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Use of Radar Depth Sounding Data to Estimate Radio Frequency Attenuation in Greenlandic and Antarctic Ice

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Antarctic ice represents the interaction volume for multiple UHE neutrino experiments. When neutrinos collide with ice particles they produce radio waves that propagate to in-ice, surface, or balloon-borne detectors. The radio frequency signal strength observed at the detector, however, depends on the radio frequency attenuation length of the ice through which the neutrino-generated signal must travel. Attenuation length is a location-specific ice property and varies mainly as a function of temperature and chemistry. The Center for Remote Sensing of Ice Sheets (CReSIS) project has data from many locations in Antarctica and Greenland produced by radar depth sounding. Using methods developed by analyzing the continuum signal in radar depth sounding data from Greenland depth-dependent attenuation length estimates are compared to estimates derived from ice core data. Comparisons between Greenlandic and colder Antarctic ice will also be made.

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