

# Yong Du

Institute of Theoretical Physics  
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## CAREER

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**Post-doc** 2020-  
*CAS Key Laboratory of Theoretical Physics, Institute of Theoretical Physics, Chinese Academy of Science*

**Visiting scholar** 2019-2020  
*CAS Key Laboratory of Theoretical Physics, Institute of Theoretical Physics, Chinese Academy of Science*

**Visiting scholar** 2018-2018  
*Department of Physics and Astronomy, University of Pittsburgh*

**Visiting scholar** 2014-2014  
*Department of Physics, University of Massachusetts-Amherst*

## EDUCATION

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**Ph.D. in Physics** 2015-2020  
*Department of Physics, University of Massachusetts-Amherst*  
Thesis Advisor: Michael J. Ramsey-Musolf; Academic Advisor: Jennie Traschen

**Ph.D. candidate in Physics (Transferred to the University of Massachusetts-Amherst in 2015 fall)** 2012-2015  
*School of Physics, Nanjing University*  
Advisor: Yeuk-Kwan Edna Cheung

**B.S. in Physics** 2008-2012  
*School of Physical Engineering, Zhengzhou University*  
Advisor: Er-Jun Liang

## CURRENT RESEARCH INTERESTS

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- Electroweak precision physics at NNLO and above;
- General neutrino physics and its connection to new physics;
- Formal development and phenomenological aspects of effective field theories;

- Dark matter production mechanisms and its detection;
- Phenomenology of new physics at colliders.

## SELECTED TEACHING

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- PHY811: Field Theory I (Grader)
- PHY605: Methods of Mathematical Physics (Grader)
- PHY424: Quantum Mechanics (Grader)
- PHY281: Computational Physics (Grader)

## PUBLICATIONS

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16. J. de Blas, **Yong Du**, C. Grojean, J. Gu, V. Miralles, M. Peskin, J. Tian, M. Vos, E. Vryonidou, “Global SMEFT Fits at Future Colliders” , 2206.08326
15. ILC International Development Team, “The International Linear Collider: Report to Snowmass 2021” , 2203.07622
14. J.L. Feng *et al*, “The Forward Physics Facility at the High-Luminosity LHC” , 2203.05090
13. Ruiyu Zhou, Ligong Bian, and **Yong Du**, “Electroweak Phase Transition and Gravitational Waves in the Type-II Seesaw Model” , 2203.01561
12. **Yong Du**, X.-X. Li, and J.-H. Yu, “Neutrino seesaw models at one-loop matching: Discrimination by effective operator” , 2201.04646
11. **Yong Du**, F. Huang, H.-L. Li, Y.-Z. Li, and J.-H. Yu, “Revisiting Dark Matter Freeze-in and Freeze-out through Phase-Space Distribution” , JCAP 04 (2022) 04, 012
10. L. A. Anchordoqui *et al*, “The Forward Physics Facility: Sites, Experiments, and Physics Potential” , Phys.Rept. 968 (2022) 1-50
9. **Yong Du**, H.-L. Li, J. Tang, S. Vihonen and J.-H. Yu, “Exploring SMEFT Induced Non-Standard Interactions: From COHERENT to Neutrino Oscillations” , Phys.Rev.D 105 (2022) 7, 075022
8. **Yong Du**, “Searching for new physics through neutrino non-standard interactions” , 2105.06191
7. **Yong Du** and J.-H. Yu, “Neutrino non-standard interactions meet precision measurements of  $N_{\text{eff}}$ ” , JHEP 05 (2021) 058
6. **Yong Du**, H.-L. Li, J. Tang, S. Vihonen and J.-H. Yu, “Non-standard interactions in SMEFT confronted with terrestrial neutrino experiments” , JHEP 03 (2021) 019
5. **Yong Du**, “Collider probes of real triplet scalar dark matter” , PoS LHCP2020 (2021) 232
4. **Yong Du**, F. Huang, H.-L. Li and J.-H. Yu, “Freezing-in Dark Matter from Secret Neutrino Interactions” , JHEP 12 (2020) 207

