Contribution ID: **647**   Type: **Poster**

Neutrino Direction Reconstruction using a CNN for GeV-Scale Neutrinos in IceCube

Thursday 15 July 2021 19:12 (12 minutes)

The IceCube Neutrino Observatory is designed to observe neutrinos interacting deep within the South Pole ice. It consists of 5,160 digital optical modules, which are arrayed over a cubic kilometer from 1,450 m to 2,450 m depth. At the lower center of the array is the DeepCore subdetector. It has a denser configuration which lowers the observable energy threshold to the GeV scale and creates the opportunity to study neutrino oscillations with low energy atmospheric neutrinos. A precise reconstruction of neutrino direction is critical in the measurements of oscillation parameters. In this poster, I will present a method to reconstruct the zenith angle of GeV-scale events in IceCube by using a convolutional neural network (CNN) and compare the result to that of the current likelihood-based reconstruction algorithm.

Keywords

Collaboration

IceCube

other Collaboration

Subcategory

Experimental Methods & Instrumentation

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Session Classification: Discussion

Track Classification: Scientific Field: NU | Neutrinos & Muons