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Tethered Balloons for Radio Detection of Ultra-high Energy Cosmic Neutrinos in Antarctica?

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Abstract

We present a brief overview of experimental efforts in Antarctica to search for radio pulses from electron-hadron cascades produced by cosmic ultrahigh-energy neutrinos in Antarctic ice. Thus far, the essential features (energy thresholds, effective recording volumes, etc.) of Antarctic neutrino radio experiments can be classified according to the deployment scheme employed: either 1. on the surface of the glacier - RAMAND-type, 2. in holes in the ice at depths of several hundred meters - RICE-type, or 3. on board stratospheric balloon, flying at an altitude of 40 km - ANITA-type. We herein propose an alternative possibility, namely to use tethered balloons for placing the radio antennas at modest (compared with ANITA) altitudes above the ice surface (1-2 km). This configuration of antennas (as compared with ANITA) will reduce the energy threshold of detection of neutrinos and increase the observation time.

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