

Minxi HE

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EMPLOYMENT

CTPU-PTC, IBS Position: Senior Researcher	2023-09 — present
Theory Center, IPNS, KEK Position: Researcher	2021-10 — 2023-08 Host: Kyohei Mukaida
University of Science and Technology of China Visiting Scholar	2015-11 — 2016-07 Host: Yi-Fu Cai
Hong Kong University of Science and Technology Visiting Internship	2015-08 — 2015-10 Host: Yi Wang

EDUCATION

The University of Tokyo Ph.D. in Physics Thesis: <i>Origin of Big Bang in Mixed Higgs-R^2 Inflation Model</i>	2018-09 — 2021-09 Supervisor: Jun'ichi Yokoyama
The University of Tokyo M.S. in Physics Thesis: <i>Inflation in the Mixed Higgs-R^2 Model</i>	2016-09 — 2018-09 Supervisor: Jun'ichi Yokoyama
University of Science and Technology of China B.S. in Physics	2011-09 — 2015-06

ACADEMIC VISITS

CERN Visitor	2022-08-01 — 08-12 Host: Valerie Domcke
Durham University Visitor	2019-09 -09 — 09-11 Hosts: Valentin Kohze, Fedor Bezrukov

HONORS AND AWARDS

Outstanding Presentation Award, Gold Prize 30th Workshop on General Relativity and Gravitation in Japan (JGRG30) Presentation title: <i>Reheating Process in Mixed Higgs-R^2 Model</i>	2021-12
JSPS Research Fellow DC1 Japan Society for the Promotion of Science (JSPS) Research proposal title: <i>Cosmological Consequences of Observationally Favored Inflationary Model</i> Research grant: 3,400,000 JPY	2019-04 — 2022-03
Global Science Graduate Course (GSGC) Scholarship School of Science, The University of Tokyo	2016-09 — 2021-09

INVITED LECTURES

<i>Lectures on Higgs Inflation and Unitarity</i> Korea Institute for Advanced Study (KIAS)	2024-04-01 — 04-05 Host: Pyungwon Ko
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ACADEMIC SERVICE

Organizer for KEK Theory Meeting on Particle Physics Phenomenology (KEK-PH2022) and International Joint Workshop on the Standard Model and Beyond	2022-11-29 — 12-02
Referee for <i>Journal of Cosmology and Astroparticle Physics</i> , <i>Physical Review D</i> , <i>European Physical Journal C</i> , <i>General Relativity and Gravitation</i> , <i>Gravitation and Cosmology</i>	

Refereed

- [1] Q. Ding, **M. He** and V. Takhistov, “Primordial Black Hole Mergers as Probes of Dark Matter in Galactic Center,” *Astrophys. J.* **981**, no.1, 62 (2025) doi:10.3847/1538-4357/adaeb4 [arXiv:2410.02591 [astro-ph.CO]].
- [2] **M. He**, K. Kohri, K. Mukaida and M. Yamada, “Thermalization and hotspot formation around small primordial black holes,” *JCAP* **10**, 080 (2024) doi:10.1088/1475-7516/2024/10/080 [arXiv:2407.15926 [hep-ph]].
- [3] **M. He**, M. Hong and K. Mukaida, “Starobinsky inflation and beyond in Einstein-Cartan gravity,” *JCAP* **05**, 107 (2024) doi:10.1088/1475-7516/2024/05/107 [arXiv:2402.05358 [gr-qc]].
- [4] **M. He**, K. Kamada and K. Mukaida, “Geometry and unitarity of scalar fields coupled to gravity,” *Phys. Rev. Lett.* **132**, no.19, 191501 (2024) doi:10.1103/PhysRevLett.132.191501 [arXiv:2308.15420 [hep-ph]].
- [5] **M. He**, K. Kamada and K. Mukaida, “Quantum Corrections to Higgs Inflation in Einstein-Cartan Gravity,” *JHEP* **01**, 014 (2024) doi:10.1007/JHEP01(2024)014 [arXiv:2308.14398 [hep-ph]].
- [6] **M. He**, K. Kohri, K. Mukaida and M. Yamada, “Formation of hot spots around small primordial black holes,” *JCAP* **01**, 027 (2023) doi:10.1088/1475-7516/2023/01/027 [arXiv:2210.06238 [hep-ph]].
- [7] **M. He**, Y. Mikura and Y. Tada, “Hybrid metric-Palatini Higgs inflation,” *JCAP* **05**, 047 (2023) doi:10.1088/1475-7516/2023/05/047 [arXiv:2209.11051 [hep-th]].
- [8] **M. He**, “Perturbative Reheating in the Mixed Higgs- R^2 Model,” *JCAP* **05**, 021 (2021) doi:10.1088/1475-7516/2021/05/021 [arXiv:2010.11717 [hep-ph]].
- [9] **M. He**, R. Jinno, K. Kamada, A. A. Starobinsky and J. Yokoyama, “Occurrence of Tachyonic Preheating in the Mixed Higgs- R^2 Model,” *JCAP* **01**, 066 (2021) doi:10.1088/1475-7516/2021/01/066 [arXiv:2007.10369 [hep-ph]].
- [10] **M. He** and T. Suyama, “Formation threshold of rotating primordial black holes,” *Phys. Rev. D* **100**, no.6, 063520 (2019) doi:10.1103/PhysRevD.100.063520 [arXiv:1906.10987 [astro-ph.CO]].
- [11] **M. He**, R. Jinno, K. Kamada, S. C. Park, A. A. Starobinsky and J. Yokoyama, “On the violent preheating in the mixed Higgs- R^2 inflationary model,” *Phys. Lett. B* **791**, 36-42 (2019) doi:10.1016/j.physletb.2019.02.008 [arXiv:1812.10099 [hep-ph]].
- [12] **M. He**, A. A. Starobinsky and J. Yokoyama, “Inflation in the mixed Higgs- R^2 model,” *JCAP* **05**, 064 (2018) doi:10.1088/1475-7516/2018/05/064 [arXiv:1804.00409 [astro-ph.CO]].
- [13] **M. He**, J. Liu, S. Lu, S. Zhou, Y. F. Cai, Y. Wang and R. Brandenberger, “Differentiating G-inflation from String Gas Cosmology using the Effective Field Theory Approach,” *JCAP* **12**, 040 (2016) doi:10.1088/1475-7516/2016/12/040 [arXiv:1608.05079 [astro-ph.CO]].

