Contribution ID: **21**   Type: **Individual talk**

A Generative Neural Network for Water Cherenkov Reconstruction

Friday, 24 July 2020 11:30 (25 minutes)

Deep neural networks are an area of very active research in neutrino event reconstruction. On the other hand, state-of-the-art reconstruction methods for water Cherenkov detectors use more traditional maximum-likelihood approaches. Here we present initial studies for a convolutional neural network that generates probability density functions for the data (hit charge and time) observed at each photosensor in water Cherenkov detectors. Such a neural network can be used to incorporate high-performance deep learning methods in existing maximum-likelihood reconstruction algorithms. We will discuss merits of this approach, its current status and future plans, such as the development of bespoke loss functions and adversarial training.

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Session Classification: Day 5 Morning