

# Christina (Yang) Gao

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## PROFESSIONAL EXPERIENCE

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### University of Illinois Urbana-Champaign & Fermi National Accelerator Laboratory

Nov 2021–

Postdoctoral Associate

Quantum technology's application in particle physics; Machine learning; Compact astrophysical objects;  
Collider phenomenology

### Fermi National Accelerator Laboratory

2018–2021

Research Associate

Quantum technology's application in particle physics; Machine learning; Compact astrophysical objects;  
Collider phenomenology

### Oxford University

2010–2011

Research Assistant

Bulge-disk relationship for nearby galaxies

## EDUCATION

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### University of California Davis

2012–2018

Ph.D. Physics

Thesis: "Topics in Particle Phenomenology at LHC"

### Oxford University

2008–2012

Master of Physics (combined bachelor's and master's programs)

Thesis topic: String phenomenology

## RESEARCH INTEREST

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Using quantum sensing to look for dark matter and other new particles. Machine learning's application in high-energy physics. Compact astrophysical objects.

## PUBLICATIONS [\[INSPIRE\]](#)<sup>1</sup>

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1. [Christina Gao](#), William Halperin, Yonatan Kahn, Man Nguyen, Jan Schütte-Engel, and John William Scott, "[Axion wind detection with the homogeneous precession domain of superfluid helium-3](#)", *Phys. Rev. Lett.* **129**, 211801 (2022).

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<sup>1</sup>Author names are listed alphabetically according to the tradition in particle physics.

2. 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).
3. A. J. Brady, [C. Gao](#), R. Harnik, Z. Liu, Z. Zhang and Q. Zhuang, “[Entangled sensor-networks for dark-matter axion searches](#)”, *Phys. Rev. X Quantum* **3**, 030333 (2022).
4. [Christina Gao](#) and Albert Stebbins, “[Structure of Stellar Remnants with Coupling to a Light Scalar](#)”, *J. Cosmol. Astropart. Phys.* **07**, 025 (2022).
5. [Christina Gao](#) and Roni Harnik, “[Axion Searches with Two Superconducting Radio-frequency Cavities](#)”, *J. High Energy Phys.* **07**, 053 (2021).
6. [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).
7. [Christina Gao](#), Stefan Hoeche, Joshua Isaacson, Claudius Krause and Holger Schulz, “[Event Generation with Normalizing Flows](#)”, *Phys. Rev. D* **101**, 076002 (2020).
8. [Christina Gao](#), Joshua Isaacson and Claudius Krause, “[i-flow: High-dimensional Integration and Sampling with Normalizing Flows](#)”, *Mach. Learn.: Sci. Technol.* **1**, 4 (2020).
9. [Christina Gao](#) and Nicolas A. Neill, “[Probing exotic triple Higgs couplings at the LHC](#)”, *J. High Energy Phys.* **05**, 087 (2020).
10. [Christina Gao](#), Ali S. Shirazi and John Terning, “[Collider Phenomenology of a Gluino Continuum](#)”, *J. High Energy Phys.* **01**, 102 (2020).
11. [Christina Gao](#), Markus A. Luty and Nicolas A. Neill, “[Almost Inert Higgs Bosons at the LHC](#)”, *J. High Energy Phys.* **09**, 043 (2019).
12. Hsin-Chia Cheng, [Christina Gao](#) and Lingfeng Li, “[Compressed Stop Searches with two Leptons and two b-jets](#)”, *J. Phys. G: Nucl. Part. Phys.* **46**, 035004 (2019).
13. [Christina Gao](#), Markus A. Luty, Michael. Mulhearn, Nicolas A. Neill, and Zhangqier Wang, “[Searching for Additional Higgs Bosons via Higgs Cascades](#)”, *Phys. Rev. D* **97**, 075040 (2018).
14. Hsin-Chia Cheng, [Christina Gao](#) and Lingfeng Li, “[Stop Search in the Compressed Region via Semileptonic Decays](#)”, *J. High Energy Phys.* **05**, 036 (2016).

## OTHER PUBLICATIONS

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1. A. Berlin et al (Christina Gao included), “[Searches for New Particles, Dark Matter, and Gravitational Waves with SRF Cavities](#)”, submitted to *Snowmass 2021 white paper*, Mar 2022.
2. [Christina Gao](#), Y.-Y. Li and L.-T. Wang, “[Testing Top Yukawa Form Factor](#)”, submitted to *Snowmass 2021 Letter of Interest*, Aug 2020.

