GNN Monthly
The Global Neutrino Network 103rd Edition February/ March (3/29) 2026
https://www.globalneutrinonetwork.org/

GNN Dissertation Prize

11 dissertations have been submitted and are presently under evaluation.

GNN Meeting

The GNN Meeting (formerly known as MANTS) will take place on May 25 and 26 at Nikhef/Amsterdam. An indico page has been set up. Registration is open. https://indico.nikhef.nl/event/7529/.

The Meeting Organizing Committee met twice until now. Several points have been discussed. For instance, the plan is to not have long summary talks from each experiment and instead to have a "special edition" of GNN Monthly just before the GNN Meeting with updates from each collaboration.

At the meeting itself, we would then be able to dedicate more time to individual presentations and discussion. We would only start with very brief "introductions" from new experiments and very brief updates from anyone who has news, e.g. the IceCube Upgrade or possibly the GVD expedition. There is only one hour of the total time set aside for that.

In addition, a list of "Questions for the collaborations" will soon be posted to the Indico page and kept updated. There will also be a link available for any member of the GNN collaborations to submit their own questions. The committee found that this would be a good way to quickly get an overview over which points people wanted to discuss and to help potential participants to find out whether topics of their interest will be discussed. Participants are also invited to submit requests for own talks, but given the 2-day duration of the meeting the organizing committee may have to select talks which fit the program best.

Needless to say, that further cooperations under the GNN roof will be discussed and fostered.

This GNN Meeting offers the chance to look deeper in methods and challenges (in good old times called "problems") and to be more productive than the previous ones. That, at least, is my expectation.

MACROS 2026

MACROS 2026, a neutrino-focused multi-messenger astrophysics meeting, will be hold at Penn State on April 23 and 24. Although this is only a bit more than 3 weeks ahead, there is still time to register. There is no registration fee, the program will focus on early-career researchers and their results. See more at https://events.icecube.wisc.edu/event/393/.

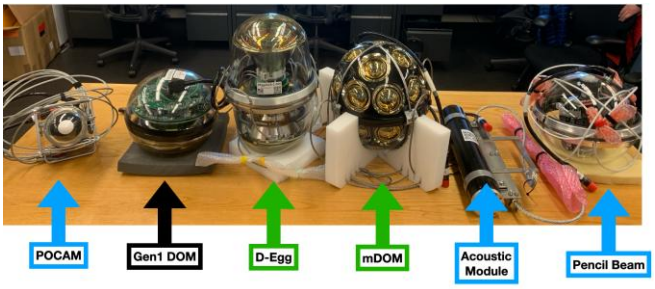
News from the experiments

IceCube

Five of the six deployed Upgrade string are taking data. At March 11, communication with string 87 (the first of the six strings deployed) was lost. Diagnostic measurements indicate a cable break at a depth of

around 700 m. As a result, all modules on the string are unresponsive, and the string is not currently expected to return to operation. Actually, during the drilling of string 87, the drill remained at a depth of around 680 m for an extended period, creating a wider hole at that depth. This led to slower and different refreezing conditions compared to the other holes -- one of the possible hypotheses, with a straight impact on future deployments. Such a failure has never happened in IceCube. The incident is under investigation, including steps to prevent this kind of failure from occurring again.

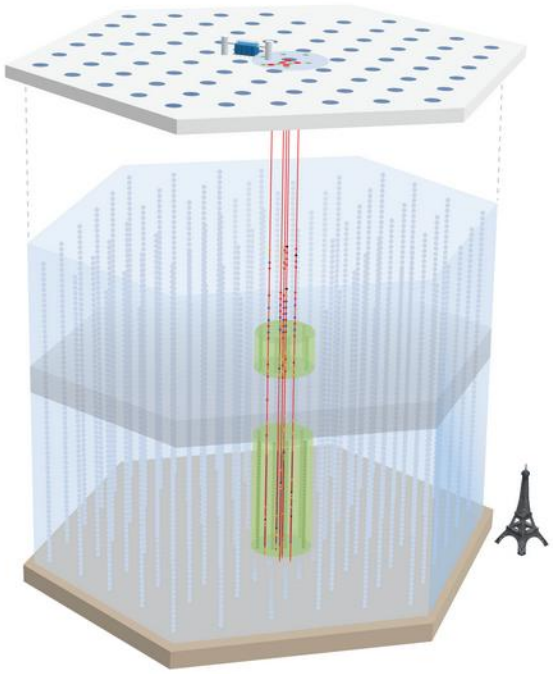
There is no impact on understanding the performance of the new optical modules and on the study of ice properties, since string 87 did not comprise any device which is not also present along other strings. Based on preliminary indications, one expects the impact on low-energy event rates to be modest.



