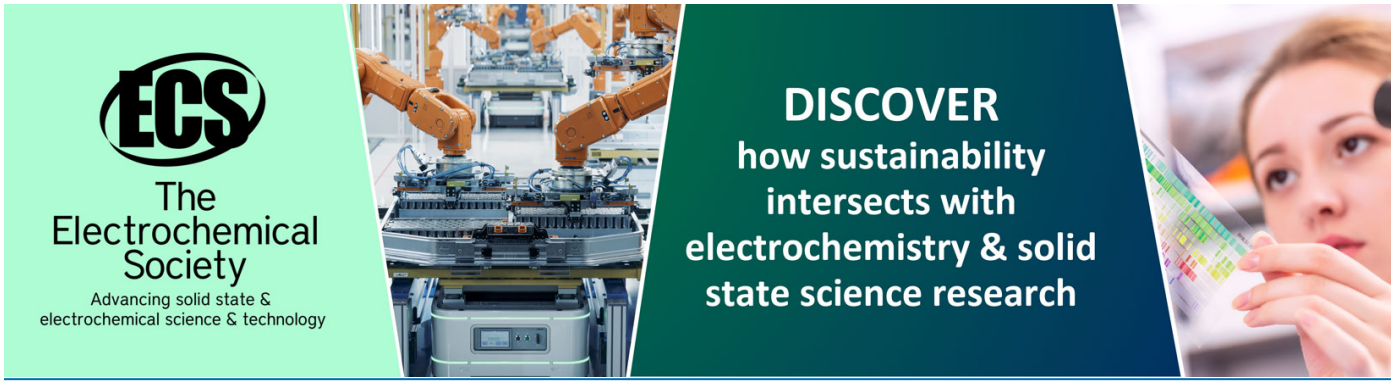
Measurements of Antarctic ice properties for acoustic neutrino detection



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Measurements of Antarctic ice properties for acoustic neutrino detection

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Detection of the faint flux of neutrinos from interactions of the highest energy charged cosmic partic1es with microwave background photons with a reasonable number of events would contribute to answering interesting questions of partic1e physics as well as astro-partic1e physics and cosmology. This needs however detector volumes 100 times larger than the biggest optical neutrino telescopes presently under construction. The use of at least two technologies with different systematics would help to fight the large background expected to hide the small signal.

A hybrid optical-radio-acoustic array suggested around the IceCube observatory at the South Pole seems to be a promising option for such an experiment. This is the reason for an extensive evaluation of the acoustic properties of the ice at the Pole with the help of the South Pole Acoustic Test Setup - SPATS.

SPATS consists of four strings with seven acoustic stations each, deployed in the upper part of IceCube bore-holes down to 400 m to 500 m depth. Each acoustic station has an acoustic transmitter and three acoustic receivers. Data have been taken with since early 2007. During the last Austral summer in addition a movable transmitter was used in several water filled bore-holes aiming in particular for a relative calibration of the setup. Preliminary results are presented on speed of sound versus depth, noise behavior and attenuation length measurements

