

Department of Physics
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RESEARCH INTERESTS

- Astroparticle physics (neutrinos, gamma rays and cosmic rays from extreme sources)
- High-energy astrophysics (particle acceleration, transport and radiation processes)
- Multimessenger astrophysics

EDUCATION

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|---------------------------|---|
| Summer 2021
(Expected) | Ph.D. in Physics, Pennsylvania State University
Supervised by Prof. Péter Mészáros and Prof. Kohta Murase
Thesis: <i>High-Energy Neutrino and Electromagnetic Emissions from Galaxy and Super Massive Black Hole Mergers</i> |
| 2016 | B.Sc. in Astronomy, Nanjing University, China
Supervised by Prof. Xiangyu Wang and Prof. Fayin Wang
Undergraduate Thesis: <i>The origin of high-energy astrophysical neutrinos</i> |

EMPLOYMENT HISTORY

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| 2018 - | Research Assistant , Dept. of Physics, Penn State |
| 2016 - | Teaching Assistant , Dept. of Physics, Penn State |
| Summer 2015 | REU Intern , Dept. of Astronomy and Astrophysics, Penn State |

HONORS & AWARDS

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| 2020, 2019 | David C. Duncan Graduate Fellowship, Penn State |
| 2018 | APS Graduate Student Travel Grant, American Physical Society |
| 2017 | Homer F. Braddock Scholarship, Penn State |
| 2016 | School of Astronomy and Space Science Dean's Scholarship, Nanjing University |
| 2016 | Outstanding Thesis Award, Nanjing University |
| 2015 | REU Intern Travel Grant (host institution: Penn State), Nanjing University |

PUBLICATIONS

Journal articles (first-author: 6)

- [7] **Yuan, C.**, Murase, K., Zhang, T. B., Kimura, S. & Mészáros, P. "Post-Merger Jets from Super-massive Black Hole Coalescences as Electromagnetic Counterparts of Gravitational Wave Emission", *submitted to ApJL*, [arXiv:2101.05788](https://arxiv.org/abs/2101.05788)
- [6] Zhang, T. B., Murase, K., **Yuan, C.**, Kimura, S. & Mészáros, P. "External Inverse-Compton Emission Associated with Extended and Plateau Emission of Short Gamma-Ray Bursts: Application to GRB 160821B", *submitted to ApJL*, [arXiv:2012.09143](https://arxiv.org/abs/2012.09143)

- *[5] **Yuan, C.**, Murase, K., Kimura, S. & Mészáros, P. “High-energy neutrino emission subsequent to gravitational wave radiation from supermassive black hole mergers”, *Phys. Rev. D* 102, 083013. doi: [10.1103/PhysRevD.102.083013](https://doi.org/10.1103/PhysRevD.102.083013)
- *[4] **Yuan, C.**, Murase, K. & Mészáros, P. (2020) “Complementarity of Stacking and Multiplet Constraints on the Blazar Contribution to the Cumulative High-Energy Neutrino Intensity”, *ApJ*, 890:1. doi: [10.3847/1538-4357/ab65ea](https://doi.org/10.3847/1538-4357/ab65ea)
- [3] **Yuan, C.**, Murase, K. & Mészáros, P. (2019) “Secondary Radio and X-ray Emissions from Galaxy Mergers”, *ApJ*, 878:76. doi: [10.3847/1538-4357/ab1f06](https://doi.org/10.3847/1538-4357/ab1f06)
- *[2] **Yuan, C.**, Mészáros, P., Murase K. & Jeong, D. (2018) “Cumulative Neutrino and Gamma-Ray Backgrounds from Halo and Galaxy Mergers”, *ApJ*, 857:50. doi: [10.3847/1538-4357/aab774](https://doi.org/10.3847/1538-4357/aab774)
- [1] **Yuan, C.** & Wang, F. (2015) “Cosmological Test Using Strong Gravitational Lensing Systems”, *MNRAS*, 452:3. doi: [10.1093/mnras/stv1444](https://doi.org/10.1093/mnras/stv1444)

