

Global Neutrino Network (GNN) Meeting 2026 (formerly MANTS)

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Nikhef

Book of Abstracts

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Topical Sessions / 1**MCEq: latest updates and future roadmap****Author:** Stefan Fröse¹¹ *High Energy Theory Group, Academia Sinica***Corresponding Author:** stefanfrose@as.edu.tw

We would like to present the latest updates and future roadmap of MCEq (Matrix Cascade Equations), the atmospheric lepton flux modeling tool. MCEq now supports the newest hadronic interaction models (SIBYLL-2.3e, QGSJet-III, EPOS-LHC-R), updated cross-sections, and improved low-energy fluxes in the GeV range. With MCEq seeing growing popularity across the neutrino telescope community, this presentation aims to inform users about the current state and planned developments, and to gather feedback that shapes our priorities.

Topical Sessions / 2**High energy DIS neutrino cross section using 10 years of IceCube data****Author:** Colton Hill¹¹ *Technical University of Munich***Corresponding Author:** chill@icecube.wisc.edu

I would like to give a talk on my measurement of the high energy DIS neutrino cross section using 10 years of IceCube data. This is a mature result approaching publication, but has not yet been shown to the wider community. The neutrino cross section is a shared model parameter and systematic uncertainty for neutrino telescopes. Even with FASER's measurements up to a few TeV, a gap exists between IceCube's initial 1 year measurement, starting around 10 TeV. My result unifies the beam-line (FASER) and legacy IceCube measurements with an expanded suite of systematic uncertainties, vastly increased statistics, and overall reduced uncertainties at the sub-10% levels up to neutrinos energies of 200 TeV and a factor 2 increase in sensitivity between 200 TeV to 10 PeV.

Topical Sessions / 3**POLARIS - new sparse radial detector concept for an underwater neutrino telescope****Corresponding Author:** khymon@as.edu.tw

We would like to present POLARIS, a new sparse radial detector concept for an underwater neutrino telescope, simulated using the Prometheus framework. The design targets multi-PeV horizontal tracks with minimal instrumentation density of around 1000 DOMs. We evaluate the astronomy potential of this design through 5-sigma point source detection flux normalization and diffuse flux limit, benchmarking against IceCube, KM3NeT ARCA, TRIDENT, TAMBO and RNO-G. Such a sparse detector concept could achieve competitive sensitivity in the PeV range, representing a compelling pathway toward PeV neutrino astronomy and a potential reference design for rescaling detectors currently in the planning phase.

Topical Sessions / 4**Inclusive Search for Taus and Charmed Hadrons in IceCube****Author:** Miaochen Jin¹¹ *Harvard University***Corresponding Author:** miaochenjin@g.harvard.edu

I would like to give a talk on my current analysis in IceCube. The name of the analysis is: Inclusive Search for Taus and Charmed Hadrons in IceCube. This is relevant in the GNN meeting since similar searches are being performed in KM3NeT. My analysis will be the first one in IceCube that inclusively treats Taus and charms in the full pipeline from simulation to analysis. I think this will be useful for the GNN community.

Topical Sessions / 5**Lorentz Invariance Violation with high-energy neutrinos and gamma-ray bursts****Author:** Mathieu Lamoureux¹¹ *APC***Corresponding Author:** mlamoureux@km3net.de

We are performing a search using ANTARES data, exploiting expected time delays between neutrinos and a gamma-ray burst onset, in the presence of Lorentz Invariance Violation (LIV). There are publications from theorists performing a similar search with IceCube public HESE data; they found a hint with a LIV scale of 1/20th of the Planck mass. We used the same data in our full statistical framework and got the same best-fit point.

It would be good to confirm this with internal IceCube data and, eventually, to discuss how we could perform a combined analysis with multiple telescopes, eventually beyond the case of gamma-ray bursts.

Topical Sessions / 6**GraphNet-based triggers for Neutrino Telescopes****Author:** Ruohan Li¹¹ *Technical University of Munich***Corresponding Author:** ruohan.li@tum.de

The presentation will show the preliminary results of GraphNet(graphic neuron network) application on neutrino telescope as a trigger algorithms. Since the application does not limit on a specific experiment, GNN is a good place to discuss it in community.

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The POCAM Calibration Devices

Authors: Elena Manao¹; Leonhard Eidenschink²

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I am part of a group of people working on the POCAM (Precision Optical CALibration Module), a calibration device developed at TUM designed to emit isotropic light to study detector systematics.

14 POCAMs have been successfully deployed in the IceCube Upgrade. We would like to present preliminary results from data collected during the devices' deployment and in the first weeks of operation, when the ice columns were refreezing. We believe this is of interest to the community, as there have been discussions about the possibility of deploying a similar instrument also in water-based neutrino telescopes such as KM3NeT.

