# LINYAN WAN

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## EMPLOYMENT

**Wilson Fellow** July 2023 - present
Fermilab, Batavia, IL, USA

**Postdoctoral Associate** May 2019 - July 2023
Department of Physics, Boston University, Boston, MA, USA

## EDUCATION

**Ph.D. in Experimental Particle Physics** Sep. 2013 - Jan. 2019
Department of Engineering Physics, Tsinghua University, Beijing, China

**B.S. in Engineering Physics** Sep. 2009 - Jul. 2013
Department of Engineering Physics, Tsinghua University, Beijing, China

## RESEARCH EXPERIENCE

**SBND experiment** Jul. 2023 - present

- Serving as the calibration group co-convener, leading the initial calibration campaign for SBND.
- Diagnostic measurement and monitoring for the LArTPC high-voltage system.
- Neutron reconstruction feasibility study.
- Booster Neutrino Beam neutrino flux constraint using thin target measurements.

**DUNE experiment** Jul. 2023 - present

- Sensitivity study for neutron-antineutron oscillation search.
- Neutrino-antineutrino separation for atmospheric neutrino oscillation analysis.

**Super-Kamiokande experiment** Dec. 2013 - present

- A novel search for boosted dark matter using recoil protons, yielding the world's most stringent limit on sub-GeV dark matter-hadron coupling.
- $n \to \bar{n}$ oscillation search, yielding the world's most stringent limit.
- DSNB search. Crucial contribution on neutron tagging development.
- Atmospheric neutrino oscillation analysis. Fundamental contributions on simulation, data selection, and systematic uncertainty constrain.
- Measurement of atmospheric neutrino NCQE cross-section.
- Solar neutrino energy reconstruction and calibration. Major contribution on PMT gain correction, quantum efficiency estimation, and multi-source calibration.
- Water quality calibration and monitoring with LEDs.
- Outer detector high voltage maintenance.

**T2K experiment** Jan. 2021 - Jan. 2024

- Reviewer for the T2K-SK joint-fit neutrino oscillation analysis.

**EMPHATIC experiment** Nov. 2019 - present

- Run coordinator for Phase 1b.
- Software development. In charge of geometry construction and calibration. Major contribution to channel mapping and reconstruction.
- Design and development of an aerogel ring imaging Cherenkov detector (ARICH).

- Mentoring multiple student projects.

**Jinping Neutrino Experiment** Sep. 2013 - Jan. 2019

- Energy-response model for liquid scintillator detectors.
- Geoneutrino proposal and sensitivity estimation.
- Solar neutrino simulation. Studies on CNO neutrino flux, day-night asymmetry, and metallicity.
- Development of the simulation software package.

## SEMINARS AND COLLOQUIA

- 2023.10.05 Seminar "Atmospheric Neutrinos", Linyan Wan, Neutrino Seminar Series, Fermilab (USA)
- 2023.08.09 Colloquium "Solar Neutrinos and Atmospheric Neutrinos", Linyan Wan, Neutrino University at Fermilab (USA)
- 2023.03.08 Seminar "Boosted Dark Matter Search at Super-Kamiokande", Linyan Wan, University of Harvard (USA)
- 2023.03.06 Colloquium "Atmospheric Neutrinos: Neutrino Oscillation, and Beyond", Linyan Wan, Florida State University (USA)
- 2023.02.27 Seminar "Boosted Dark Matter Search at Super-Kamiokande", Linyan Wan, University of Toronto (via Zoom)
- 2023.02.02 Seminar "Boosted Dark Matter Search at Super-Kamiokande", Linyan Wan, Indiana University (USA)
- 2022.10.19 Seminar "Boosted Dark Matter Search at Super-Kamiokande", Linyan Wan, University of Sheffield (via Zoom)
- 2022.07.22 Seminar "Baryon Number Violation at Super-Kamiokande", Linyan Wan, HEP Seminar at Tsinghua University (via Zoom)
- 2022.06.15 Seminar "Astrophysics at Super-Kamiokande", Linyan Wan, EPD Seminar at Institute of High Energy Physics (via Zoom)
- 2022.04.21 Special colloquium "Physics at Super-Kamiokande", Linyan Wan, TRIUMF (ver, via Zoom)
- 2020.02.27 Seminar "Searching for Diffused Supernova Neutrino Background at Super-Kamiokande", Linyan Wan, Department of Physics, Boston University (USA)
- 2018.09.27 Seminar "Supernova Relic Neutrino Search and Related Topics at Super-Kamiokande", Linyan Wan, Center for High Energy Physics, Peking University (China)

## CONFERENCE TALKS AND POSTERS

### Invited talks

- 2024.05.15 "Overview of Nucleon Decay", Linyan Wan, CoSSURF 2024 (USA)
- 2024.04.05 "Astrophysical Neutrinos with Large Neutrino Experiments", Linyan Wan, APS April Meeting 2024 (USA)
- 2022.06.02 "New Results on Atmospheric Neutrinos at Super-Kamiokande", Linyan Wan, NEUTRINO 2022 (via Zoom)
- 2020.08.03 "Searching for Neutron Antineutron Oscillation at Super-Kamiokande & Prospect for SK-Gd and HK", Linyan Wan, ACFI workshop at University of Massachusetts Amherst (via Zoom)
- 2019.11.08 "Super-Kamiokande Status and Prospect for SK-Gd", Linyan Wan, NNN19 (Colombia)
- 2017.07.15 "Geoneutrino detection at Jinping", Linyan Wan, Workshop of Jinping Neutrino Experiment 2017 (China)
- 2016.10.26 "Proposal: Low-energy Neutrino Research at Jinping", Linyan Wan, International Workshop: Neutrino Research and Thermal Evolution of the Earth (Japan)

