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Education

- 2009 Ph.D., Physics, Georgia Institute of Technology, USA (Advisor: Alex Kuzmich)
- 2005 M.Sc., Physics, Georgia Institute of Technology, USA
- 2002 B.Sc., Physics, National Tsing Hua University, Taiwan

Employment

- Aug 2023 – Associate Professor, Department of Physics, National Taiwan University
- Sep 2022 – Jul 2023 Associate Professor with tenure, School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore
- Jan 2023 – May 2023 Assistant Chair of School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore
- Sep 2013 – Aug 2022 Nanyang Assistant Professor, School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore
- Jan 2009 – Jul 2013 Postdoctoral Scholar, University of California at Berkeley, USA
Mentor: Holger Müller
- Aug 2002 – Jun 2003 Research Assistant, National Synchrotron Radiation Research Center, Taiwan

Research

I am an experimentalist interested in quantum sensing, quantum communication, atomic, molecular, and optical physics, and quantum optics. Current research topics include:

- Ultra-cold atoms in hollow-core fiber platforms for quantum sensing and quantum information
- Atom optics and atom interferometry in optical lattices for quantum sensing and precision measurement
- Motion sensing using quantum interference in thermal atomic vapor using electromagnetically-induced-transparency

Awards

- National Research Foundation Fellowship, Singapore (2013)
Most prestigious annual award for early-career scientists for all fields.
- School of Physical and Mathematical Sciences, Nanyang Technological University, Young Researcher Award, Singapore (2018)
Annual award for one young researcher in Physics in Nanyang Technological University

Research Grants

- Over S\$ 8 million (~ US \$ 6 million) in competitive grant funding as a PI since 2013 (National Research Foundation Fellowship, National Research Foundation Quantum Engineering, Ministry of Education Tier 2, and Ministry of Education Tier 1)
- Over S\$ 10 million (~ US \$ 7.5 million) in competitive grant funding as a Co-I since 2013 (National Research Foundation Quantum Engineering and National Research Foundation Competitive Research Programme)

Publications

Journal papers

1. Jianing Li, Kelvin Lim, Swarup Das, Thomas Zanon-Willette, Chen-Hao Feng, Paul Robert, Andrea Bertoldi, Philippe Bouyer, Chang Chi Kwong, [Shau-Yu Lan](#), David Wilkowski. Bi-color atomic beam slower and magnetic field compensation for ultracold gases. *AVS Quantum Science* **4**, 046801 (2022).
2. Yu Wang, Shijie Chai, Thomas Billotte, Zilong Chen, Mingjie Xin, Wui Seng Leong, Foued Amrani, Benoit Debord, Fetah Benabid, and [Shau-Yu Lan](#). Enhancing fiber atom interferometer by in-fiber laser cooling. *Phys. Rev. Research* **4**, L022058 (2022).
3. Mingjie Xin, Wui Seng Leong, Zilong Chen, Yu Wang, and [Shau-Yu Lan](#). Rapid quantum squeezing by jumping harmonic oscillator's frequency. *Phys. Rev. Lett.* **127**, 183602 (2021).
4. Chang Huang, Shijie Chai, and [Shau-Yu Lan](#) (2021). Dark-state sideband cooling in an atomic ensemble. *Phys. Rev. A* **103**, 013305.
5. Wui Seng Leong, Mingjie Xin, Zilong Chen, Shijie Chai, Yu Wang, and [Shau-Yu Lan](#) (2020). Large array of Schrödinger cat states facilitated by an optical waveguide. *Nat Commun* **11**, 5295.
6. Pei-Chen Kuan, Chang Huang, and [Shau-Yu Lan](#) (2020). Probing Bloch oscillations using a slow-light sensor. *Advanced Optical Technologies* **9**, 5, pp. 243-246.
7. Wui Seng Leong, Mingjie Xin, Chang Huang, Zilong Chen, and [Shau-Yu Lan](#) (2020). Long Light Storage Time in an Optical Fiber. *Phys. Rev. Research* **2**, 033320.
8. Yu Wang, Shijie Chai, Mingjie Xin, Wui Seng Leong, Zilong Chen, [Shau-Yu Lan](#) (2020). Loading Dynamics of Cold Atoms into a Hollow-Core Photonic Crystal Fiber. *Fibers* **8**, 28.
9. Zilong Chen, Hong Ming Lim, Chang Huang, Rainer Dumke, and [Shau-Yu Lan](#) (2020). Quantum-enhanced velocimetry with Doppler-broadened atomic vapor. *Phys. Rev. Lett.* **124**, 093202.
10. Mingjie Xin, Wui Seng Leong, Zilong Chen, and [Shau-Yu Lan](#) (2019). Transporting long-lived quantum spin coherence in a photonic crystal fiber. *Phys. Rev. Lett.*, **122**, 163901.
11. Chang Huang, Pei-Chen Kuan, and [Shau-Yu Lan](#) (2018). Laser Cooling of ^{85}Rb Atoms to the Recoil Temperature Limit. *Phys. Rev. A* **97**, 023403.
12. Mingjie Xin, Wui Seng Leong, Zilong Chen, and [Shau-Yu Lan](#) (2018). An atom interferometer inside a hollow-core photonic crystal fiber. *Sci. Adv.* **4**, e1701723.
13. Pei-Chen Kuan, Chang Huang, Wei Sheng Chan, Sandoko Kosen, and [Shau-Yu Lan](#) (2016). Large Fizeau's light-dragging effect in a moving electromagnetically induced transparent medium. *Nat Commun* **7**, 13030.

