mar 2020, Fermi National Accelerator Laboratory, IL, USA (remote)
26. Mar 2020, Argonne National Laboratory, IL, USA (cancelled)
27. Nov 2019, Cornell University, NY, USA
28. Oct 2019, University of Cincinnati, OH, USA
29. Apr 2019, Center for Theoretical Physics of the Universe, Institute for Basic Science, Daejeon, South Korea
30. Apr 2019, Seoul National University, Seoul, South Korea
31. Apr 2019, Zhejiang University, Hangzhou, China
32. Nov 2018, Johns Hopkins University, MD, USA
33. Nov 2018, University of Maryland, MD, USA
34. Oct 2018, Lawrence Berkeley National Laboratory, CA, USA
35. Oct 2018, University of California Davis, CA, USA
36. Sep 2018, Harvard University, MA, USA
37. Feb 2018, University of Massachusetts at Amherst, MA, USA
38. Jan 2018, T.D. Lee Institute, Shanghai Jiaotong University, Shanghai, China
39. Dec 2017, Tsinghua University, Beijing, China
40. Dec 2017, Institute of High Energy Physics, Chinese Academy of Sciences, Beijing, China
41. Mar 2017, Massachusetts Institute of Technology, MA, USA
42. Jun 2016, University of California Riverside, CA, USA
43. Jun 2016, SLAC National Accelerator Laboratory, CA, USA
44. Apr 2016, Boston University, MA, USA
45. Nov 2015, Perimeter Institute for Theoretical Physics, ON, Canada

INVITED TALKS AT INTERNATIONAL CONFERENCES

1. Sep 2022, ICTP-SAIFR Program on New Directions in Particle Physics, São Paulo, Brazil (declined)
2. Mar 2022, New Methods and Ideas at the Frontiers of Particle Physics (Winter Aspen 2022), Aspen, CO, USA
3. Jul 2021, Dark Matter from the Laboratory to the Cosmos, Aspen, CO, USA
4. Jun 2021, Discovering the New Physics of $g-2$ with Fixed Target Muon Facilities at Fermilab, Batavia, IL, USA (remote)
5. Mar 2021, The 1st Workshop on New Light Physics and Photon-beam Experiments, Newport News, VA, USA (remote)
6. Mar 2020, Prospecting for New Physics through Flavor, Dark Matter and Machine Learning (Winter Aspen 2020), Aspen, CO, USA (cancelled)
7. Feb 2020, Lighting new Lampposts for Dark Matter and Beyond the Standard Model, Stony Brook, NY, USA
8. Jun 2019, Indirect Searches for New Physics across the Scale, Mainz, Germany
9. Apr 2019, Korea Physical Society Spring Meeting, Daejeon, South Korea
10. Apr 2019, Workshop on the Circular Electron-Positron Collider, EU Edition 2019, Oxford, UK (declined)
11. Oct 2018, Implication Workshop 2018, Geneva, Switzerland (declined)
12. Oct 2018, The 2018 International Workshop on Future Linear Colliders, Arlington, TX, USA (declined)
13. Sep 2018, 10th International Workshop on The CKM Unitarity Triangle (CKM 2018), Heidelberg, Germany
14. Aug 2018, The Flavor of New Physics in Collisions, Aspen, CO, USA
15. May 2018, The Small-scale Structure of Cold(?) Dark Matter, Santa Barbara, CA, USA
16. Jan 2018, The 2nd Future Circular Collider Workshop, Geneva, Switzerland
17. Jan 2018, High Energy Program 2018, Hong Kong, China
18. Mar 2017, U.S. Cosmic Visions: New Ideas in Dark Matter, College Park, MD, USA
19. May 2016, Belle II Theory Interface Platform Workshop, Pittsburgh, PA, USA
20. Apr 2016, Dark Sector Workshop, Menlo Park, CA, USA
21. Mar 2015, LHC Higgs Cross Section Working Group 3 (WG3): Exotic Higgs Decays Kick-off Meeting, Geneva, Switzerland (remote)