The talk will be shared with Leonhard Eidenschink, a PhD student from TUM.

Topical Sessions / 8

GFU-cluster alerts in IceCube and Extension to joint IC-KM3NeT

Author: Sarah Louise Mancina^{None}

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I would like to present recent developments in IceCube's GFU-cluster alerts along with preliminary efforts to extend this framework to a joint IceCube-KM3NeT alert stream for identifying neutrino flares. The GNN meeting would be an excellent venue for this discussion as it brings together the neutrino telescope community and provides a forum to exchange ideas on the technical and organizational challenges of real-time data sharing. Despite the many difficulties, a joint-experiment real-time system would improve the robustness and timeliness of neutrino flare alerts for the multi-messenger community.

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Combined analyses with pyForwardFolding (pyFF)

Authors: Anke Mosbrugger¹; Oliver Janik¹

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pyFF is a new open-source framework, handling forward-folding analyses. With that, it can be used for various analyses in all GNN collaborations. An explicit future goal is to perform a joint IceCube-ARCA analysis on the galactic plane. We want to present this tool to the GNN audience to motivate stronger contributions to joint detector analyses.

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Updates to the modeling of the downgoing atmospheric neutrino self-veto using BDTs

Author: Zoë Rechav¹

¹ *University of Wisconsin at Madison*

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The atmospheric neutrino self-veto plays a critical role in characterizing the atmospheric neutrino background, not only for IceCube but for neutrino telescopes in general. I would like to present recent updates to the modeling of the downgoing atmospheric neutrino self-veto in IceCube using gradient boosted decision trees. The GNN meeting is ideal for this contribution, as this work directly aligns with GNN's goals of fostering collaboration, enabling comparisons across detectors with different systematics and contributing to a more unified treatment of atmospheric neutrino backgrounds across neutrino telescopes.

Topical Sessions / 11

Machine-learning-based optimization of neutrino telescope designs

Author: Kristian Tchiorniy¹

¹ *Technical University of Munich*

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I work on machine-learning-based optimization of neutrino telescope designs (i.e. string placement) (with a focus on the future design of P-ONE). I think it would be relevant and I would want to see if there is interest to apply this to other experiments.

Topical Sessions / 12

IceCube Galactic Plane results using a combined data set

Author: Matthias Thiesmeyer¹

¹ *University of Wisconsin-Madison*

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I would like to give a talk on the most recent IceCube Galactic Plane results using a combined data set. In the talk, I can include many things we have learned about combining data sets and the galactic plane that go beyond the usual measurement results shown at conferences. This could include interesting details learned by combining data sets and techniques used in the actual measurement. The talk could also include an outlook on future follow-up characterization of the galactic center as a potential source.

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TAMBO - a new neutrino telescope to be deployed in a deep valley

Author: Will Thompson¹

¹ *Harvard*

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I would like to give a presentation on TAMBO, which is a new neutrino telescope to be deployed in a deep valley. GNN would be a great forum in which to discuss TAMBO as the it is in line with the meeting expanding from its prior MANTS focus, to neutrino telescopes more broadly. Additionally, we are currently in the R&D stage of TAMBITO, the TAMBO prototype. Feedback from the community at this stage would be particularly useful to guide the prototype as it comes into existence.

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IceCube searches for high-energy neutrinos from gravitational-wave events in real time

Author: Jessie Thwaites¹

¹ *Queen's University*

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I would like to give a talk about “IceCube searches for high-energy neutrinos from gravitational-wave events in real time”. The GNN meeting is a good venue for this because real time multimessenger astrophysics requires global collaboration between collaborations, and these are exciting sources for neutrino detectors in all GNN collaborations to search for.

Topical Sessions / 15

A software tool to interpolate neutrino cross sections between different generators

Author: Alexandra Trettin¹

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I would like to present a software tool to interpolate neutrino cross sections between different generators, and to construct correlated, data driven cross section uncertainties across reactor, accelerator, atmospheric and cosmic neutrino energies. This tool would enable global analyses of different types of neutrino experiments by unifying the cross section uncertainties. A first working version of the tool will be presented.

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P-ONE Optical Module production

Author: Laura Winter¹

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We use 3 inch PMTs from Hamamatsu. The PMTs are optically coupled to the glass with individual gel pads. Additionally, a spring-loaded system presses them against the glass and holds them in place. The GNN collaboration could benefit from this talk by discussing new ideas and developments for optical module design and production.

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NEPTUNE transformer models and its usage in a new event selection

Author: Felix Yu^{None}

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I want to give a talk about my machine learning work in IceCube (specifically regarding the NEPTUNE transformer models and its usage in a new event selection). I will be discussing aspects and features of the model and its training procedure that will be applicable and useful to any type of ML-based model, which should make it interesting across experiments.