3. C.-W. Chiang, G. Cottin, **Yong Du**, K. Fuyuto and M. J. Ramsey-Musolf, “Collider Probes of Real Triplet Scalar Dark Matter” , JHEP 01 (2021) 198
2. **Yong Du**, A. Freitas, H.H. Patel and M. J. Ramsey-Musolf, “Parity-Violating Møller Scattering at Next-to-Next-to-Leading Order: Closed Fermion Loops” , Phys.Rev.Lett. 126 (2021) 13, 131801
1. **Yong Du**, A. Dunbrack, M. J. Ramsey-Musolf and J.-H. Yu, “Type-II Seesaw Scalar Triplet Model at a 100 TeV  $pp$  Collider: Discovery and Higgs Portal Coupling Determination” ,JHEP 1901 (2019) 101.

## TALKS

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27. Higgs Potential 2022  
Peking University, Beijing, China  
Plenary talk: **Gravitational wave searches of the type-II seesaw model**
26. Seattle Snowmass Summer Meeting 2022  
University of Washington, WA, USA  
Invited parallel talk: **SMEFT fit for 4-fermion and CP-violating interactions**
25. Energy Frontier Workshop  
Brown University, RI, USA  
Invited summary talk as an early career representative: **EF04 proposal for summary plots/tables**
24. Energy Frontier Workshop  
Brown University, RI, USA  
Invited talk: **SMEFT fits for CP-violating and four-fermion processes**
23. 4th Forward Physics Facility Meeting  
(*virtual*)  
Parallel talk: **4-fermion operators and their UV completion at FASER $\nu$**
22. PKU HEP Seminar and Workshop  
Peking University, Beijing, China  
Invited talk: **Neutrino non-standard interactions in EFTs: Low-energy experiments**
21. EF04 Topical Group Community Meeting  
(*virtual*)  
Invited talk: **Global fit for 4-fermion operators & operators at Z-pole**
20. The 2021 International Workshop on the High Energy Circular Electron Positron Collider (CEPC 2021)  
Nanjing University, Jiangsu, China  
Invited talk: **Global fit with operators in W/Z-pole and 4-fermion**
19. 49th SLAC Summer Institute (SSI 2021)  
SLAC, CA, USA (*virtual*)  
Poster presentation: **Constraining neutrino non-standard interactions from low energy neutrino experiments**

18. 2021 Meeting of the Division of Particles and Fields of the American Physical Society (DPF21, July 2021)  
Florida State University, FL, USA (*virtual*)  
Parallel talk: **Neutrino non-standard interactions revisited in effective field theories**
17. The 28th International Workshop on Weak Interactions and Neutrinos (WIN2021, June 2021)  
University of Minnesota, MN, USA (*virtual*)  
Poster presentation: **Implications on the UV from neutrino non-standard interactions in the EFT approach**
16. Phenomenology 2021 Symposium (May 2021)  
University of Pittsburgh, PA, USA (*virtual*)  
Parallel talk: **Implications on new physics from neutrino non-standard interactions in the EFT framework**
15. Higgs and Effective Field Theory 2021 (HEFT 2021, April 2021)  
University of Science and Technology of China, Hefei, China  
Plenary talk: **Exploring the ultraviolet from neutrino oscillations and  $N_{\text{eff}}$  in the EFT framework**
14. Beyond Standard Model: From Theory to Experiment, (BSM-2021, March 2021)  
Zewail City of Science and Technology & Sabanci University (*virtual*)  
Parallel talk: **Searching for new physics through neutrino non-standard interactions**
13. The XIX International Workshop on Neutrino Telescopes, (NeuTel2021, February 2021)  
INFN Sezione di Padova & Physics and Astronomy Department of Padova University (*virtual*)  
Parallel talk: **Constraints on neutrino non-standard interactions: From neutrino oscillations to precision cosmology**
12. The 6th China LHC Physics Workshop (CLHCP2020, November 2020)  
Tsinghua University, Beijing, China (*virtual*)  
Parallel talk: **Discovery of the real and complex triplet models at the LHC and future colliders**
11. SLAC Summer Institute 2020 (SSI 2020, August 2020)  
SLAC, CA, USA (*virtual*)  
Poster presentation: **Freeze-in Dark Matter from Secret Neutrino Interactions**
10. The XXIX International Conference on Neutrino Physics and Astrophysics (Neutrino 2020, June-July 2020)  
Chicago, Illinois USA (*virtual*)  
Poster presentation: **Freeze-in Dark Matter from Secret Neutrino Interactions**
9. The Seventh Dark Matter@LHC 2020 Workshop (DM@LHC, June 2020)  
DESY, Hamburg, Germany (*virtual*)  
Plenary talk: **Probing the real triplet scalar dark matter at colliders**
8. The Seventh Workshop of the LHC LLP Community (LHC LLP, May 2020)  
CERN (*virtual*)  
Plenary talk: **Collider probes of real triplet scalar dark matter**

