

Ian Holst

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[arXiv](#) | [INSPIRE](#) | [ADS](#) | [Google Scholar](#) | [ORCID](#) | [Website](#)

Education

- 2020 – now **University of Chicago**
Ph.D. Candidate in Astrophysics
Advisors: Edward W. “Rocky” Kolb, Dan Hooper
- 2019 – 2020 **Perimeter Institute for Theoretical Physics / University of Waterloo**
M.S. in Physics, Perimeter Scholars International (PSI)
Advisor: Latham Boyle
- 2015 – 2019 **Carnegie Mellon University**
B.S. in Physics

Research Experience

- 2025 – 2026 **SLAC National Accelerator Laboratory** – Visiting Student
2024 **Laboratoire d’Annecy-le-Vieux de Physique Théorique (LAPTh)** – Visiting Researcher
- 2020 – 2026 **UChicago Astro / Kavli Institute for Cosmological Physics** – Graduate Student Researcher
- 2019 – 2020 **Perimeter Insitute** – PSI Student
2018 **Perimeter Insitute** – Summer Undergraduate Student
- 2016 – 2019 **Astrobotic Technology Inc.** – Future Missions and Technologies Intern
- 2016 – 2018 **CMU Physics** – Undergraduate Research Assistant
- 2016 – 2017 **CMU Field Robotics Center** – Research Assistant

Awards, Fellowships, and Honors

- 2025 **DOE Office of Science Graduate Student Research Fellowship (SCGSR)** – Awarded to carry out dissertation work at SLAC National Accelerator Laboratory for one year
- 2024 **Brinson Fellowship** – Awarded at University of Chicago to carry out research during summer quarter
- 2019 **Perimeter Scholars International Award** – Awarded to cover tuition and other costs of PSI program
- 2019 **Phi Beta Kappa** – Honor society inductee
- 2017 **Michael McQuade Research Scholarship** – Awarded to support undergraduate summer research at Carnegie Mellon University

Skills

- **Programming:** Python, Mathematica, C++
- **Tools:** L^AT_EX, UNIX, Git
- **Web Design:** HTML, CSS, JavaScript

Teaching

Teaching Support Manager at University of Chicago Winter – Spring 2025

- Replaced departing full-time staff member during 2 quarters
- Trained and oversaw TAs in laboratory components of 5 astrophysics courses
- Developed and maintained course materials including lab manuals, software, and equipment
- Participated in hiring and training of replacement staff

Teaching Assistant at University of Chicago 2020 – 2025

- ASTR 12600: Matter, Energy, Space, and Time Autumn 2024
- Tutor for astronomy students taking physics courses Spring 2024
- ASTR 24100: Physics of Stars Winter 2024
- ASTR 12720: Exoplanets Spring 2022
- ASTR 12710: Galaxies Winter 2022
- ASTR 12700: Stars Autumn 2021
- ASTR 12610: Black Holes Spring 2021
- ASTR 12710: Galaxies Winter 2021
- ASTR 12700: Stars Autumn 2020

Physics Course Center Tutor at Carnegie Mellon University 2018 – 2019

- Provided academic support to students during walk-in sessions for all physics courses

Talks

- Nov 2024 **Chicago-Area Pheno Symposium**, UIUC: “Tidal Effects on Primordial Black Hole Capture in Neutron Stars”
- May 2024 **DPF-PHENO**, Pittsburgh: “PBH Mergers in PBH Clusters during PBH Domination”
- Sep 2023 **UChicago GIST Talks**: “How to pick better colormaps (or, why you shouldn’t use the rainbow)”
- June 2022 **Chicago-Area Pheno Symposium**, UChicago: “The Simplest and Most Predictive Model of Muon $g - 2$ and Thermal Dark Matter”
- June 2020 **PSI Master’s Thesis Defense**, Perimeter Institute: “Quantum Cosmology and Path Integrals in the CPT -Symmetric Universe”
- Aug 2018 **Cosmology Group Meeting**, Perimeter Institute: “Forecasting Primordial Non-Gaussianities with Galaxies, kSZ, and CMB Lensing”

Other Activities

- 2024 **TASI Participant** – Selected to participate in the Theoretical Advanced Study Institute summer school in theoretical particle physics at University of Colorado Boulder
- 2023 – 2025 **Theory Ramble** – Initiated and organized a weekly student-led theoretical physics discussion group at University of Chicago
- 2022 – 2025 **Curriculum Committee Member**, UChicago Astronomy & Astrophysics Department – Served as graduate student representative on department-wide committee, advocating for and achieving improvements in the PhD program curriculum

Publications

- [1] **I. Holst**, Y. Génolini, and P. D. Serpico, “Tidal effects on primordial black hole capture in neutron stars,” *JCAP* **09** (2025) , [arXiv:2505.04709](#) [[astro-ph.HE](#)].
- [2] **I. Holst**, G. Krnjaic, and H. Xiao, “Clustering and runaway merging in a primordial black hole dominated universe,” *Phys. Rev. D* **112** (2025) , [arXiv:2412.01890](#) [[astro-ph.CO](#)].
- [3] **I. Holst** and D. Hooper, “A New determination of the millisecond pulsar gamma-ray luminosity function and implications for the Galactic Center gamma-ray excess,” *Phys. Rev. D* **111** (2025) , [arXiv:2403.00978](#) [[astro-ph.HE](#)].
- [4] **I. Holst**, W. Hu, and L. Jenks, “Dark matter isocurvature from curvature,” *Phys. Rev. D* **109** (2024) , [arXiv:2311.17164](#) [[astro-ph.CO](#)].
- [5] A. Dekker, **I. Holst**, D. Hooper, G. Leone, E. Simon, and H. Xiao, “Diffuse ultrahigh-energy gamma-ray emission from TeV halos,” *Phys. Rev. D* **109** (2024) , [arXiv:2306.00051](#) [[astro-ph.HE](#)].
- [6] **I. Holst**, D. Hooper, G. Krnjaic, and D. Song, “Twin sterile neutrino dark matter,” *Phys. Rev. D* **109** (2024) , [arXiv:2305.06364](#) [[hep-ph](#)].
- [7] H. Trac, N. Chen, **I. Holst**, M. A. Alvarez, and R. Cen, “AMBER: A Semi-numerical Abundance Matching Box for the Epoch of Reionization,” *Astrophys. J.* **927** (2022) , [arXiv:2109.10375](#) [[astro-ph.CO](#)].
- [8] **I. Holst**, D. Hooper, and G. Krnjaic, “The Simplest and Most Predictive Model of Muon $g - 2$ and Thermal Dark Matter,” *Phys. Rev. Lett.* **128** (2022) , [arXiv:2107.09067](#) [[hep-ph](#)].
- [9] F. Gray, **I. Holst**, D. Kubiznak, G. Odak, D. M. Pirvu, and T. R. Perche, “Conformally Coupled Scalar in Rotating Black Hole Spacetimes,” *Phys. Rev. D* **101** (2020) , [arXiv:2002.05221](#) [[hep-th](#)].