



Contribution ID: 5

Type: **not specified**

Using Convolutional Neural Network for Pulse Shape Discrimination in Liquid Argon

Wednesday, 17 June 2020 13:30 (15 minutes)

The COHERENT collaboration utilizes a suite of detectors to search for CEvNS and associated backgrounds at the Spallation Neutron Source (SNS) at Oak Ridge National Laboratory. CENNS-10, a single-phase liquid Ar detector operating since the spring of 2017, seeks to measure the CEvNS process in Ar. Standard pulse-shape discrimination in Ar makes use of the characteristic scintillation emission timescales to differentiate between gamma/electron-induced events (ER) and nuclear recoils (NR), but the efficacy of this method begins to degrade at lower energies as photon statistics decrease. Machine learning methods which use all information from event waveforms may be capable of improving discrimination at lower energies. This talk will detail an investigation into the usefulness of using a convolutional neural network to discriminate between NR and ER events in CENNS-10.

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Session Classification: Day 1: Afternoon