Preprint

- [14] E. J. Chun, S. Jyoti Das, **M. He**, T. H. Jung and J. Sun, “Cogenesis by a sliding pNGB with symmetry non-restoration,” [arXiv:2406.04180 [hep-ph]].
- [15] **M. He**, M. Hong and K. Mukaida, “Increase of n_s in regularized pole inflation & Einstein-Cartan gravity,” [arXiv:2504.16069 [astro-ph.CO]].
- [16] Q. Ding, **M. He**, V. Takhistov and H. Y. Zhu, “Superradiant Bosons Driving Supermassive Black Hole Mergers,” [arXiv:2505.09696 [hep-ph]].
- [17] **M. He**, M. Hong and K. Mukaida, “Torsion induced current-scalar coupling in Einstein-Cartan gravity,” [arXiv:2507.12151 [hep-ph]].

SEMINARS

<i>Hotspot formation by evaporating primordial black holes</i> Sun Yat-sen University, Shenzhen, China	2025-07
<i>Hotspot formation by evaporating primordial black holes</i> The Chinese University of Hong Kong, Shenzhen, China	2025-07
<i>Geometry of target space and unitarity of Higgs inflation</i> Chung-Ang University, South Korea	2025-03 Invited
<i>Fire Balls from Primordial Black Hole Explosion</i> Institute of Theoretical Physics, Chinese Academy of Science, China	2023-05
<i>Making Fire Balls from Primordial Black Holes</i> Tsung-Dao Lee Institute, China (online)	2023-03
<i>Hot Spot Created by Primordial Black Holes</i> University of California, Los Angeles, USA (online)	2023-02 Invited
<i>Creating a Hot Spot around a Primordial Black Hole</i> École Normale Supérieure, France (online)	2022-12
<i>Reheating in the mixed Higgs-R^2 model</i> Perimeter Institute for Theoretical Physics, Canada (online)	2020-11
<i>Preheating in the Mixed Higgs-R^2 Model</i> Yonsei University, South Korea (online)	2020-08 Invited
<i>Rotation and Formation Threshold of Primordial Black Holes</i> Sun Yat-sen University, China	2019-09
<i>Inflation and Preheating in the Mixed Higgs-R^2 Model</i> Waseda University, Japan	2019-06 Invited