14. Brian Estey, Chenghui Yu, Holger Müller, Pei-Chen Kuan, and Shau-Yu Lan (2015). High-Resolution Atom Interferometers with Suppressed Diffraction Phases. *Phys. Rev. Lett.*, **115**, 083002.
15. Shau-Yu Lan, Pei-Chen Kuan, Brian Estey, Damon English, Justin Brown, Michael Hohensee, Holger Müller (2013). A clock directly linking time to a particle's mass. *Science*, **339**, 554.
16. Shau-Yu Lan, Pei-Chen Kuan, Brian Estey, Philipp Haslinger, and Holger Müller (2012). Influence of the Coriolis force in atom interferometry. *Phys. Rev. Lett.* **108**, 090402.
17. Michael A. Hohensee, Brian Estey, Francisco Monsalve, Geena Kim, Pei-Chen Kuan, Shau-Yu Lan, and Holger Müller (2011). Gravitational redshift, equivalence principle, and matter waves. *J. Phys.: Conf. Ser.* **264**, 012009.
18. M. Hohensee, S.-Y. Lan, R. Houtz, C. Chan, B. Estey, G. Kim, P.-C. Kuan and H. Müller (2011). Sources and technology for an atomic gravitational wave interferometric sensor. *Gen. Relativ. Gravit.* **43**, 1905.
19. S.-Y. Lan, A. G. Radnaev, O. A. Collins, D. N. Matsukevich, T. A. B. Kennedy and A. Kuzmich (2009). A multiplexed quantum memory. *Optics Express* **17**, 13639.
20. S.-Y. Lan, S. D. Jenkins, T. Chanelière, D. N. Matsukevich, C. J. Campbell, R. Zhao, T. A. B. Kennedy, and A. Kuzmich (2007). Dual species matter qubit entangled with light. *Phys. Rev. Lett.* **98**, 123602.
21. T. Chanelière, D. N. Matsukevich, S. D. Jenkins, S.-Y. Lan, R. Zhao, T.A.B. Kennedy, and A. Kuzmich (2007). Quantum interference of electromagnetic fields from remote quantum memories. *Phys. Rev. Lett.* **107**, 113602.
22. S. D. Jenkins, D. N. Matsukevich, T. Chaneliere, S.-Y. Lan, T. A. B. Kennedy, and A. Kuzmich (2007). Quantum telecommunication with atomic ensembles. *JOSA B* **24**, 316.
23. D. N. Matsukevich, T. Chaneliere, S. D. Jenkins, S.-Y. Lan, T.A.B. Kennedy, and A. Kuzmich (2006). Deterministic single photons via conditional quantum evolution. *Phys. Rev. Lett.* **97**, 013601.
24. D. Matsukevich, T. Chaneliere, S. D. Jenkins, S.-Y. Lan, T.A.B. Kennedy, and A. Kuzmich (2006). Entanglement of remote atomic qubits. *Phys. Rev. Lett.* **96**, 030405.
25. D. Matsukevich, T. Chaneliere, S. D. Jenkins, S.-Y. Lan, T.A.B. Kennedy, and A. Kuzmich (2006). Observation of dark-state polariton collapses and revivals. *Phys. Rev. Lett.* **96**, 033601.
26. T. Chanelière, D. N. Matsukevich, S. D. Jenkins, S.-Y. Lan, T.A.B. Kennedy, and A. Kuzmich (2005). Storage and retrieval of single photons transmitted between remote quantum memories. *Nature* **438**, 833.
27. D. N. Matsukevich, T. Chanelière, M. Bhattacharya, S.-Y. Lan, S. D. Jenkins, T.A.B. Kennedy, and A. Kuzmich (2005). Entanglement of a photon and a collective atomic excitation. *Phys. Rev. Lett.* **95**, 040405.

Book chapters

1. M. Hohensee, S.-Y. Lan, and H. Müller (2014). Atom interferometry. Editors of McGraw-Hill (editors), McGraw-Hill Yearbook of Science and Technology 2014 (McGraw-Hill Book Co, New York, 2013).

