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# A novel microstructure based model to explain the IceCube ice anisotropy

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The IceCube Neutrino Observatory instruments about 1 $km^3$ of deep, glacial ice at the geographic South Pole using 5160 photomultipliers to detect Cherenkov light from relativistic, charged particles. Most IceCube science goals rely on precise understanding and modeling of the optical properties of the instrumented ice. A peculiar light propagation effect observed by IceCube is an anisotropic attenuation, which is aligned with the local flow of the ice. Recent efforts have shown this effect is most likely due to curved photon trajectories resulting from the asymmetric light diffusion in the birefringent polycrystalline microstructure of the ice. This new model can be optimized by adjusting the average size and shape of the ice crystals. We present the parametrization of the birefringence effect in our photon propagation simulation, the fitting procedures and results. The impact of the new ice model on the agreement between data and Monte Carlo is also discussed.

## Keywords

calibration; ice properties

## Collaboration

IceCube

## other Collaboration

## Subcategory

Experimental Results

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