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Feasibility of acoustic neutrino detection in ice: First results from the South Pole Acoustic Test Setup (SPATS)

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Abstract content

Astrophysical neutrinos in the EeV range (particularly those generated by the interaction of cosmic rays with the microwave background) promise to be a valuable tool to study astrophysics and particle physics at the highest energies. Much could be learned from temporal, spectral, and angular distributions of ˜100 events, which could be collected by a detector with ˜100 kmˆ3 effective volume in a few years. It would be prohibitive to scale the optical Cherenkov technique to this sensitivity. However, using the thick ice available at the South Pole, the radio and acoustic techniques promise to provide sufficient sensitivity with sparse instrumentation. The best strategy may be a hybrid approach combining all three techniques. A new array of acoustic transmitters and sensors, the South Pole Acoustic Test Setup, was installed in three IceCube holes in January 2007. The purpose of SPATS is to measure the attenuation length and both Gaussian and transient background noise for 10-100 kHz acoustic waves. Favorable results would pave the way for a large hybrid array. SPATS is the first array to study the possibility of acoustic neutrino detection in ice, the medium expected to be best for the purpose. The first results from SPATS will be presented.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 5 (HE part 2), pages 1605-1608

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