Contribution ID: **45** Type: **Poster**

Denoising Autoencoder for LArTPC Detectors

Monday 10 July 2023 19:00 (2 hours)

We present a denoising autoencoder for extracting low-energy signals in Liquid Argon Time Projection Chamber (LArTPC) detectors. In particular, we are interested in neutrinos originating from core-collapse supernova events, and the detection of these neutrinos can help improve our knowledge of the physics of core-collapse supernova events [1]. Additionally, if we can detect them fast enough, we can provide an alert via the SuperNova Early Warning System, so that other observatories may direct their telescopes and detectors at the supernova. However, these neutrinos can have energies on the order of 10MeV, which makes their detection challenging because the electronic signals resulting from their interaction in liquid argon are close to noise levels. To address this, we apply an autoencoder consisting of convolutional layers to denoise and extract these low-energy signals. We show that the autoencoder can detect the presence of low-energy signals better than a threshold-based method, and we present the model's ability to denoise these signals.

Author: LIAN, Van Tha Bik (Duke University)

Presenter: LIAN, Van Tha Bik (Duke University)

Session Classification: Working dinner