DOMs and special devices. Gen1 DOM is the DOM with a single 10" PMT as used in IceCube, D-Egg and mDOM the DOMs deployed in the Upgrade. POCAM stands for Precision Optical Calibration Module. More on the special devices in one of the next GNN Monthly.

Group photo of IceCube Upgrade team with the drill tower, hose reel and IceCube Lab in the background. Credit: Colton Hill, IceCube/NSF

Here is the actual configuration of IceCube, with the five operating new strings in red and the instrumented volume of DeepCore in green.



Baikal GVD

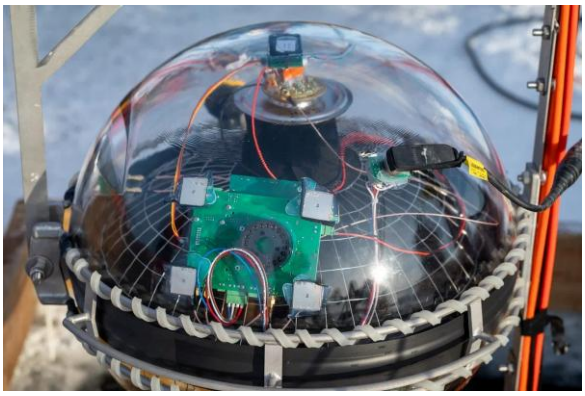
Two new clusters have been deployed this season, so that GVD now comprises 16 clusters in total. Both clusters contain the nominal 8 strings plus one "external" string to fill the room between the clusters. These new clusters are connected to shore via a double-headed electro-optical cable which was laid also this season. Last but not least, two Chinese test strings with a total of 42 OMs have been deployed.

Nikolaj (Kolja) Budnev, Baikal neutrino pioneer from the first hours on, at a winch.

Here are some more photos from the expedition:

Cutting an ice hole

View from the top of a winch



Many (top) and one (bottom) of the Chinese OMs

Zhan Dzhilkibaev, Igor Belolaptikov and Alexander Doroshenko

Bair Shaibonov (JINR Dubna) took most of the photos shown on this page.

Five proud members of the Chinese Crew

KM3NeT

Collaboration Meeting: End of January, The KM3NeT Collaboration gathered in Valencia, Spain, for the first Collaboration Meeting of 2026. During the meeting, the KM3NeT Collaboration welcomed the Ruhr-Universität Bochum (Germany) and the University of Turku (Finland), with research teams led respectively by Anna Franckoviak and Elina Lindfors, as newest observer institutes.

Additionally, the Valencia meeting saw the announcement of the latest winners of the Giorgos Androulakis Prize, which is assigned for recognizing exceptional dedication and achievements by early-career scientists and technicians and engineers: Alfonso Garcia Soto, Lizeth Morales Gallegos, Alexander Enzenhöfer and Irene Sgura (see the webpage for details).

The award ceremony in Valencia – standing, from left to right: Alfonso Garcia Soto, Lizeth Morales Gallegos, Paul de Jong (KM3NeT spokesperson), Vincent Bertin (receiving the prize on behalf of Alexander Enzenhöfer), Irene Sgura.