CONFERENCES AND WORKSHOPS

<i>Regularized pole inflation and Einstein-Cartan gravity</i> Oral talk, CosPA 2025, Institute for Basic Science, Daejeon, South Korea	2025-07
<i>Inflation in Einstein–Cartan framework</i> Oral talk, 2025 APCTP-IBS Focused Research Program, APCTP, South Korea	2025-06 Invited
<i>Unitarity in Einstein–Cartan Higgs Inflation with Quantum Correction</i> Oral talk, 7th Int. Workshop HPNP, University of Osaka, Japan	2025-06
<i>Hotspot Formation around Evaporating Primordial Black Holes</i> Oral talk, 7th CUBES Workshop, South Korea	2025-04 Invited
<i>Probing Dark Matter with Red Giants</i> Oral talk, CAU-IBS BSM Workshop, Chung-Ang University, South Korea	2025-02
<i>Einstein–Cartan gravity as a broad framework for inflation</i> Oral talk, 100+9 GR & Beyond, Jeju National University, South Korea	2024-11 Invited
<i>Unitarity and Violent Preheating in Einstein–Cartan Higgs Inflation</i> Poster, COSMO, Kyoto University, Japan	2024-10
<i>Probing Dark Matter in Red Giants</i> Oral talk, 4th DMNet symposium, IBS-CTPU, South Korea	2024-09 Invited
<i>Geometry in scalar field theories with gravity</i> Oral talk, JGRG32, Nagoya University, Japan	2023-11
<i>One-loop effect in Higgs inflation</i> Oral talk, 3rd Int. Joint Workshop on BSM & 11th KIAS Workshop, South Korea	2023-11 Invited
<i>One-loop Correction to Higgs Inflation</i> Oral talk, Second Mini-workshop on the Early Universe, Suwa, Japan	2023-07 Invited
<i>Thermalization of Hawking Radiation from Primordial Black Holes</i> Oral talk, AAPPS-DACG Workshop 2022, APCTP, South Korea (online)	2022-11 Invited
<i>Temperature Profile around a Primordial Black Hole</i> Oral talk, JGRG31, RESCEU, University of Tokyo, Japan	2022-10

<i>Hot Spot Around Evaporating Primordial Black Holes</i>	2022-09
Oral talk, DESY Theory Workshop 2022, DESY, Germany	
<i>Reheating process in mixed Higgs-R^2 model</i>	2022-08
Oral talk, APPC, South Korea (online)	
<i>Reheating Process in Mixed Higgs-R^2 Model</i>	2022-07
Oral talk, PASCOS, Max Planck Institute for Nuclear Physics, Germany	
<i>Reheating after Mixed Higgs-R^2 Inflation</i>	2022-03
Oral talk, 6th KEK-PH + 2nd KEK-COSMO, KEK, Japan (online)	Invited
<i>Reheating Process in Mixed Higgs-R^2 Model</i>	2021-12
Poster, JGRG30, Waseda University, Japan (online)	
<i>Perturbative Reheating after Mixed Higgs-R^2 Inflation</i>	2021-08
Oral talk, RESCEU Summer School, Japan (online)	
<i>Reheating Process in Mixed Higgs-R^2 Inflation Model</i>	2021-08
Poster, COSMO, University of Illinois Urbana-Champaign, USA (online)	
<i>Reheating in the Mixed Higgs-R^2 Inflation Model</i>	2021-06
Oral talk, PASCOS, IBS-CTPU, South Korea (online)	
<i>Tachyonic preheating in the mixed Higgs-R^2 model</i>	2020-11
Oral talk, JGRG, Nagoya University, Japan (online)	
<i>Reheating in the mixed Higgs-R^2 model</i>	2020-11
Oral talk, AAPPS-DACG Workshop, APCTP, South Korea (online)	
<i>Tachyonic preheating in the mixed Higgs-R^2 model</i>	2020-08
Oral talk, RESCEU Summer School, Japan (online)	
<i>Formation Threshold of Rotating Primordial Black Holes</i>	2019-12
Oral talk, Focus Week on PBHs, IPMU, University of Tokyo, Japan	
<i>Formation Threshold of Rotating Primordial Black Holes</i>	2019-11
Oral talk, JGRG29, Kobe University, Japan	
<i>Formation Threshold of Rotating Primordial Black Holes</i>	2019-11
Oral talk, APPC, Malaysian Institute of Physics, Kuching, Malaysia	
<i>Preheating in Mixed Higgs-R^2 Model</i>	2019-09
Poster, COSMO, RWTH Aachen University, Germany	
<i>Rotation and Formation Threshold of Primordial Black Holes</i>	2019-08
Oral talk, RESCEU Summer School, Akita, Japan	
<i>Preheating in Mixed Higgs-R^2 Model</i>	2019-03
Poster, Accelerating Universe in the Dark, YITP, Kyoto University, Japan	
<i>Reheating in Mixed Higgs-R^2 Model</i>	2018-11
Oral talk, CosPA, Center for Gravitation and Cosmology, Yangzhou, China	
<i>Reheating in Mixed Higgs-R^2 Model</i>	2018-11
Oral talk, JGRG28, Rikkyo University, Japan	
<i>Inflation in the Mixed Higgs-R^2 Model</i>	2018-08
Oral talk, COSMO, IBS-CTPU, South Korea	
<i>Inflation in the Mixed Higgs-R^2 Model</i>	2018-07
Oral talk, RESCEU Summer School, Hakodate, Japan	
<i>Higgs-R^2 Inflation</i>	2017-12
Oral talk, CosPA, YITP, Kyoto University, Japan	
<i>Higgs-R^2 Inflation</i>	2017-11
Oral talk, JGRG27, Hiroshima University, Japan	
<i>Higgs-R^2 Inflation</i>	2017-07 — 08
Poster, RESCEU Summer School, Yamaguchi, Japan	