

Performance of the muon track reconstruction with the Baikal-GVD neutrino telescope

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Baikal-GVD is a cubic-kilometer scale neutrino detector being constructed in Lake Baikal. After the deployment campaign in spring 2020 the telescope includes over 2000 optical modules distributed among 56 strings. Effective volume for the detection of high-energy charged particle cascades constitutes 0.35 km^3 . Muon (anti)neutrino interactions in the vicinity of the detector through the W boson exchange are accompanied by muon tracks. Reconstructed direction of the muon track is the most precise probe of the neutrino direction attainable in Cerenkov neutrino telescopes. Reconstruction techniques adopted by Baikal-GVD include methods for the rejection of noise due to water chemiluminescence and track parameter reconstruction based on χ^2 minimisation. Muon reconstruction performance is discussed in the present report. Performance metrics of the muon reconstruction are studied using realistic Monte Carlo (MC) simulation of the detector. The algorithms are applied to real data from Baikal-GVD and the results are compared with simulations.

Keywords

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Collaboration

other Collaboration

Baikal-GVD

Subcategory

Experimental Methods & Instrumentation

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