7. The Eighth Annual Large Hadron Collider Physics (LHCP2020, May 2020)  
International Conference Centre of Sorbonne Universite, Paris, France (*virtual*)  
Theory poster presentation in the “Dark Sector BSM”: **Collider probes of real triplet scalar dark matter**
6. Phenomenology 2020 Symposium (May 2020)  
University of Pittsburgh, PA, USA (*virtual*)  
Parallel talk: **Collider probes of real triplet scalar dark matter**
5. LoopFest XVIII (August 2019)  
Fermilab, IL, USA  
Plenary talk: **Two-loop fermionic contributions to polarized Moller scattering asymmetries**
4. Opportunities at Future High Energy Colliders (June-July 2019)  
IFT, Madrid, Spain  
Plenary talk: **Type-II seesaw scalar triplet at a 100 TeV  $pp$  collider**
3. Phenomenology 2019 Symposium (May 2019)  
University of Pittsburgh, PA, USA  
Parallel talk: **Type-II seesaw scalar triplet at a 100 TeV  $pp$  collider**
2. Seminar talk (April 2019)  
University of Massachusetts-Amherst, MA, USA  
**Minimal dark matter at a 100 TeV collider**
1. Seminar talk (November 2018)  
University of Massachusetts-Amherst, MA, USA  
**Type-II seesaw scalar triplet at a 100 TeV  $pp$  collider**

## GRANTS

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- Graduate Student Travel Grant, Department of Physics, University of Massachusetts-Amherst, \$600 ( 2019 ).
- National University Student Innovation Program, Ministry of Education of the People’s Republic of China, RMB 40000 (PI 2010 - 2012).

## SKILLS

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- **Computing Skills:**
  - **Mathematica:** Developed own code for symbolically evaluating 2-loop Feynman integrals based on method of regions; Developed own code for precision  $N_{\text{eff}}$  calculation.
  - **Python:** Developed own Python and Mathematica code for dark matter relic density calculation.
  - **Also very familiar with:** FeynArts, Package-X, FIRE, COLLIER, FeynCalc, LoopTools, REDUCE, LanHEP, CalcHEP, FeynRules, MicrOMEGAs, MadGraph, Delphes, Pythia, ROOT, C++, C, bash, CLASS, MontePython, Wilson, GLoBES etc.

- **Languages:**
  - English (Full professional proficiency.)
  - Mandarin (Native proficiency.)

## **AWARDS**

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- **May 2013**, Freshman Scholarship for Graduate Students, Nanjing University (Awarded to top 5)
- **Oct. 2011**, National English Contest for College Students, National Rank: 3, Zhengzhou University
- **2011**, First-class scholarship, Zhengzhou University
- **Sep. 2010**, National Computer Examination Certificate, 2 Grade, C programming Language, Zhengzhou University
- **2010**, National Endeavor Fellowship, Zhengzhou University
- **2009**, Second-class scholarship, Zhengzhou University
- **2009**, Merit Student, Zhengzhou University

## REFERENCES

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Ayres Freitas

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University of Pittsburgh, Pittsburgh, PA 15260, USA  
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