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A Precision Optical Calibration Module for IceCube-Gen2

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A next generation of IceCube is under design targeting the Precision IceCube Next Generation Upgrade (PINGU) for the neutrino mass ordering and an extended array for astrophysical neutrino sources. A new level of precision is needed in order guarantee improved performances respect IceCube. A better calibration system will enable a better understanding of the ice and will therefore significantly reduce systematic effects. We present a new instrument called the Precision Optical Calibration Module (POCAM). By keeping the outer topology identical to that of the IceCube Digital Optical Module (DOM), cost effective construction and deployment is ensured. The design of the POCAM is based on the principle of an inverted integrating sphere. An appropriately placed LED in combination with a diffusing layer on the inside of the sphere results in an isotropic light emission from the apertures in the spherical housing. The output of the LED is monitored in-situ to high precision, it therefore ensures control over the output from the apertures. The POCAM has been simulated and tested in the framework of Geant4. A prototype POCAM is under construction. We will report about the status of the POCAM R&D.

Collaboration

IceCube

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