OTHER TALKS AT INTERNATIONAL CONFERENCES

1. Nov 2022, ICTP-SAIFR Workshop on the Nature of Dark Matter, São Paulo, Brazil (declined)
2. May 2022, Phenomenology 2022 Symposium, Pittsburgh, PA, USA
3. Dec 2021, Dark Sectors and Astroparticle Physics: Axions, Neutrinos, Black Holes and Gravitational Waves, Tokyo, Japan (remote)
4. Dec 2021, The 11th Meeting for Phenomenology in Illinois, Kentucky, Indiana, Michigan, and Ohio (PIKIMO 11), Pittsburgh, PA, USA (remote)
5. Nov 2021, Brookhaven Forum 2021, Upton, NY, USA (remote)
6. Aug 2021, The 24th International Conference on Particle Physics and Cosmology, Champaign, IL, USA (remote)
7. May 2021, Workshop on Potential Fermilab Muon Campus and Storage Ring Experiments, Batavia, IL, USA (remote)
8. Jul 2019, Meeting of the American Physical Society Division of Particles and Fields, Boston, MA, USA
9. Sep 2018, DESY Theory Workshop: Particle Physics Challenges, Hamburg, Germany
10. Mar 2017, Beyond WIMPs: from Theory to Detection, Stony Brook, NY, USA
11. Aug 2015, Brookhaven Forum 2015, Upton, NY, USA
12. May 2015, Phenomenology 2015 Symposium, Pittsburgh, PA, USA
13. Apr 2015, American Physical Society April Meeting, Baltimore, MD, USA
14. Jun 2014, Action at a Distance, Waterloo, ON, Canada (remote)
15. May 2014, Phenomenology 2014 Symposium, Pittsburgh, PA, USA
16. Oct 2013, Dark Matter Paradigm, Princeton, NJ, USA
17. May 2013, Brookhaven Forum 2013, Upton, NY, USA

SERVICE TO PROFESSION

Organizer for Jefferson Lab workshop, "1st Workshop on New Light Physics and Photon-beam Experiments", Mar 2021

Convener for SLAC workshop, "Exotic Higgs Decays Meeting", Nov 2016; "Phenomenology 2022 Symposium", May 2022.

Referee for *Physical Review D*, *Journal of Cosmology and Astroparticle Physics*, *Journal of High Energy Physics*, *Nuclear Physics B*, *Physics Letters B*, and *European Physical Journal C*.

Contributor for multiple Letters of Interest of Snowmass 2021, the Conceptional Design Reports of the CEPC and FCC.

Co-orgnizer of the theory seminar and journal club at BU (2017–2019), the joint postdoc lunch journal club at BU, Harvard, and MIT (2016–2019), the KICP seminar (2019–2020), and the particle cosmology journal club at the UChicago (2019–2022).

TEACHING AND MENTORING EXPERIENCE

Teaching Assistant

Responsibilities included grading, supervising group discussions and laboratories, holding office hours, and developing assignments and exams

- Theoretical Particle Physics, Fall 2015, Stony Brook University
- Classical Physics C, 2011–2012, Stony Brook University

Tutorial

"Hands on start to MadGraph" at JLab's 1st Workshop on New Light Physics and Photon-beam Experiments, Mar 2021

Mentoring Experience

Yunjia Bao (graduate student at UChicago), since 2022, 1 paper in preparation.
Wei-Xiang Feng (graduate student at UC Riverside), since 2019, 2 papers, 1 papers in preparation.

COMMUNITY INVOLVEMENT & OUTREACH

Chinese Translator of the popular science book

- "*Time reborn: From the Crisis in Physics to the Future of the Universe*", Zhejiang People's Publishing House, 2017.
- "*The Greatest Story Ever Told—So Far: Why Are We Here?*", Zhejiang People's Publishing House, 2019.
- "*The Theoretical Minimum: What You Need to Know to Start Doing Physics*", (to be published).

The published books received 100+ reviews on douban.com, a book review website.

Participant of the KICP Lifelong Learning Outreach Program, since 2019, public talks to older adults at Conard Sulzer Public Library, Chicago Cultural Center, and Chicago Department of Family and Support Services (remote).

MEDIA COVERAGE

UChicago News on the work of first supermassive black holes and self-interacting dark matter.

Phys.org on the work of the Galactic center excess.

Live Science on the works of leptoquark.