

Chengchao Yuan



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RESEARCH INTERESTS

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

EDUCATION

- 08/2022 **Ph.D. in Physics, Pennsylvania State University**
Supervised by Prof. Péter Mészáros and Prof. Kohta Murase
Thesis: *Neutrino and Electromagnetic Counterparts of Galaxy and Astrophysical Black Hole Mergers*
- 06/2016 **B.Sc. in Astronomy, Nanjing University, China**
Supervised by Prof. Xiangyu Wang and Prof. Fayin Wang
Undergraduate Thesis: *The origin of high-energy astrophysical neutrinos*

EMPLOYMENT HISTORY

- 2018 - 2022 **Research Assistant**, Dept. of Physics, Penn State
- 2016 - 2022 **Teaching Assistant**, Dept. of Physics, Penn State
- Summer 2015 **REU Intern**, Dept. of Astronomy and Astrophysics, Penn State

HONORS & AWARDS

- 2022 **TDLI Prize Postdoctoral Fellowship**, Tsung-Dao Lee Institute (declined)
- 2022, 21 **W. Donald Miller Graduate Fellowship**, Pennsylvania State University
- 2019-2022 **David C. Duncan Graduate Fellowship**, Pennsylvania State University
- 2018 **APS Graduate Student Travel Grant**, American Physical Society
- 2017 **Homer F. Braddock Scholarship**, Pennsylvania State University
- 2016 **School of Astronomy and Space Science Dean's Scholarship**, Nanjing Univ.
- 2016 **Outstanding Thesis Award**, Nanjing University
- 2015 **REU Intern Travel Grant** (host institution: Penn State), Nanjing University

CONFERENCES AND SCIENTIFIC TALKS

- 03/2022 **Seminar talk:** University of Maryland, virtual
- 12/2021 **Seminar talk:** Columbia University, in-person
- 11/2021 **Seminar talk:** DESY, virtual
- 10/2021 **Seminar talk:** UNLV, virtual
- 07/2021 **Contributed talk:** EPS Conference on High Energy Physics, virtual
- 04/2021 **Contributed talk:** APS April meeting, virtual

02/2021	Lunch talk: Institute for Gravitation and the Cosmos (IGC), Penn State, virtual
10/2020	Invited talk: CCAPP AstroParticle Lunch, Ohio State University, virtual
10/2020	Seminar talk: Tohoku University, Japan, virtual
09/2020	Lunch talk: Dept. of Astronomy & Astrophysics, Penn State University, virtual
08/2020	Invited talk: Time-Domain High-Energy Messenger Astrophysics Workshop, University of Kyoto, Japan, virtual
07/2019	Poster: 36th International Cosmic Ray Conference (ICRC), Madison, WI
06/2019	Contributed talk: IGC@25: Multimessenger Universe Workshop, State College, PA
04/2018	Contributed talk: APS April meeting, Columbus, OH
08/2015	Lunch talk: Dept. of Astronomy & Astrophysics, Penn State University

PUBLICATIONS

Journal articles (first-author: 7)

- [8] **Yuan, C.**, Murase, K., Guetta, D., Pe'er, A., Bartos, I., & Mészáros, P., (2021) "GeV Signature of Short Gamma-Ray Bursts in Active Galactic Nuclei", *arXiv: 2112.07653*
- [7] **Yuan, C.**, Murase, K., Zhang, B. T., Kimura, S. S. & Mészáros, P. (2021) "Post-Merger Jets from Supermassive Black Hole Coalescences as Electromagnetic Counterparts of Gravitational Wave Emission", *ApJL*, 911 L15, [doi: 10.3847/2041-8213/abee24](#)
- [6] Zhang, T. B., Murase, K., **Yuan, C.**, Kimura, S. S. & Mészáros, P. (2020) "External Inverse-Compton Emission Associated with Extended and Plateau Emission of Short Gamma-Ray Bursts: Application to GRB 160821B", *ApJL* 908 L36, [doi: 10.3847/2041-8213/abe0b0](#)
- [5] **Yuan, C.**, Murase, K., Kimura, S. & Mészáros, P. (2020) "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](#)
- [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](#)
- [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](#)
- [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](#)
- [1] **Yuan, C.** & Wang, F. (2015) "Cosmological Test Using Strong Gravitational Lensing Systems", *MNRAS*, 452:3. [doi: 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](#)

SOFTWARE

Astrophysical Multimessenger Emission Synthesizer (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

2021 F	T.A. PHYS 561: Quantum Mechanics
2021 S	T.A. PHYS 400: Electrodynamics
2020 F	T.A. PHYS/MATH 479: Special and General Relativity
2018 S - 2020 S	Lab. T.A. PHYS 250: Introductory Physics
2018 F	T.A. PHYS 525: Methods of Theoretical Physics
2016 - 2017	Lab. T.A. PHYS 212: Electromagnetism

SELECTED PROFESSIONAL/OUTREACH EXPERIENCE

2021	Abstract Sorting Committee of AAS 239th Annual Meeting
2021	Journal Club Organizer for the Center of Multimessenger Astrophysics
2017 - 2022	Guest Lecturer and A Tour of Universe Demonstrator at AstroFest (4-night outreach, 2500+ public visitors)
2018	Astropy Demonstrator at K-12 Educators - Bring Cutting-Edge STEM Research into your Classroom (2-day outreach, 100+ high-school teachers)

REFERENCES

Dr. Péter Mészáros (nnp@psu.edu)

Eberly Chair Professor, Astronomy & Astrophysics and Physics
Pennsylvania State University, USA

Dr. Kohta Murase (murase@psu.edu)

Associate Professor, Physics and Astronomy & Astrophysics
Pennsylvania State University, USA

Dr. Dafne Guetta (dafneguetta@braude.ac.il)

Professor of Physics, ORT Braude College, Israel

Dr. Donghui Jeong (djeong@psu.edu)

Associate Professor, Astronomy & Astrophysics
Pennsylvania State University, USA