

# VICTORIA XU

## Assistant Professor @ Berkeley Physics

📍 Birge Hall, University of California, Berkeley, CA 94720

✉ [vax@berkeley.edu](mailto:vax@berkeley.edu) 🏛 [Berkeley Physics](#) ⚙ [Quantum Interferometry Lab](#)

Interested in precision metrology, quantum technologies, and fundamental science. Experience includes laser interferometry, atom interferometry, quantum optics, and cold atoms, for precision tests of fundamental physics and gravitational-wave detection.

## 🏛 EDUCATION

Dec. 2020	Ph.D., Physics ‣ Thesis: <i>Lattice atom interferometry in an optical cavity</i> ‣ Thesis advisor: Professor Holger Müller	University of California, Berkeley, CA
May 2017	M.A., Physics	University of California, Berkeley, CA
Dec. 2013	B.S., Physics	University of California, Santa Barbara, CA

## 🔧 PROFESSIONAL EXPERIENCE

Present - January 2025	Assistant Professor of Physics ‣ 10-fold quantum enhancement for gravitational-wave detectors (LIGO Scientific Collaboration) ‣ Strongly-coupled trapped atom interferometry <a href="#">quantum interferometry</a> <a href="#">gravitational-wave detection</a> <a href="#">quantum optics and technology</a> <a href="#">precision metrology</a>	University of California, Berkeley, CA
Dec. 2024 - July 2021	Postdoctoral Associate, MIT-LIGO Laboratory Supervisors: Dean Nergis Mavalvala, Dr. Peter Fritschel, Dr. Lisa Barsotti, Dr. Daniel Sigg, Dr. Sheila Dwyer <a href="#">laser interferometry</a> <a href="#">gravitational-wave detection</a> <a href="#">quantum optics</a> <a href="#">astrophysics instrumentation</a> <a href="#">precision metrology</a>	MIT Kavli Institute, Cambridge, MA
Dec. 2020 - March 2016	Graduate Student Researcher, Müller Group Thesis Advisor: Professor Holger Müller <a href="#">atom interferometry</a> <a href="#">atomic physics</a> <a href="#">quantum sensing and gravimetry</a> <a href="#">tests of new physics</a> <a href="#">precision metrology</a>	University of California, Berkeley, CA

## ★ HONORS AND AWARDS

2023	<b>Hänsch Prize in Quantum Optics</b> , Optica Foundation, inaugural recipient “for her contributions in using quantum optics to fundamentally improve metrology through large-scale interferometers and advance gravitational wave detection.”
2023	<b>Rising Stars in Physics</b> , UC Berkeley Physics
2022	<b>Quantum Creators Prize</b> , University of Chicago, Chicago Quantum Exchange
2021	<b>Finalist</b> , APS Division of Laser Science Dissertation Award
2019	<b>Poster Prize Winner</b> , 2019 International Conference on Laser Spectroscopy (ICOLS), Queenstown, NZ
2019	<b>Lars Commins Memorial Award for Experimental Physics</b> , UC Berkeley Physics Annual department award to an outstanding graduate student(s) in experimental physics.
2016-2017	<b>Berkeley Connect Fellowship</b> , UC Berkeley “Competitive research fellowship with a service component...Fellows are graduate students with exceptional teaching records and mentoring experience, as well as demonstrated research progress.”
2014	<b>DOE-INFN Fellowship</b> , Sapienza University of Rome, ATLAS Collaboration
2014	<b>DOE-SULI Fellowship</b> , Lawrence Berkeley National Lab, ATLAS Collaboration
2013	<b>NSF Research Experience for Undergraduates (REU)</b> , UC Berkeley, Quantum Nanoelectronics Lab
2011-2013	<b>UC Santa Barbara</b> , Physics Dept. Research Awards, L&S College Honors, Dean’s Honors
2011	<b>California Space Grant</b> , UC Santa Barbara

## 📖 COURSES TAUGHT

- **Physics 111B: Experimentation Lab** – Capstone experimental physics lab. Spring 2026
- **Physics 111A: Instrumentation Lab** – Upper-division analog and digital electronics lab. Spring 2025, Summer 2025, Fall 2025

(BELOW EXCLUDES COLLABORATION PAPERS AS A MEMBER OF THE LIGO SCIENTIFIC COLLABORATION AND THE LIGO DETECTOR COLLABORATION)

