Curriculum Vitae

CONTACT
Yukawa Institute for Theoretical Physics
Kyoto University
Kitashirakawa Oiwakecho, Sakyo-ku, Kyoto 606-8502 Japan

Bing Theodore Zhang
https://btheodorezhang.github.io
E-mail: bing.zhang@yukawa.kyoto-u.ac.jp
Mobile phone: +81 90 4620 9810

APPOINTMENTS

IHEP, China 2024.08 – present

Associate Professor
Institute of High-Energy Physics, Chinese Academy of Science

Kyoto University, Japan 2021.10 – 2024.08

Research Assistant Professor
Yukawa Institute for Theoretical Physics

The Pennsylvania State University, USA 2019.9 – 2021.9

Postdoctoral Research Scholar
Department of Physics, Institute for Gravitation & the Cosmos (IGC)
Mentored by Prof. Kohta Murase and Prof. Miguel Mostafa

The Pennsylvania State University, USA 2016.9 – 2017.9
Visiting Scholar

EDUCATION

Ph.D. of Astrophysics, Peking University, China 2013.9 – 2019.7
Thesis Title: The origin of ultrahigh-energy cosmic ray nuclei
Advisor: Prof. Zhuo Li, Peking Universiy
Co-advised by: Prof. Kohta Murase, Pennsylvania State University

B.C., Applied Physics, Harbin Institute of Technology, China 2009.9 – 2013.7

RESEARCH INTERESTS

Multimessenger astrophysics: The origin of ultra-high-energy cosmic rays, high-energy gamma-rays and high-energy neutrinos, particle acceleration and propagation, hybrid detection of extensive air showers

High-energy astrophysics: Supernova, Gamma-ray bursts, Tidal disruption events, Active galactic nuclei and Galaxy Clusters

AWARDS AND DISTINCTIONS

Outstanding Doctoral Thesis, Peking University 2019
China Scholarships Council Fellowship 2016

SKILLS

Programming: C++, Python
Software: Developer of Astrophysical Multimessenger Emission Synthesizer (AMES)
Public Software: Familiar with CRPropa, SOPHIA, CORSIKA, AIRES, Auger Offline

TEACHING EXPERIENCE

Peking University 2015.9 – 2016.1
Teaching Assistant in Radiative Processes in Astrophysics

PROFESSIONAL SERVICE

Peer review referee for JHEP 2022 – present
Peer review referee for JCAP 2021 – present
Peer review referee for ApJ 2020 – present
Peer review referee for MNRAS 2020 – present
Organizing astrophysics seminar, YITP, Kyoto University 2022 – present
Organizing weekly Journal Club, IGC, Pennsylvania State University 2020 – 2021

COLLABORATIONS

Member, Giant Radio Array for Neutrino Detection (GRAND) Collaboration 2017 – 2022
– Work on the design of a conventional ground array (i.e., array of water-Cherenkov detectors) for hybrid detection of the extensive air showers for GRAND300.

CONFERENCES AND TALKS

2nd Astro-COLIBRI multi-messenger astrophysics workshop, Institut Pascal 2023.11
- *Participate the Sciathon project*

AstroParticle Symposium 2023, Institut Pascal 2023.11
- *Invited talk: Theoretical perspective on multimessenger astrophysics*

New Evolution of MultiMessenger Astrophysics 2023, Penn State University 2023.8
- *Invited talk: Very-high-energy gamma-rays from compact mergers*

The 38 th international Cosmic Ray Conference, Nagoya 2023.07
- *Contributed talk: Reverse shock proton synchrotron emission from GRB 221009A*

Purple Mountain Observatory Youth Forum Issue 107, Nanjing 2023.06
- *Invited seminar: The origin of UHECRs and neutrinos*

The 1st LHAASO Symposium, Chengdu 2023.05
- *Invited talk: Nuclear and electron cascades induced by UHECRs*

Astrophysics Workshop on Numerical Multimessenger Modeling, Bochum 2023.02
- *Invited talk: Recent developments on GRB afterglow modeling in the VHE era*

Astronomical Institute, Tohoku University 2023.01
- *Invited colloquium: Very-high-energy gamma-rays from gamma-ray bursts*

Fast Radio Bursts and Cosmic Transients, YITP, Kyoto University 2022.06
- *Invited talk: Very-high-energy gamma-rays from short gamma-ray bursts*

Tsung-Dao Lee Institute (TDLI), Shanghai 2021.06
- *Invited seminar (Astronomy and astrophysics): Energetics of UHECRs*

APS April meeting 2021, Virtual 2021.04
- *Contributed talk: A neutral beam model for high-energy neutrino emission from the blazar TXS 0506+56*

Department of Physics, The Pennsylvania State University, State College, PA 2019.10
- *Invited seminar: The origin of UHECRs*

Benoziyo Center for Astrophysics 2019, Weizmann Institute of Science, Israel 2019.01
- *Invited talk: UHECR nuclei and neutrinos from engine-driven supernova*

TeV Particle Astrophysics 2018, Berlin, German 2018.08
- *contributed talk: LL GRBs as the sources of UHECR nuclei*

LHAASO Collaboration Meeting 2017, SDU, Weihai, China 2017.09
- *Contributed talk: High-energy gamma-rays from blazars*

TeV Particle Astrophysics 2017, Columbus, OH 2017.08
- *Contributed talk: High-energy cosmic ray nuclei from tidal disruption events*

973 Multimessenger Astronomy Frontier, CCNU, Wuhan, China 2015.12
- *Contributed talk: High-energy neutrinos from blazars*