## PUBLICATIONS IN PREPARATION

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1. Nikita Blinov, [Christina Gao](#), Roni Harnik, Ryan Janish, and Neil Sinclair, “Axion Searches on a Chip”.
2. Nikita Blinov, [Christina Gao](#), Roni Harnik, Ryan Janish, and Neil Sinclair, “Light Dark Matter Searches with Nonlinear Optics”.
3. [Christina Gao](#) and Albert Stebbins, “White Dwarf Structure in the Presence of a Leptophilic Scalar”.

## SEMINARS

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1. Boston University, Boston, MA, USA, Nov 2022
2. Massachusetts Institute for Technology, Cambridge, MA, USA, Nov 2022
3. Johns Hopkins University, Baltimore, MD, USA, Nov 2022
4. University of Michigan, Ann Arbor, MI, USA, Nov 2022
5. University of Wisconsin-Madison, Madison, WI, USA, Oct 2022
6. Chinese University of Hong Kong, Hong Kong, China, Oct 2022
7. Hong Kong University of Science and Technology, Hong Kong, China, Oct 2022
8. City University of Hong Kong, Hong Kong, China, Oct 2022
9. University of Illinois at Urbana-Champaign, IL, USA, Sep 2022
10. Institute of Theoretical Physics, Chinese Academy of Sciences, Beijing, China, Apr 2022 (remote)
11. Fudan University, Shanghai, China, Apr 2022 (remote)
12. Tsinghua University, Beijing, China, Mar 2022 (remote)
13. University of Toronto, ON, Canada, Mar 2022 (remote)
14. Stanford University, CA, USA, Feb 2022 (remote)
15. University of Utah, UT, USA, Dec 2021
16. University of Illinois at Urbana-Champaign, IL, USA, Oct 2021
17. SLAC National Accelerator Laboratory, CA, USA, Jun 2021 (remote)
18. University of Notre Dame, IN, USA, Apr 2021 (remote)
19. University of Wisconsin Madison, WI, USA, Mar 2021 (remote)
20. University of Massachusetts Amherst, MA, USA, Feb 2021 (remote)
21. Kavli Institute for Cosmological Physics, University of Chicago, IL, USA, Dec 2020 (remote)
22. BSM PANDEMIC Seminars, New York, NY, USA, Sep 2020 (remote)
23. Brookhaven National Laboratory, NY, USA, Feb 2020

## CONFERENCE TALKS

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1. Light Dark World International Forum, Daejeon, Korea, Dec 2022 (invited, remote)
2. SPIE Photonics West Conference, San Francisco, USA, Jan 2023 (invited)
3. ICTP-SAIFR Program on New Directions in Particle Physics, São Paulo, Brazil, Sep 2022 (invited)
4. Phenomenology 2022 Symposium, Pittsburg, PA, USA, May 2022
5. The 12th Meeting for Phenomenology in Illinois, Kentucky, Indiana, Michigan, and Ohio (PIKIMO 12), Notre Dame, IN, USA, Apr 2022 (invited)
6. New Methods and Ideas at the Frontiers of Particle Physics, Aspen, CO, USA, Mar 2022 (invited)
7. Cambridge High Energy Workshop 2021–Axion Physics, Cambridge, MA, USA, Jul 2021 (invited, remote)
8. Dark Matter from the Laboratory to the Cosmos, Aspen, CO, USA, Jul 2021 (invited)
9. New Physics from Precision at High Energies, Santa Barbara, CA, USA, May 2021 (invited, remote)
10. ML4Jets 2020, New York, NY, USA, Jan 2020 (invited)
11. Phenomenology 2019 Symposium, Pittsburg, PA, USA, May 2019

## TEACHING EXPERIENCE

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- 2016–2018: Instructor of **Electricity and Magnetism**  
University of California Davis
- 2012–2015: Teaching Assistant of **undergraduate and graduate level physics classes**  
University of California Davis

## PROFESSIONAL SERVICE

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- **Organizer** for Fermilab Theoretical Physics Seminar, 2019–2020
- **Convener** for Fermilab workshop, “[Topics in Cosmic Neutrino Physics](#)”, Oct 2019; “[Pheno 2022](#)”, May 2022.
- **Referee** for *Physical Review Letter*, *Physical Review D*, *Journal of High Energy Physics*, and *SciPost Physics*.

## **OUTREACH & DIVERSITY ACTIVITIES**

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- Participant of the [QuarkNet Summer Research Program at Fermilab](#) (summer research internship for U.S. high school students).
- Participant of the [Fermilab TARGET Program](#) (summer research internship for Illinois high school students).
- Participant of the [STEM For Girls Program at UC Davis](#).