

Isaac Ruoquan Wang

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Career Experiences

· **Postdoctoral Research Associate** **Oct. 2023 -**
Fermi National Accelerator Laboratory, Theory Division *Illinois, USA*

Education

Rutgers University - New Brunswick **Sep. 2017 - Sep. 2023**
Ph.D., theoretical particle physics and cosmology *New Jersey, USA*

- **Thesis Advisor:** Prof. David Shih
- **Co-advisor:** Prof. Keisuke Harigaya (U-Chicago)
- **Thesis:** Electroweak (-like) phase transitions: baryogenesis, strong CP, and light particles

Fudan University **Sep. 2013 - Jun. 2017**
B.Sc, department of physics *Shanghai, China*

- **Thesis Advisor:** Prof. Xu-Guang Huang
- **Co-advisor:** Prof. Huan Zhong Huang (UCLA & Fudan U.)
- **Thesis:** Microcausality and CPT violation in chiral quantum electrodynamics

Publications

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1. Upper Bound on Parity Breaking Scale for Doublet WIMP Dark Matter, *Matthew J. Baldwin, Keisuke Harigaya* and **Isaac R. Wang**, arXiv: 2507.22113, [INSPIRE](#)
 2. The Discriminant Power of Bubble Wall Velocities: Gravitational Waves and Electroweak Baryogenesis, *Marcela Carena, Aurora Ireland, Tong Ou* and **Isaac R. Wang**, arXiv: 2504.17841, [INSPIRE](#)
 3. Widen the Resonance: Probing a New Regime of Neutrino Self-Interactions with Astrophysical Neutrinos, **Isaac R. Wang**, *Xun-Jie Xu* and *Bei Zhou*, arXiv: 2501.07624, [INSPIRE](#)
 4. Discovering Dark Matter with the MUonE Experiment, *Gordan Krnjaic, Duncan Rocha* and **Isaac R. Wang**, arXiv: 2409.00170, Phys.Rev.Lett. 134 (2025) 16, 161801, [INSPIRE](#)
 5. Imprints of light dark matter on the evolution of cosmic neutrinos, **Isaac R. Wang** and *Xun-Jie Xu*, arXiv: 2312.17151, JCAP 05 (2024) 050, [INSPIRE](#)
 6. ALP-Assisted Strong First-Order Electroweak Phase Transition and Baryogenesis, *Keisuke Harigaya* and **Isaac R. Wang**, arXiv: 2309.00587, JHEP 04 (2024) 108, [INSPIRE](#)
 7. Baryogenesis in a Parity Solution to the Strong CP Problem, *Keisuke Harigaya* and **Isaac R. Wang**, arXiv: 2210.16207, JHEP 11 (2023) 189, [INSPIRE](#)
 8. First-Order Electroweak Phase Transition and Baryogenesis from a Natural Light Singlet Scalar, *Keisuke Harigaya* and **Isaac R. Wang**, arXiv: 2207.02867, [INSPIRE](#)
 9. Dark Photon and Displaced Vertices in MUonE Experiment, *Iftah Galon, David Shih* and **Isaac R. Wang**, arXiv: 2202.08843, Phys.Rev.D 107 (2023) 9, 095003, [INSPIRE](#)

10. Axiogenesis from $SU(2)_R$ Phase Transition, *Keisuke Harigaya* and **Isaac R. Wang**, arXiv: 2107.09679, JHEP 10 (2021) 022, *INSPIRE*
11. Electroweak-like Baryogenesis with New Chiral Matter, *Kohei Fujikura, Keisuke Harigaya, Yuichiro Nakai* and **Isaac R. Wang**, arXiv: 2103.05005, JHEP 07 (2021) 224, *INSPIRE*

Selected Talks

Selected and not limited to...

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| · Discovering dark photon and dark matter at the MUonE experiment
<i>U. of Notre Dame Theory Seminar</i> | Nov. 2024
<i>Seminar</i> |
| · Discovering dark photon and dark matter at the MUonE experiment
<i>UFlorida Theory Seminar</i> | Nov. 2024
<i>Seminar</i> |
| · Discovering dark photon and dark matter at the MUonE experiment
<i>UCLA Nuclear Physics Seminar</i> | Oct. 2024
<i>Seminar</i> |
| · ALP-assisted electroweak phase transition and baryogenesis
<i>Argonne Lab Theory Seminar</i> | Apr. 2024
<i>Seminar</i> |
| · Imprints of light dark matter on the evolution of cosmic neutrinos
<i>U. Chicago EFI Seminar</i> | Jan. 2024
<i>Seminar</i> |
| · ALP-assisted electroweak phase transition and baryogenesis
<i>Fermilab Theory Seminar</i> | Jan. 2024
<i>Seminar</i> |
| · ALP-assisted electroweak phase transition and baryogenesis
<i>PIKIMO Fall 2023</i> | Nov. 2023
<i>Short Plenary</i> |
| · Baryogenesis in a parity solution to the strong CP problem
<i>Pheno 2023</i> | May. 2023
<i>Parallel</i> |
| · Electroweak baryogenesis from a naturally light singlet scalar
<i>Fermilab Theory Seminars</i> | Sep. 2022
<i>Seminar</i> |
| · Dark photon and displaced vertex search at the MUonE experiment
<i>11th Workshop of the Long-Lived Particle Community (Virtual)</i> | Jun. 2022
<i>Short Plenary</i> |
| · Dark photon and displaced vertex search at the MUonE experiment
<i>Pheno 2022</i> | May. 2022
<i>Parallel</i> |
| · Baryogenesis from $SU(2)_R$ phase transition
<i>High-scale Baryogenesis Workshop (Virtual)</i> | Jan. 2022
<i>Plenary</i> |
| · Axiogenesis from $SU(2)_R$ phase transition
<i>Brookhaven Forum 2021 (Virtual)</i> | Nov. 2021
<i>Parallel</i> |

Workshops/Summer Schools/Visitings

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| · Visitor, Perimeter Institute <i>Waterloo, ON, Canada</i> | Jan. - Feb., 2025 |
| · TASI 2022 , <i>Boulder, CO, USA</i> | Jun. 2022 |

Teaching Experience

- Teaching Assistant, Rutgers University, Introduction to Cosmology 444 **Fall 2021**
- Teaching Assistant, Rutgers University, Analytical Physics 124 **Spring 2019**
- Teaching Assistant, Rutgers University, Analytical Physics 123 **Fall 2018**
- Teaching Assistant, Rutgers University, General Physics Lab 205 **Fall 2017**

Skills

Natural Languages	English, Chinese Mandarin
Programming Languages	Python, C/C++, Mathematica, Emacs-Lisp, CSS, HTML
Computer Skills	Git, L ^A T _E X, Vim/Emacs/VSC, Linux/Unix, Keynote, MS Offices

References

Below is a list of individuals who have provided reference letters for me and had research experience together since I started my undergrad, arranged by the time we first met.

Xu-Guang Huang	Undergrad thesis advisor , Fudan University, huangxuguang@fudan.edu.cn
Huan Zhong Huang	Undergrad co-advisor , UCLA, huang@physics.ucla.edu
David Shih	Ph.D. thesis advisor , Rutgers University, dshih@physics.rutgers.edu
Yuichiro Nakai	Shanghai Jiaotong University & T.D.Lee Institute, ynakai@sjtu.edu.cn
Keisuke Harigaya	Ph.D. co-advisor , University of Chicago, kharigaya@uchicago.edu