

Radio detection of neutrinos in Antarctica

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The radio detection of UHE neutrinos is currently being actively developed. Radio experiments carried out in Antarctica (ARIANNA, ARA, ANITA balloon experiment) are able to scan huge volumes of ice in search of neutrinos.

The scale of the experiments is growing - work is underway to deploy an array of radio detectors in the Greenland Ice Sheet, it is planned to build a new radio detector at the South Pole (IceCube Gen-2 radio) and launch a balloon experiment PUEO.

The detection method is based on the Askaryan effect predicted by a Soviet physicist in 1962. Due to this effect, UHE neutrino-induced cascades in ice radiates in the radio range. And the radio transparency of polar ice makes it possible to cover large volumes of the target with sparse array of radio antennas.

In this work, the abilities of AURA experiment to detect UHE neutrino were explored.

The AURA is a pilot radio experiment whose antennas are deployed in IceCube holes in polar ice at a depth of 200-1500 m. The experiment was carried out from 2006 to 2011 to study the background conditions at the South Pole. Its distinguishing feature is the presence of deeply located antennas.

In the work it is shown which radio noise sources are present at the South Pole and how they affect on the efficiency of neutrino detection. The relationship between settings of the trigger system and the thermal noise level recorded by the equipment has been studied. And the possibilities of the AURA experiment for detecting UHE neutrinos are presented here.

The speaker is a student or young scientist

Yes

Section

1. Neutrino physics and nuclear astrophysics

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