PUBLICATIONS

[19] **B. Theodore Zhang**, K. Murase, K. Ioka and B. Zhang, The origin of very-high-energy gamma-rays from GRB 221009A: implications for reverse shock proton synchrotron emission, 2023, MNRAS submitted, arXiv: 2311.13671

[18] B. Željka, **B. Theodore Zhang**, K. Murase and K. Ioka, Off-axis MeV and very-high-energy gamma-ray emissions from structured gamma-ray burst jets, 2023, MNRAS submitted, arXiv: 2306.14729

[17] **B. Theodore Zhang** and K. Murase, Nuclear and electromagnetic cascades induced by ultrahigh-energy cosmic rays in radio galaxies: Implications for Centaurus A, MNRAS, 524, 76, 2023, arXiv: 2302.14048

[16] Y. Wei, **B. Theodore Zhang**, and K. Murase, Multi-wavelength afterglow emission from bursts associated with magnetar flares and fast radio bursts, MNRAS, 524, 6004, 2023, 2301.10184

[15] **B. Theodore Zhang**, K. Murase, K. Ioka, D. Song, C. Yuan, and P. Mészáros, External Inverse-compton and Proton Synchrotron Emission from the Reverse Shock as the Origin of VHE Gamma Rays from the Hyper-bright GRB 221009A, ApJL 947, L14, 2023, arXiv:2211.05754

[14] Y. Sato, K. Obayashi, **B. Theodore Zhang**, S. J. Tanaka, K. Murase, Y. Ohira, & R. Yamazaki, Synchrotron Self-Compton Emission in the Two-Component Jet Model for Gamma-Ray Bursts, JHEAp 37 (2023) 51, arXiv: 2208.13987

- Contribute to the synchrotron self-Compton calculation process.

[13] Simeon Reusch, Robert Stein, Marek Kowalski, Sjoert van Velzen, Anna Franckowiak, Cecilia Lunardini, Kohta Murase, ..., **B. Theodore Zhang**, Erez Zimmerman, The candidate tidal disruption event AT2019fdr coincident with a high-energy neutrino, PhysRevLett.128.221101, 2021, arXiv: 2101.05788
- Provide the theoretical spectrum of neutrinos from hidden wind model.

[12] Chengchao Yuan, Kohta Murase, **B. Theodore Zhang**, Shigeo S. Kimura, Peter Mészáros, Post-merger Jets from Supermassive Black Hole Coalescences as Electromagnetic Counterparts of Gravitational Wave Emission, ApJL 911L15, 2021, arXiv: 2101.05788
- Contribute to the calculation of the energy spectrum.

[11] **B. Theodore Zhang**, Kohta Murase, Chengchao Yuan, Shigeo S. Kimura, Peter Mészáros, External Inverse Compton Emission Associated with Extended and Plateau Emission of Short Gamma-Ray Bursts: Application to GRB 160821B, ApJL **908** L36, 2021, arXiv: 2012.09143

[10] **B. Theodore Zhang**, Kohta Murase, Péter Veres, Peter Mészáros, External Inverse Compton Emission from Low-Luminosity Gamma-Ray Bursts: Application to GRB 190829A, ApJ **920** 55, 2021, arXiv: 2012.07796

[9] Jiang Yu, **B. Theodore Zhang**, Kohta Murase, *Energetics of ultrahigh-energy cosmic-ray nuclei*, Phys. Rev. D104 (2021) 4, 043017, arXiv: 2012.03122
- Contribute to generate the main results and paper writting.

[8] Kohta Murase, Shigeo S. Kimura, **B. Theodore Zhang**, Foteini Oikonomou, Maria Petropoulou, *High-energy Neutrino and Gamma-Ray Emission from Tidal Disruption Events*, the Astrophysical Journal, 902(2), 108, 2020, arXiv: 2005.08937
- Contribute to the calculation of the photohadronic interaction in the hidden wind model.

[7] **B. Theodore Zhang**, Maria Petropoulou, Kohta Murase, Foteini Oikonomou, *A Neutral Beam Model for the Neutrino Emission of TXS 0506+056*, the Astrophysical Journal, 889(2), 118., 2020, arXiv: 1910.11464

[6] **B. Theodore Zhang**, Kohta Murase, *Ultrahigh-energy cosmic-ray nuclei and neutrinos from engine-driven supernovae*, Phys. Rev. **D100**, 103004, arXiv: 1812.10289

[5] **GRAND Collaboration**, *The Giant Radio Array for Neutrino Detection (GRAND): Science and Design*, , Sci. China Phys. Mech. Astron. **63** (2020) 219501, arXiv: 1810.09994
- Contribute to the discussion of particle detector array.

[4] **B. Theodore Zhang**, Kohta Murase, Shigeo S. Kimura, Shunsaku Horiuchi, Peter Mészáros, *Low-luminosity gamma-ray bursts as the sources of ultrahigh-energy cosmic ray nuclei*, Phys. Rev. **D97**, 083010, 2018, arXiv: 1712.09984

[3] **B. Theodore Zhang**, Kohta Murase, Foteini Okonomonu, Zhuo Li, *High-energy cosmic ray nuclei from tidal disruption events: Origin, survival, and implications*, Phys. Rev. **D96**, 063007, 2017, arXiv: 1706.00391

[2] Shigeo S. Kimura, Kohta Murase, **B. Theodore Zhang**, *Ultrahigh-energy cosmic-ray nuclei from black hole Jets: recycling galactic cosmic rays through shear acceleration*, Phys. Rev. **D97**, 023026, 2018, arXiv: 1705.05027
- Contribute to the propagation of UHECR nuclei.

[1] **B. Theodore Zhang**, Zhuo Li, *Constraints on cosmic ray loading and PeV neutrino production in blazars*, JCAP, **1703**, 024, 2017, arXiv: 1607.02211