

Welcome to MACROS 2026

Hosted by:
Institute for Gravitation and the Cosmos
IGC

Run by:

Multimessenger Astrophysics of High-Energy Cosmic
Neutrinos Focus Initiative
NuMMA FI



PennState





MACROS 2026

Neutrino Astrophysics Workshop

April 23–24, 2026

Penn State University | University Park, PA

Institute for Gravitation and the Cosmos (IGC)



FOUNDATION & LEADERSHIP

- Formed in 2007 by **Abhay Ashtekar**
- Current Director: **Sarah Shandera**

MISSION

- Joint Institute: Math, Physics, & Astronomy
- Supporting a vibrant postdoc community

Research Centers

Structure as of last year

- Center for Multi-Messenger Astrophysics
- Center for Observational and Theoretical Cosmology
- Center for Fundamental Theory

IGC Redesign: Centers to Focus Initiatives

The Shift: Focus Initiatives

- FIs are more specific and operate on a 3-year timeline
- Designed to naturally evolve with scientific trends
- Achievable goals in a typical grant and Postdoc timeframe
- New FIs selected annually from competitive proposals

Inaugural Initiatives

3 FIs chosen to start this semester

Collaboration on Gravitational Discovery for Particle Physics

Open Quantum Universe

Multimessenger Astrophysics of High-Energy Cosmic Neutrinos

Collaboration on Gravitational Discovery for Particle Physics

FOCUS INITIATIVE DETAILS

Aims to study dark matter in the scenario that it interacts with standard model particles through gravity.

FI HEAD

Chad Hanna



Open Quantum Universe

FOCUS INITIATIVE DETAILS

Aims to apply the principles of quantum information and condensed matter to cosmology.

FI HEAD

Eugenio Bianchi



Multimessenger Astrophysics of High-Energy Cosmic Neutrinos

FOCUS INITIATIVE DETAILS

Aims to exploit astrophysical neutrinos to perform physics and astrophysical studies.

FI CO-HEADS

Stephanie Wissel
Jimmy DeLaunay



The Three FI Pillars

OTHER FI LEADS

Carlos Blanco, Doug Cowen,
Derek Fox, Kohta Murase



* Shameless AI Image

Goals of this Workshop

SCIENCE & FUTURE

Discuss what physics and astrophysics we can do with cosmic neutrinos now and in the future.

COLLABORATION

Form connections and possibly collaboration between Early Career Researchers

- those who will be executing the future of the field alongside you

FOUNDATION

Help form the foundation of this FI.

Schedule

DAY 1

Detection of UHE neutrinos & BSM studies

DAY 2

Multi-Messenger Astrophysics with neutrinos

DAILY AGENDA

- Morning talks by leading ECRs in the field
- Lunch here
- Afternoon talks
- Speaker Panel on the day's topic
- Discussion session lead by you all

Discussion Sessions

The last session of each day will be an **open discussion** on the day's topics.

Moderated by session organizers who are in charge of gathering topics or questions from you all throughout the day.

DAY 1

Nick Kamp and Yuchieh Ku

DAY 2

Rostom Mbarek and Abhishek Das

Closing Thoughts

I encourage you all to **meet new people, discuss science, and have fun!**