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Baikal Collaboration – Baikal-GVD neutrino telescope

The Baikal Collaboration unites 9 institutions and organizations from 4 countries with the Institute for Nuclear Research in Moscow as the head institute. The primary goal of the collaboration is the development of the Baikal-GVD kilometer scale underwater neutrino telescope and using it to study high energy astrophysical neutrino fluxes and their sources.

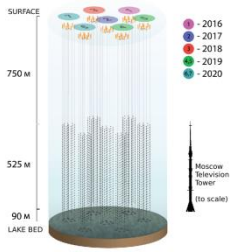
Besides its primary function as a neutrino detector, Baikal-GVD provides a unique opportunity for research in hydrology, limnology, geophysics, hydrooptics, hydroacoustics and hydrobiology.

Unlike other large scale neutrino telescopes of its class, GVD hardware can be accessed and serviced after installation, but this is only possible during the 2 months of the winter expedition, when the lake's ice sheet can provide an adequate support.

Baikal-GVD is a founding member of the Global Neutrino Network (GNN) - a collaboration of large volume neutrino detectors that includes members from United States (IceCube) and Europe (ANTARES and KM3Net).

The primary venues for international collaboration with Baikal-GVD are:

1. Data processing and visualization.
2. Unifying data formats among experiments and data sharing.
3. Developing new types of hardware for the next generation of neutrino detectors.
4. Hydrological, hydrooptic and hydroacoustic research.
5. Utilizing optical communications within clusters of Baikal-GVD
6. Advancing multi-messenger studies



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Instruments:	Domain and object of research : PSE
Baikal-GVD	The GVD detector is a three-dimensional lattice of photomultipliers installed in the Southern basin of Lake Baikal, at the depths between 1275 and 730 meters. The telescope operates by detecting Cherenkov radiation from secondary particles induced by astrophysical neutrinos and then using the acquired information to reconstruct the neutrino's direction and energy. The facility is designed to detect neutrinos with energies ranging from 100s of GeV to multiple PeVs and beyond and is, at the moment, the largest neutrino telescope in the Northern hemisphere. The design of the telescope also allows for using it to study luminescence and deep water dynamics in Lake Baikal, or installing additional research equipment near the lake floor. Baikal-GVD possesses a set of unique, purpose-designed components that includes: a network of hydroacoustic positioning devices; impulse light sources; hardware for measuring hydrological and optic properties of the Baikal water; hardware for measuring variation in the natural electric fields. **Main directions of research are:** - Hydroacoustic positioning and communication. - Optical properties of the water in Lake Baikal. - High energy astrophysical neutrino fluxes, their sources; multimessenger studies. - Water luminescence and deep water dynamics in Lake Baikal.