# Curriculum Vitae


## Prof. Dr. Wei Ji

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## Research Interest Keywords

- New Physics beyond the Standard Model
  Exotic Spin-Dependent Force (5th Force)
  Ultralight Bosonic Dark Matter
- Precision Magnetometry
  LeMaMa (Levitated Magnet Magnetometer)
  Atomic Magnetometers

## Employment

Assistant Professor, Peking University — Mar. 2025 -

Research Associate, Helmholtz Institute Mainz, Johannes Gutenberg University
Apr. 2021 - 12. 2024

Section Leader: Prof. Dr. Dmitry Budker

Research Associate, Tsinghua University — Aug. 2020 - Mar. 2021

Visiting Instructor for Physics, Duke Kunshan University — Aug. 2019 - Jul.2020

## Education

**Ph.D. in Physics, Sep. 2014 - Jul. 2019**
Department of Physics, Tsinghua University

- Doctoral Advisor: Haiyan Gao
  Henry Newson Professor, Department of Physics, Duke University, U.S.A
  Visiting Professor, Tsinghua University, China (2009 - 2019)
- Ph.D Dissertation:
  *Searching for Spin and Velocity Dependent forces with Spin-Exchange-Relaxation-Free magnetometer and SmCo5.*

- Joint Training of Doctoral Students (non-degree),
  Department of Physics, Duke University Aug. 2017 - Aug. 2018

  Advisor: Haiyan Gao & Calvin R. Howell

**Bachelor of Science, Sep. 2010 - Jul. 2014**

Department of Mathematics , Jilin University

- Major: Physics- Aoqing Tang Elite Class
  (National Training Plan of Basic Science of Top-notch Students).
- Academic Dissertation:
  *Optimization of the magnetic field uniformity in the searching for Spin-Dependent Short Range Force experiment.*
- Exchange Students (non-degree) Aug. 2013 - Dec. 2013

  Georgia Institute of Technology

## Honors and Awards

2019 Doctoral Thesis With the Highest Distinction, Tsinghua University

2019 Chih-Kung Jen Prize, Tsinghua University

2019 Yu-Hsun Woo Nominee Prize, Tsinghua University

2018 First Prize (for oral presentation),
PFUNT (Physics Five Universities, the National Top) Forum

## Publications

* represent the corresponding author(s), † represent the co-first author(s).

Invitated or peer-reviewed publication:

[1] Lei Cong, **Wei Ji***, Pavel Fadeev, Filip Ficek, Min Jiang, Victor V. Flambaum, Haosen Guan, Derek F. Jackson Kimbal, Mikhail G. Kozlov, Yevgeny V. Stadnik and Dmitry Budker. *Spin-dependent exotic interactions. arXiv:2408.15691* (Accepted by Reviews of Modern Physics)

[2] Wei, Kai, Zitong Xu, Yuxuan He, Xiaolin Ma, Xing Heng, Xiaofei Huang, Wei Quan et al. "Dark matter search with a resonantly-coupled hybrid spin system." Reports on Progress in Physics 88, 057801 (2025).

[3] Felix Ahrens, **Wei Ji**, Dmitry Budker, Chris Timberlake, Hendrik Ulbricht, and Andrea Vinante *Levitated ferromagnetic magnetometer with energy resolution well below ħ.* Physical Review Letters 134, 18, 110801 (2025).

[4] Haowen Su, Min Jiang, Yuanhong Wang, Ying Huang, Xiang Kang, **Wei Ji**, Xinhua Peng, and Dmitry Budker. *"New constraints on axion-mediated spin interactions using magnetic amplification."* Physical Review Letters 133, no. 19 : 191801 (2024).

[5] Zitong Xu, Xiaolin Ma, Kai Wei, Yuxuan He, Xing Heng, Xiaofei Huang, Tengyu Ai et al. "Constraining ultralight dark matter through an accelerated resonant search." Communications Physics 7, no. 1: 226 (2024).

