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Sensitivity of the IceCube Upgrade to Atmospheric Neutrino Oscillations

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IceCube DeepCore, the existing low-energy extension of the IceCube Neutrino Observatory, was designed to lower the neutrino detection energy threshold to the GeV range. A new extension, called the IceCube Upgrade, will consist of seven additional strings installed within the DeepCore fiducial volume. These new strings will host modules with spacings of about 20 m horizontally and 3 m vertically, compared to about 40-70 m horizontally and 7 m vertically in DeepCore. It will be deployed in the polar season of 2025/26. This additional hardware features new types of optical modules with multi-PMT configurations, as well as calibration devices. This upgrade will more than triple the number of PMT channels with respect to current IceCube, and will significantly enhance its capabilities in the GeV energy range. However, the increased channel count also poses new computational challenges for the event simulation, selection, and reconstruction. In this contribution we present updated oscillation sensitivities based on the latest advancements in simulation, event selection, and reconstruction techniques.

Poster prize

Yes

Given name

Kayla

Surname

Leonard DeHolton

First affiliation

Penn State University

Second affiliation

Institutional email

kayla.deholton@icecube.wisc.edu

Gender

Female

Collaboration (if any)

IceCube Collaboration

Autori principali: WELDERT, Jan (Penn State University); LEONARD DEHOLTON, Kayla (Pennsylvania State University); ELLER, Philipp (Technical University of Munich); ØRSØE, Rasmus (TUM)

Relatore: LEONARD DEHOLTON, Kayla (Pennsylvania State University)

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