Contribution ID: **668** Type: **Poster**

Performance Study of the IceCube Upgrade Camera System

The IceCube Neutrino Observatory is a neutrino detector located beneath the glacial ice at the South Pole. The IceCube Upgrade is currently being deployed, adding seven new strings to the central region of the existing array deep under the ice. Each string contains around 100 newly designed optical modules (mDOMs and D-Eggs) along with calibration devices. One of the primary goals of the IceCube Upgrade is to enhance detector calibration and minimize systematic uncertainties associated with the optical properties of the ice. The Upgrade Camera System is designed to measure these properties by analyzing images of illumination light propagating through the ice. The Upgrade Camera system comprises nearly 2,000 cameras and illumination boards: for every D-Egg and mDOM, 3 cameras and 3 and 4 illumination boards are equipped, respectively. By combining transmission and reflection photographic measurements, we aim to characterize the optical properties of both the bulk ice between strings and the refrozen ice within the drill holes, and the system can also be utilized to measure module positions. To maximize the system's performance, various image analysis methodologies have been explored, ranging from classic maximum likelihood estimation to AI-based approaches using neural networks. In this study, we present preliminary performance results obtained through the application of these methods to the anticipated measurements.

Collaboration(s)

IceCube

Authors: ROTT, Carsten (University of Utah); Mr IVERSON, Garrett (University of Utah); JANSSON, Matti; Mr PARK, Minje (SKKU); Ms SEO, Minyeong (SKKU)

Presenter: ROTT, Carsten (University of Utah)

Session Classification: PO-2

Track Classification: Neutrino Astronomy & Physics