### Posters and Contributed Talks

- 2024.05.16 "Diffuse Supernova Neutrino Background Search", Linyan Wan, CoSSURF 2024 (USA)

- 2022.06.02 Poster "Boosted Dark Matter Search with Hadrons at Super-Kamiokande", Linyan Wan, NEUTRINO 2022 (via virtual reality)
- 2022.05.12 Talk "Nucleon Decay Studies at Super-Kamiokande", Linyan Wan, CoSSURF 2022 (USA)
- 2020.06.24 Poster "Neutron-antineutron oscillation search at Super-Kamiokande", Linyan Wan, NEUTRINO 2020 (via virtual reality)
- 2018.07.06 Talk "Status of the Supernova Relic Neutrino Search and Atmospheric Neutrino Neutral-Current Quasi-Elastic Interactions Measurement at Super-Kamiokande", Linyan Wan, ICHEP 2018 (South Korea)
- 2018.06.20 Talk "Supernova Relic Neutrino Search and Atmospheric Neutrino NCQE at Super-Kamiokande", Linyan Wan, Chinese Physics Society Meeting (China)
- 2018.06.14 Talk "Simulation and sensitivity studies for solar neutrinos at Jinping", Linyan Wan, 5th International Solar Neutrino Conference (Germany)
- 2018.06.07 Poster "First Measurement of Atmospheric Neutrino Neutral-Current Quasi-Elastic Interactions for Supernova Relic Neutrino Search at Super-Kamiokande", Linyan Wan, NEUTRINO 2018 (Germany)
- 2016.07.04 Poster "Neutrino telescopes with the deepest overburden: The Jinping neutrino experiment", Linyan Wan, NEUTRINO 2016 (UK)

## SELECTED PUBLICATIONS

- Atmospheric neutrino oscillation analysis with neutron tagging and an expanded fiducial volume in Super-Kamiokande I–V
  Super-Kamiokande Collaboration, Phys. Rev. D, **109**, 072014 (2024).
- Measurement of the neutrino-oxygen neutral-current quasielastic cross section using atmospheric neutrinos in the SK-Gd experiment
  Super-Kamiokande Collaboration, Phys.Rev.D, **109** 1, L011101 (2024).
- Search for Cosmic-ray Boosted Sub-GeV Dark Matter using Recoil Protons at Super-Kamiokande
  *(Corresponding author)* Super-Kamiokande Collaboration, Phys. Rev. Lett., **130**, 031802 (2023).
- Neutron-antineutron oscillation search using a 0.37 megaton-years exposure of Super-Kamiokande
  *(Corresponding author)* Super-Kamiokande Collaboration, Phys. Rev. D, **103**, 012008 (2021).
- Diffuse supernova neutrino background search at Super-Kamiokande
  Super-Kamiokande Collaboration, Phys. Rev. D, **104**, 122002 (2021).
- Search for solar electron anti-neutrinos due to spin-flavor precession in the Sun with Super-Kamiokande-IV
  Super-Kamiokande Collaboration, Astropart.Phys. **139**, 102702 (2022).
- Muon Flux Measurement at China Jinping Underground Laboratory
  JNE Collaboration, Chin. Phys. C, **45**, 025001 (2021).
- Indirect search for dark matter from the Galactic Center and halo with the Super-Kamiokande detector
  Super-Kamiokande Collaboration, Phys. Rev. D, **102**, 072002 (2020).
- Measurement of the neutrino-oxygen neutral-current quasielastic cross section using atmospheric neutrinos at Super-Kamiokande.
  *Linyan Wan*, et al., Phys. Rev. D, **99**, 032005 (2019).
- Sensitivity of Super-Kamiokande with Gadolinium to Low Energy Anti-neutrinos from Pre-supernova Emission
  Super-Kamiokande Collaboration, Astrophys. J. **885**, 133 (2019).
- An efficient energy response model for liquid scintillator detectors.
  Logan Lebanowski, *Linyan Wan*, et al., Nucl. Instrum. Meth. A. **890**, 133-141 (2018).
- Search for Boosted Dark Matter Interacting With Electrons in Super-Kamiokande
  Super-Kamiokande Collaboration, Phys. Rev. Lett. **120**, 221301 (2018).
- Geoneutrinos at Jinping: Flux prediction and oscillation analysis.
  *Linyan Wan*, Ghulam Hussain, Zhe Wang, Shaomin Chen, Phys. Rev. D, **95**, 053001 (2017).

- Physics prospects of the Jinping neutrino experiment.
  Jinping Collaboration, Chin. Phys. C, **41**, 023002 (2017).

## SERVICE WORK

- Local organization committee for NuFact 2024
- Referee for Physical Review X
- Referee for European Physical Journal C
- Referee for Chinese Physics C, Outstanding Reviewer 2022

## MENTORING AND OUTREACHES

- 2024 Author for *Atmospheric Neutrinos Revisited*, Viewpoint, Physics 16, 212 (2023).
- 2023-present Core organizer for Conferences for Undergraduate Women in Physics (CUWiP) at Fermilab, proposed for 2025.
- 2019-2023 Mentor of Boston University undergraduate and graduate students, on simulation, sensitivity estimation, and data analysis for EMPHATIC experiment
- 2017 Invited speech to undergraduates at Miyagi University of Education, on a virtual tour to Super-Kamiokande, invited by Prof. Yoshiyuki Fukuda
- 2016 Teaching assistant of Advanced Modern Physics, Tsinghua University
- 2015 Translator for *Quantum Field Theory*. Science Press. LLC (2015), 978-7030458971 (English to Chinese).
- 2013-2015 Teaching assistant of General Physics, Tsinghua University