Noah Ringrose

726 Broadway, New York, NY 10003 | nmr8481@nyu.edu | (717) 451-8625

Research Interests

Algebraic topology and (higher) category theory in physics: symmetries of QFTs and lattice models and their anomalies, classification of topological phases of matter, higher representation theory, and topological quantum codes.

Education

New York University August 2025 – Present
PhD in Physics

- **Advisors:** Yifan Wang and Aditi Mitra
- **Graduate Level Coursework:** Quantum Field Theory III, String Theory I

Pennsylvania State University, Schreyer Honors College August 2021 – May 2025
BS in Mathematics (Honors) and Physics

- **Thesis:** *Higher Structures from Simple Lattice Models*
- **Advisor:** Adrian Ocneanu
- **Graduate Level Coursework:** Quantum Field Theory I & II, General Relativity, Loop Quantum Gravity, Algebraic Topology, Differentiable Manifolds, TQFT & Higher Representation Theory
- **GPA:** 3.99/4.00

Undergraduate Research Experience

The Ohio State University, Researcher in ROMUS Program May 2024 – August 2024

- Under the supervision of David Penneys and Kyle Kawagoe, I researched the relations between Levin-Wen string net systems coming from unitary fusion categories and anyons in 2+1 dimensional topological phases of matter.
- Developed new unitary movement operators in the Levin-Wen model which move anyons regardless of their type and utilized them to compute categorical data.

Institute for Advanced Study, Park City Mathematics Institute July 2023 – August 2023

- Attended daily lectures by renowned faculty on quantum information theory, focusing particularly on quantum algorithms.
- Engaged in a brief, three-week research project on dynamical systems, particularly focusing on billiard dynamics on Veech surfaces.

Polymath Jr., Remote Researcher June 2023 – August 2023

- Researched exactly solvable lattice models and combinatorial representation theory under the supervision of Ben Brubaker from the University of Minnesota.
- Employed the use of SageMath and Mathematica to compute partition functions and solve for R-Matrices using the Yang Baxter Equation.

Talks and Presentations

GCS25 School: Topological Symmetries and Defects in QFT June 17, 2025
How to Build a Topological Phase Out of a Unitary Fusion Category in Five Minutes (Gong Show Talk)

Joint Mathematics Meetings 2025 January 10, 2025
Generalized Movement Operators for Non-Abelian Anyon Theories

Young Mathematicians Conference August 15, 2024
Generalized Movement Operators for Non-Abelian Anyons

IAS Park City Mathematics Institute August 3, 2023
Billiard Dynamics on Veech Surfaces

Workshops and Schools

2025 Simons Collaboration on Global Categorical Symmetries Annual Meeting November 17-21, 2025
New York University: 726 Broadway, New York, NY

GCS25 School: Topological Symmetries and Defects in QFT June 15-20, 2025
SwissMap Research Station: Les Diablerets, Switzerland

Atlantic TQFT Spring School 2025 May 19-23, 2025
University of New Brunswick: Fredericton, Canada

IAS Park City Mathematics Institute 2023: Quantum Computation July 16 - August 5, 2023
Park City Math Institute: Park City, Utah

Honors and Awards

John and Elizabeth Holmes Teas Scholarship Eberly College of Science
Scholarship September 2024 - Present

- Awarded $24,400 for the 2024-2025 academic year on account of academic excellence and contributions to the physics community.

Elsbach Honors Physics Scholarship Schreyer Honors College
Scholarship August 2022 - May 2024

- Awarded $12,000 over two years for outstanding performance as an honors physics student

Sigma Pi Sigma American Physical Society
National Physics Honors Society March 2022 - Present

- Inducted into the PSU chapter of Sigma Pi Sigma as a first-year undergraduate

Teaching Experience

Prep Expert Remote
Private Tutor March 2022 - May 2024

- Tutored high school students in standardized tests and math/physics courses, specifically focusing on AP Calculus, AP Physics, and the SAT.
- Coordinated with parents to come up with lesson plans for students, schedule meetings, and discuss progress.