[6] Saarik Kalia, Dmitry Budker, Derek F. Jackson Kimball, **Wei Ji**, Zhen Liu, Alexander O. Sushkov, Chris Timberlake, Hendrik Ulbricht, Andrea Vinante, and Tao Wang. "Ultralight dark matter detection with levitated ferromagnets." Physical Review D 110, 115029 (2024).

[7] **Wei Ji**, Weipeng Li, Pavel Fadeev, Jianan Qin, Kai Wei*, Yong-Chun Liu*, and Dmitry Budker. *New Constraints on Spin-Spin-Velocity-Dependent Interaction.* Physical Review Letters 130, 133202(2023).

[8] Kai Wei, Tian Zhao, Xiujie Fang, Zitong Xu, Chang Liu, Qian Cao, Arne Wickenbrock, Yanhui Hu*,**Wei Ji***, Jiancheng Fang and Dmitry Budker. *Ultrasensitive Atomic Comagnetometer with Enhanced Nuclear Spin Coherence.* Physical Review Letters 130, 063201 (2023).

[9] Wang, Yuanhong, Ying Huang, Chang Guo, Min Jiang*, Xiang Kang, Haowen Su, Yushu Qin, **Wei Ji**, Dongdong Hu, Xinhua Peng*, Dmitry Budker, *'Search for Exotic Parity-Violation Interactions with Quantum Spin Amplifiers'.* Science Advances, 9, eade0353 (2023)

[10] Kai Wei, **Wei Ji***, Changbo Fu*, Arne Wickenbrock, Victor V. Flambaum, Jiancheng Fang, and Dmitry Budker. *'Constraints on Exotic Spin-Velocity-Dependent Interactions'.* Nature Communications 13.1 (2022): 7387.

[11] Yuanhong Wang, Haowen Su, Min Jiang*, Ying Huang, Yushu Qin, Chang Guo, Zehao Wang, Dongdong Hu, **Wei Ji**, Pavel Fadeev, Xinhua Peng*, and Dmitry Budker. *'Limits on Axions and Axionlike Particles within the Axion Window Using a Spin-Based Amplifier'.* Physical Review Letters 129, no. 5 (25 July 2022): 051801.

[12] Haowen Su, Yuanhong Wang, Min Jiang*, **Wei Ji**, Pavel Fadeev, Dongdong Hu, Xinhua Peng*, and Dmitry Budker. *Search for Exotic Spin-Dependent Interactions with a Spin-Based Amplifier,* Science advances 7, no. 47 (2021): eabi9535.

[13] Laskaris, G., **W. Ji**, X. Yan, J. Zhou, W. R. Zimmerman, M. W. Ahmed, T. Averett, ... H. Gao*, J. Golak, A. Kafkarkou*, et al. *First Measurement of the Asymmetry and the Gerasimov-Drell-Hearn Integrand from the* $^3He(\vec{\gamma},p)^2H$ *Reaction at an Incident Photon Energy of 29 MeV,* Physical Review C 103, no. 3 (2021): 034311.

[14] **Wei Ji**, Yao Chen*, Changbo Fu*, Ming Ding, Jiancheng Fang, Zhigang Xiao, Kai Wei, and Haiyang Yan, *New Experimental Limits on Exotic Spin-Spin-Velocity-Dependent Interactions by Using SmCo5 Spin Sources*, Physical Review Letters, 121(26): 261803, 2018.

[15] **Wei Ji**, Changbo Fu*, and Haiyan Gao*, *Searching for New Spin-dependent Interactions with SmCo5 Spin Sources and a SERF Comagnetometer*, Physical Review D, 95(7): 075014, 2017.

