

Niko Kopparapu

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Education

Massachusetts Institute of Technology

Sep 2023-May 2027

BS in Physics and Mathematics

- Physics Coursework: General Relativity, Astrophysics II, Quantum Physics I-III, Statistical Physics
- Math Coursework: Differential Geometry, Functional Analysis, Real Analysis

Research

Formation of Extremal Black Holes in Spherically Symmetric Einstein-Maxwell Charged Scalar Field System

Feb 2026-present

MIT Department of Mathematics - Advisor: Christoph Kehle

- Studying the formation of extremal (zero surface temperature) black holes in the spherically symmetric Einstein-Maxwell charged scalar field system. The project aims to extend recent work on the collapse to extremal Reissner-Nordström black holes by removing the coupling constant-mass requirement $|\epsilon M| \gg 1$ and proving that extremal formation can occur even for $|\epsilon M| \ll 1$.

Identifying Stellar Binaries with Machine Learning

Feb-Aug 2025

MIT Kavli Institute - Advisors: Andrew Vanderburg, Emily Pass, Javier Viaña

- Implemented an ML pipeline to classify stellar binaries in a nearby M-dwarf sample, using ADQL to query Gaia DR3 features/spectra and cross-matching sources with 2MASS, Simbad, and VizieR.
- Designed and trained sequential and multibranch neural networks on Gaia data using TensorFlow, addressed severe class imbalance and limited survey data.

Implementing a GAN to Generate MIDI Music

Jul-Aug 2022

NJ Governor's School of Engineering and Technology

- Created a Generative Adversarial Network (GAN) for music generation, processed and analyzed MIDI files, utilized PyTorch.
- Presented at MIT Undergraduate Research Technology Conference (URTC), paper in IEEE Xplore.

Academic Activities

Physics Directed Reading Program

- IAP 2025: completed readings on gravitational waves & coalescing binaries, [presentation](#). [🔗](#)
- IAP 2026: completed readings on standard/dark sirens and GWs for cosmology.

Wallace Observatory Outreach Program

Dec 2024-present

- Facilitate MIT Wallace Astrophysical Observatory tours for students and visitors
- Received training on Wallace Observatory telescope operation and history

Publications

Implementing a GAN to Generate MIDI Music

Rutgers University

N. Kopparapu, S. Arora, A. Dassler, T. Earls, M. Ferrara, S. Matthew

June 2022

[10.1109/URTC56832.2022.10002181](https://arxiv.org/abs/10.1109/URTC56832.2022.10002181) [🔗](#)

Leadership

PLEASURE@MIT (President, GBM Chair, Workshop Facilitator)

Jan 2024-present

- Facilitate trainings for fraternities, sororities, and athletics teams on sexual violence prevention, healthy relationships, and campus resources.

East Campus and Random Hall CPW/REX Chair

Mar 2024-Sep 2025

- Organized East Campus Residence Exploration (REX) 2025, and Random Hall's Campus Preview Weekend (CPW) and REX 2024-2025
- Raised \$50k in sponsorships, scheduled 200+ events, filed reimbursements, submitted safety plans, managed early return housing and meal plan

Skills and Interests

- **Programming:** Python (TensorFlow, Pandas, Matplotlib, Astroquery, Jupyter), C++, Java, $\text{\LaTeX}$
- **Interests:** general relativity, gravitational waves, analysis & PDEs