

Abstract Submitted
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Performance Studies for IceCube-Gen2 Optical Sensors DELANEY BUTTERFIELD, University of Wisconsin - Madison, ICECUBE COLLABORATION — A new Cherenkov photon sensor, the Long Optical Module (LOM), is under development for IceCube-Gen2, the proposed expansion to the IceCube South Pole Neutrino Observatory. There are two types of LOMs in development: the LOM16 and LOM18. Our studies concentrate on the LOM16, which is made of 16 4" Photomultiplier Tubes (PMTs) in a glass vessel, distributed uniformly to increase photon detection rate by a factor of 3 compared to the existing modules. The new modules have conical gel pads that interface the PMT sensors to the glass vessel, and will increase module sensitivity and collection efficiency. Part of this enhancement is due to the total internal reflection on the conical side of the gel pads, which helps capture photons which may not have been aimed at the PMT. The alignment of the PMTs and opening angles of the gel pads are crucial to maximizing the photon capture rate. In order to investigate the photon acceptance of the LOM16 module, we generated a ray-trace simulation using Geant4 and calculated the angular acceptance of each PMT in the module to further optimize geometry and PMT alignment. We will provide an overview of the results of our simulations, as well as our design implementation. Prototypes of the modules will be installed and tested in the IceCube Upgrade.

Delaney Butterfield
University of Wisconsin - Madison

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