Conference proceedings and other articles

- [2] **Yuan, C.**, Mészáros, P., Murase K. & Jeong, D. (2018) “Cumulative Neutrino and Gamma-Ray Backgrounds from Halo and Galaxy Mergers”, in *APS April meeting: U17.004*. [Talk abstract](#)
- [1] **Yuan, C.**, Murase K. & Mészáros, P. (2019) “A Multi-Messenger Picture of Galaxy Mergers: Neutrinos and Electromagnetic Emissions”, *(ICRC2019) 1041*. [Proceedings of Science](#)

CONFERENCES AND SCIENTIFIC TALKS

Oct 2020	Invited talk: High-energy neutrino and electromagnetic emissions from SMBH mergers. <i>CCAPP AstroParticle Lunch</i> , Ohio State University
Oct 2020	Talk: Galaxy and SMBH mergers in the era of multi-messenger astrophysics. <i>Astronomical seminar</i> , Tohoku University, Japan
Sep 2020	Lunch talk: High-energy neutrino emission from SMBH mergers. Dept. of Astronomy & Astrophysics, Penn State
Aug 2020	Invited talk: High-energy neutrino emission subsequent to GW radiation from SMBH mergers. <i>Time-Domain High-Energy Messenger Astrophysics Workshop</i> , University of Kyoto, Japan
Jul 2019	Poster: A Multi-Messenger Picture of Galaxy Merger. <i>36th International Cosmic Ray Conference (ICRC)</i> , Madison, WI
Jun 2019	Talk: A Multi-Messenger Picture of Galaxy Mergers: Neutrinos and Electromagnetic Emissions. <i>IGC@25: Multimessenger Universe Workshop</i> , State College, PA
May 2019	Invited talk: Galaxy and halo mergers in the era of multi-messenger astronomy. <i>Astronomy seminar</i> , Nanjing University, China
Apr 2018	Talk: Cumulative Neutrino and Gamma-Ray Backgrounds from Halo and Galaxy Mergers. <i>APS April meeting</i> , Columbus, OH

- Aug 2015 **Lunch talk:** Monte Carlo simulations of electron-photon interactions with pair formation. Dept. of Astronomy & Astrophysics, Penn State
- May 2015 **Talk:** Cosmological test using strong gravitational lensing systems. *Cosmology and Galaxy Workshop*, Yangzhou, China

CODE DEVELOPMENT

Astrophysical Multimessenger Emission Synthesize (AMES)

A time-dependent numerical code for the production and propagation of high-energy cosmic rays, neutrinos, and gamma-rays for various astrophysical environments

- Developed the code for photo-meson/photo-hadronic interaction cross sections and cosmic $\gamma\gamma$ interactions.

PROGRAMMING SKILLS

- Extensive experience in using **CRpropa**, an astrophysical simulation code for the propagation of ultra-high-energy particles.
- Programming languages: C++, Python, Mathematica and Fortran

TEACHING EXPERIENCE

2020 F	T.A. PHYS/MATH 479: Special and General Relativity
2018 S, 2019, 2020 S	Lab. T.A. PHYS 250: Introductory Physics
2018 F	Office hour assistant PHYS 525: Methods of Theoretical Physics
2016 F - 2017 F	Lab. T.A. PHYS 212: Electromagnetism

OUTREACH

Jul 2017,18,19	AstroFest - A Tour of Universe, Penn State
May 2018	K-12 Educators: Bring Cutting-Edge STEM Research into your Classroom, Penn State

REFERENCES

Dr. Péter Mészáros (nnp@psu.edu)

Eberly Chair Professor, Astronomy & Astrophysics and Physics, Penn State

Dr. Kohta Murase (murase@psu.edu)

Assistant Professor, Physics and Astronomy & Astrophysics, Penn State

Dr. Donghui Jeong (djeong@psu.edu)

Associate Professor, Astronomy & Astrophysics, Penn State

Dr. Xiangyu Wang (xywang@nju.edu.cn)

Professor, Astronomy & Space Science, Nanjing University, China