[16] Han Yi, Li-Ming Lü, Zhao Zhang, Wen-Jing Cheng, **Wei Ji**, Yan Huang, YanZhang, Hong-Jie Li, Yin-Ping Cui, Ming Lin, Yi-Jie Wang, Li-Min Duan,Rong-Jiang Hu, and Zhi-Gang Xiao, *A Flash-ADC Data Acquisition System Developed for a Drift Chamber Array and a Digital Filter Algorithm for Signal Processing*, Chinese Physics C, 40(11):116102, 2016.

Submitted manuscripts without peer review:

[1] Lai, Zheng-Ting, Jun-Xu Lu, Li-Sheng Geng, Kai Wei, and Wei Ji. "Constraining the Fifth Force Using the Earth as a Spin and Mass Source from the Chinese Space Station." https://arxiv.org/abs/2410.12469

[2] Wei Ji*,†, Changhao Xu†, Guofeng Qu and Dmitry Budker, "Levitated Sensor for Magnetometry in Ambient Environment", https://arxiv.org/abs/2504.21524

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## Invited Talks

- Levitated Ferromagnetic Particle and its Application in Fundamental Physics.
  University of Stuttgart, Stuttgart, July, 2023.
- Searching for New Physics with Atomic Magnetometers.
  School of Physics, Peking University, March, 2023.
- Searching for New Physics with Atomic Magnetometers.
  Department of Physics, Tsinghua University, March, 2023.
- Searching for New Physics with Table-top Experiments.
  Tsung-Dao Li Institute, Shanghai Jiao Tong University, December, 2019.
- New Exotic Spin and Velocity Dependent Forces Between Electrons.
  University of Science and Technology of China, January, 2019.
- Searching for Exotic Spin-Dependent Forces with SmCo5 Spin Sources.
  Institute of Photonics Technology, Jinan University, March, 2019.
- New Exotic Spin and Velocity Dependent Forces Between Electrons.
  University of Science and Technology of China, January, 2019.
- Searching for Exotic Spin-Dependent Forces with SmCo5 Spin Sources and Co-magnetometer.

*First Prize (for oral presentation)*

PFUNT forum, Fudan University, December, 2018.

- New Constraints on Spin-Dependent Forces with SmCo5 Spin Sources and Co-magnetometer.
  Huazhong University of Science and Technology, November, 2018.

## Conferences and Meetings

- International Workshop on New Opportunities for Particle Physics
  IHEP, Beijing, Aug. 2024

- Quantum Sensing and Fundamental Physics with Levitated Mechanical Systems
  The European Center for Theoretical Physics in Trento, Italy, Aug. 2023

- Frontiers of Sensing in the Quantum Regime with Atomic, Solid-State and Photonic Systems
  Les Diablerets Conference Center, Switzerland, Jul. 2023

- The 18th Patras Workshop on Axions, WIMPs and WISPs
  Rijeka University, Croatia, Jul. 2023

- The 17th Patras Workshop on Axions, WIMPs and WISPs
  Johannes Gutenberg University of Mainz, Germany, Sep. 2022

- International Conference on Precision Physics of Simple Atomic Systems
  Warsaw University, Poland, May 2022

- Quantum Engineering of Levitated Systems
  Center for Conference in Benasque, Spain, Apr. 2022

- Fall Meeting of Chinese Physics Society
  Zhengzhou University, Oct. 2019

- Symposium on Quantum Information and Frontiers of Quantum Technology
  Tsinghua University, Dec. 2018

- Jefferson Lab Computing Workshop 2018
  Thomas Jefferson National Accelerator Facility, May 2018.

- 12th "Patras" Workshop on Axions, WIMPs and WISPs
  Institute for Basic Science, CAPP, South Korea, Jun. 2016.

- 6th International Symposium on Nuclear Symmetry Energy
  Tsinghua University, Jun. 2016.

- 7th Workshop on Hadron Physics in China and Opportunities Worldwide
  Duke Kunshan University, Aug. 2015

- *The 21st International Symposium on Spin Physics (Spin 2014)*
  Peking University, Otc. 2014