Intellectual Property

Technology disclosure filed

1. Title: A motional sensor based on light dragging effect in an electromagnetically induced transparent medium. TD#: 2016-196. Filed on 30-June-2016 and protected in the form of know-how.
2. Title: A motional sensor using compact room temperature atomic vapor cell. TD#: 2018-092. Filed on 17-May-2018 and protected in the form of know-how.

Invited Presentations

- International Conference on Squeezed States and Uncertainty Relations (ICSSUR), Taipei 2023
- SPIE, Photonics West, USA, February 2023
- 2023 Annual Meeting of the Physical Society of Taiwan
- 27th International Conference on Optical Fiber sensors (Workshops), USA, August 2022
- Asia-Pacific Workshop on Trapped Quantum Systems (APTQS 2022), Online, April 2022
- SPIE, Photonics West, Online, January 2022
- IEEE the 6th Optoelectronics Global Conference (OGC 2021), Online, September 2021
- SPIE, Photonics West, Online, March 2021
- STT46 Symposium "Emerging Trends of Quantum Technology", Online, October 2020
- Asia-Pacific Workshop on Trapped Quantum Systems (APTQS 2020), Online, October 2020
- SPIE, Photonics West, USA, February 2020
- XVI International Conference on Quantum Optics and Quantum Information, Minsk, Belarus, May 2019
- Asia-Pacific Workshop on Trapped Quantum Systems (APTQS 2019), Daejeon, Korea, February 2019
- SPIE, Photonics West, USA, February 2019
- Seminar, National Sun Yat-sen University, Kaohsiung, Taiwan, January 2019
- 13th IEEE International Conference on Nano/Micro Engineered and Molecular Systems (IEEE NEMS 2018), Singapore, April 2018
- 11th India-Singapore Joint Physics Symposium, NTU Singapore, March 2018
- SPIE, Photonics West, USA, February 2018
- XV International Conference on Quantum Optics and Quantum Information, Minsk, Belarus, November 2017
- Seminar, Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei, Taiwan, August 2017
- From a single particle to many-body quantum physics and its application workshop, Singapore, February 2017
- SPIE, Photonics West, USA, February 2017
- SUTD-MIT IDC Design Summit, SUTD Singapore, January 2017
- Seminar, the Hong Kong University of Science of Technology, Hong Kong, China, November 2016
- Tsing Hua-NTU workshop, Tsing Hua University, Beijing, China, September 2016

- Quantum Limits on Information Processing workshop, NTU Singapore, March 2016
- Joint IAS-ICTP School on Quantum Information Processing, NTU Singapore, January 2016
- Annual Meeting of PSROC 2016, Taiwan, January 2016
- 2015 AMO Summer School, Taiwan, August 2015.
- National Taiwan University, Taipei, Taiwan, January 2013
- Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei, Taiwan, January 2013
- National Tsing Hua University, Hsin Chu, Taiwan, January 2013
- National Cheng Kung University, Tainan, Taiwan, January 2013
- 43rd Meeting of Division of Atomic, Molecular and Optical Physics, Anaheim, USA, June 2012
- The University of Toronto, Toronto, Canada, August 2008
- National Institute of Standards Technology, Gaithersburg, USA, July 2008
- University of Mainz, Mainz, Germany, July 2008

Teaching

- PH2101 Electromagnetism (For second-year physics students; ~100 students)
- PH1011 Physics (For first-year engineering students; ~700 students)
- PH1802 Foundations of Physics II (For first-year physics students; ~40 students)
- PH2101 Quantum Mechanics I (For second-year physics students; ~40 students)
- PH2103 Thermal Physics (For second-year physics students; ~70 students)

Mentoring

- 7 Research Fellows, 5 Research Assistants, 5 Ph.D. Students, 9 Undergraduate Students

Academic Services

Committee

- CLEO program subcommittee 2019 to 2021
- SPIE Photonics West program subcommittee 2020 to now

Journal reviewer

Physical Review X, Physical Review Letters, Science Advances, Nature Review Physics, New Journals of Physics, Annals of Physics, Applied Science, Metrologia, Optics Letter, and Physics Letters A

Outreach

- Judge of Asian Science Camp, March 2014
- Judge of Singapore Science and Engineering Fair (SSEF), March 2014
- Guest lecture of Atomic, Molecular, and Optical Physics Summer School, Taiwan, August 2015
- Guest lecture of Joint Institute of Advanced Studies (IAS) and International Centre for Theoretical Physics (ICTP) School on Quantum Information Processing, NTU Singapore, January 2016
- Guest lecture of Singapore University of Technology and Design (SUTD) and Massachusetts Institute of Technology (MIT) International Design Centre (IDC) Design Summit, SUTD Singapore, January 2017