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The IceCube Neutrino Observatory as an Instrument for Glaciology

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The IceCube Neutrino Observatory is a cubic-kilometer array of 5160 photosensors instrumenting the deep, glacial ice at the geographic South Pole. It detects Cherenkov light emitted by charged particles resulting from neutrino interactions. The spatial and temporal distributions of light in the detector allow to infer the energies and directions of the original neutrinos. As the detector instruments a natural medium, precise in-situ investigations of its optical properties are crucial to the performance of the experiment. This talk will provide an overview over the ice optical modeling. This entails Mie scattering induced by impurities deposited over the past 100'000 years of climate history, undulations of the climate stratigraphy due to the underlying bedrock topology, as well as an anisotropic light propagation along the glacial flow direction resulting from the microscopic crystal structure of the ice.

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