10. E. Capote<sup>†,\*</sup>, W. Jia<sup>†</sup>, N. Aritomi<sup>†</sup>, M. Nakano<sup>†</sup>, **V. Xu<sup>†</sup>**, and LIGO instrument scientists, “Advanced LIGO detector performance in the fourth observing run,” LIGO-P2400256, *Phys. Rev. D* **111**, 062002 (2025)
9. W. Jia<sup>\*</sup>, **V. Xu<sup>\*</sup>**, K. Kuns, M. Nakano, L. Barsotti, M. Evans, N. Mavalvala, and LIGO instrument scientists, “Squeezing the quantum noise of a gravitational-wave detector below the standard quantum limit,” *Science* **385**, 1318-1321 (2024)
  - > “We’ve just doubled the number of gravitational waves we can find,” *New Scientist*, September 19, 2024
8. C. D. Panda, M. Tao, J. Egelhoff, M. Ceja, **V. Xu**, and H. Müller, “Coherence limits in lattice atom interferometry at the one-minute scale,” *Nature Physics*, **20**, 1234–1239 (2024)
7. D. Ganapathy<sup>†</sup>, W. Jia<sup>†</sup>, M. Nakano<sup>†</sup>, **V. Xu<sup>†</sup>**, N. Aritomi, T. Cullen, N. Kijbunchoo, S. E. Dwyer, A. Mullavey, L. McCuller, L. Barsotti, and LIGO instrument scientists, “Broadband quantum enhancement of the LIGO detectors with frequency-dependent squeezing,” *Phys. Rev. X* **13**, 041021 (2023) *\*Featured in Physics*
  - > “LIGO Surpasses the Quantum Limit,” *Caltech & MIT News + others* (2023)
  - > “Quieting Noise in Gravitational-Wave Detectors,” M. Rini, *Physics* **16**, 189 (2023)
  - > “Frequency-dependent squeezing pushes LIGO sensitivity to new records” J. Miller, *Physics Today* **77**, 1, 13-16 (2024)
6. D. Ganapathy, **V. Xu**, W. Jia, C. Whittle, M. Tse, L. Barsotti, M. Evans, L. McCuller, “Probing squeezing for gravitational-wave detectors with an audio-band field,” *Phys. Rev. D* **105**, 122005 (2022)
5. S. L. Kristensen, M. Jaffe, **V. Xu**, C. D. Panda, and H. Müller, “Raman transitions driven by phase-modulated light in a cavity atom interferometer,” *Phys. Rev. A* **103**, 023715 (2021) *\*Editor’s Suggestion*
4. **V. Xu<sup>\*</sup>**, M. Jaffe, C. D. Panda, S. L. Kristensen, L. W. Clark, and H. Müller<sup>\*</sup>, “Probing gravity by holding atoms for 20 seconds,” *Science* **366**, 745-749 (2019)
  - > “2019 Top 10 Breakthroughs of the Year,” *Physics World*
  - > “Hold my gravimeter,” A. Taroni, *Nature Physics* **15**, 1210 (2019)
  - > “A powerful interferometer works by holding, not dropping, its atoms,” R. M. Wilson, *Physics Today* **73**, 1, 14 (2020)
3. M. Jaffe, **V. Xu**, P. Haslinger, H. Müller, and P. Hamilton, “Efficient adiabatic spin-dependent kicks in an atom interferometer,” *Phys. Rev. Lett.* **121**, 040402 (2018)
2. P. Haslinger<sup>†</sup>, M. Jaffe<sup>†</sup>, **V. Xu**, O. Schwartz, M. Sonnleitner, M. Ritsch-Marte, H. Ritsch, and H. Müller, “Attractive force on atoms due to blackbody radiation,” *Nature Physics* **14**, 257-260 (2018)
  - > “Hot bodies are attractive,” R. Sanders, *UC Berkeley News*, December 8, 2017
1. M. Jaffe<sup>†</sup>, P. Haslinger<sup>†</sup>, **V. Xu**, P. Hamilton, A. Upadhye, B. Elder, J. Khoury, and H. Müller, “Testing sub-gravitational forces on atoms from a miniature, in-vacuum source mass,” *Nature Physics* **13**, 938-942 (2017)

## INVITED TALKS (SELECTED)

40+ invited talks (including colloquia, symposiums, seminars, workshops, summer schools, conferences, and outreach), including:

- > *Quantum optics and interferometry* 8/2025  
Invited lecturer, Summer School on Quantum Sensing and Precision Physics, John Hopkins University, Baltimore, MD
- > *Broadband quantum enhancement of the LIGO detectors with frequency-dependent squeezing* 3/2025  
Invited Symposium speaker, 2025 APS Global Physics Summit, Anaheim, CA
- > *Advancing the quantum limit of gravitational-wave detectors* 6/2024  
Invited talk and panel discussion, DAWN-VII Conference, University of British Columbia, Vancouver, Canada
- > *At the quantum limit of gravitational-wave detection* 9/2023  
Thorlabs Webinar (virtual)
- > *Probing gravity by levitating atoms for 20 seconds* 3/2021  
CSU East Bay Spitzer Memorial Lecture (virtual)
- > *Lattice atom interferometry in an optical cavity* 6/2019  
Gordon Research Conference on Atomic Physics, Newport, RI
- > *Cavity matter-wave interferometry: Inertial effects of blackbody radiation* 3/2017  
52nd Rencontres de Moriond, Gravitation Session, La Thuile, Italy