ARCA: The "Nautilus" funding proposal was approved by INFN. It contains a modest number of DUs (aka strings) for ARCA but is important for extension of the underwater infrastructure for ARCA (junction boxes). It funds ARCA sea campaigns, contains funds for an upgrade of the ARCA shore station, and has funds to hire additional staff. A second proposal for adding more DUs is still under review.

At present, 45 of the deployed 51 DUs can be read out and are taking data. Four strings cannot be powered. Two of them are at the edge of the field and are accessible. They will likely be recovered and replaced this summer. The remaining two can be powered. One shows some effects which are not fully understood, the other one just needs a new server at shore.

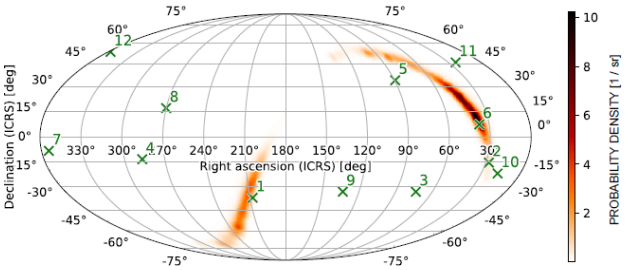
ORCA: The next ORCA sea campaign is foreseen for April 13-19, depending, as always, on weather conditions. All 33 deployed ORCA strings are taking data.

Masterclasses: In the last March week, the collaboration had the first KM3NeT Masterclasses for high school students, at seven institutes in the collaboration. They follow the concept of the IPPOG masterclasses which are typically focused on working with LHC data. For these masterclasses students classified some events from event displays and videos, performed a time calibration (!) and searched for point sources in a data set.

Publications

The IceCube, LIGO and Virgo collaborations have posted a paper *Deep Search for Joint Sources of Gravitational Waves and High-Energy Neutrinos with IceCube During the Third Observing Run of LIGO and Virgo* at https://arxiv.org/pdf/2601.07595.
Main authors are Zsuzsa Márka, Doga Veske and Albert Zhang (Columbia Univ., NY).

Including sub-threshold events, they searched for common sources of gravitational waves and high-energy neutrinos. The next figure gives an example for the localization of one of the GW events and the IceCube neutrinos registered in the corresponding time window.



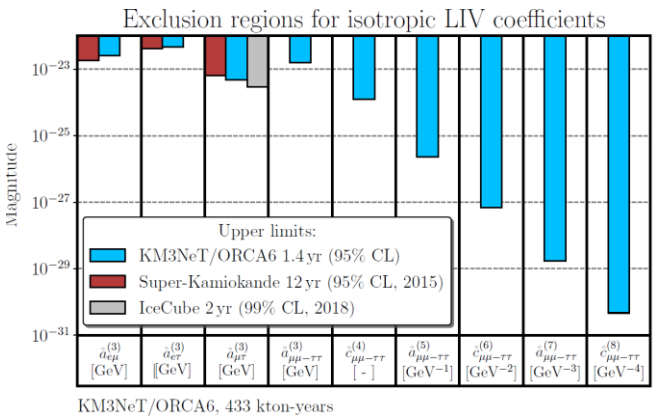
Joint sky localization showing all neutrino candidates coincident with GW BNS candidate at GPS time = 1262142545.615. Neutrino #6 gives the dominant contribution to the significance.

The search did not identify significant joint sources. The authors derive constraints on the rate densities of joint sources. The results constrain the isotropic neutrino emission from gravitational-wave sources for very high values of the total energy emitted in neutrinos (> 10^{52}–10^{54} erg).

The KM3NeT collaboration has posted a paper *Atmospheric neutrino constraints on Lorentz invariance violation with the first six detection units of KM3NeT/ORCA* at https://arxiv.org/pdf/2603.04264. Main authors are Lukas Henning and Alba Domi (both University Erlangen).

The paper presents a search for isotropic Lorentz invariance violation with 1.4 years of atmospheric neutrino data collected by a partial configuration of the KM3NeT/ORCA detector comprising six detection units.

