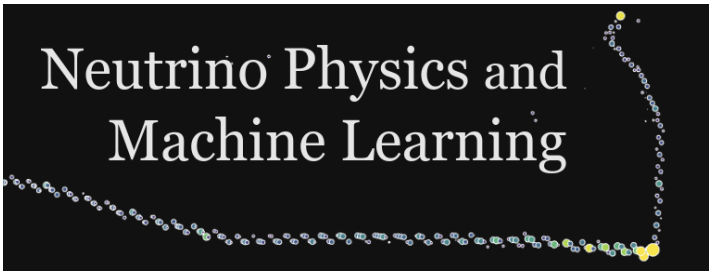

Contribution ID: **7** Type: **Individual talk**

Neutrino energy reconstruction with a regression CNN in the DUNE far detector

Wednesday, July 22, 2020 10:40 AM (25 minutes)

In the framework of three-active-neutrino mixing, the charge parity phase, the neutrino mass ordering and the octant of θ_{23} remain unknown. The primary goal of DUNE is to address these questions by measuring the oscillation patterns of ν_μ and $\bar{\nu}_\mu$ over a range of energies spanning the first and second oscillation maxima, which requires precisely reconstructed neutrino energy spectra. However, energy reconstruction of neutrino events in DUNE presents many challenges due to missing energies caused by argon impurities, nonlinear energy response of the detector, etc. One way of approaching this problem is using machine learning to reconstruct neutrino energies from pixel map images of interactions in the detector. In this talk, a regression convolutional neural network with a custom architecture designed to reconstruct neutrino energies will be presented. Comparing to a traditional method, it shows considerable performance improvements for both ν_e and ν_μ scenarios.

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