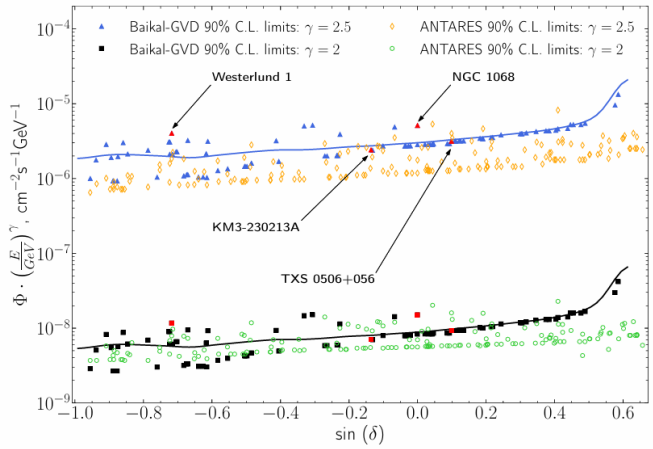
No evidence for such a violation is found; thus, competitive limits are set on a subset of isotropic Lorentz invariance violating coefficients, which complement and extend existing experimental constraints (see the figure, and for the definition of the LIV coefficients the paper).



Exclusion regions for isotropic LIV coefficients obtained with 1.4 years of ORCA6 data. The regions are compared to previous upper limits set with 12 years of Super-Kamiokande data and 2 years of IceCube data.

The Baikal-GVD collaboration has posted a *paper First constraints on point-like astrophysical sources using Baikal-GVD muon neutrino events* at https://arxiv.org/pdf/2603.21261. Main authors are Evgenii Bondarev and Dmitry Zaborov (both INR Moscow).

The analysis uses track-like events collected between April 2019 and March 2024 (total live time of about 30 cluster-years equivalent to 1.5 km^3-years) to search for muon neutrino fluxes from a list of 92 astrophysical objects of interest. For this, a χ^2-based track reconstruction method is used along with a cut-based analysis (i.e. not the maximum likelihood method used in IceCube and ANTARES which also includes energy information). The analysis uses upward-going muons only, providing coverage for declinations between −90° and +38°. No significant excess has been found, so upper limits are reported. The obtained limits are of the same order as those set by ANTARES and KM3NeT (dominated by ANTARES since the statistics of ARCA cannot yet compete with that of ANTARES) – see the next figure. The authors note that the sensitivity at present has an uncertainty of ±35%.



Comparison of the Baikal-GVD results (filled squares and triangles) with the ANTARES 15- year limits (empty circles).

The object with the smallest pre-trial p-value (0.0036) in this analysis is the young star cluster Westerlund 1, which can be called an indication at best.

This analysis has used only single-cluster data, therefore the sensitivity and angular resolution for near-horizon tracks is much worse than for nearly vertical tracks (~ 0.5° for the latter). With the inclusion of multi-cluster tracks the GVD sensitivity over the full declination range will considerably improve.

Miscellaneous

Francis Halzen has won *the APS Medal for Exceptional Achievement in Research***,** the American Physical Society's highest honor. It is for his work in neutrino astrophysics, and especially his “leadership of the IceCube Neutrino Observatory, and the discovery of high-energy astrophysical neutrinos and their sources”. See https://www.youtube.com/watch?v=lYwzUmEougc

Julia Tjus, professor of theoretical physics at Ruhr University Bochum (Germany), associate principal investigator at the Lamarr Institute for Machine Learning and Artificial Intelligence and member of the IceCube collaboration, has been elected as an international member of the Royal Swedish Academy of Sciences (KVA). This membership recognizes her internationally acclaimed research at the intersection of astroparticle physics and AI.

The Royal Swedish Academy of Sciences has only 175 seats for international members, all of whom are elected for life.

Julia has headed the Chair of Theoretical Physics, specializing in plasma and astroparticle physics, at Ruhr University since 2013. She is also an associate researcher at Chalmers University of Technology in Gothenburg, where she was awarded an honorary doctorate in 2025.

Impressum
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