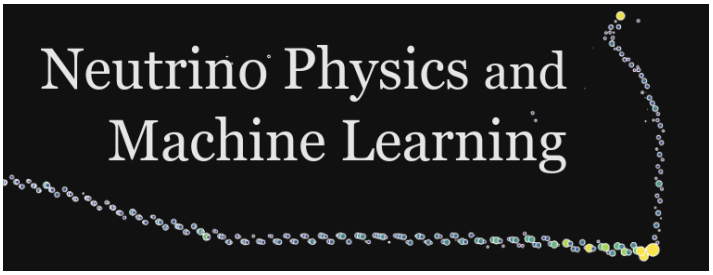

Contribution ID: **33** Type: **Individual talk**

Simulation and Calibration of light response in nEXO detector using machine learning

Tuesday, 21 July 2020 11:30 (25 minutes)

nEXO is a proposed 5 tonne liquid xenon experiment which seeks to detect neutrinoless double beta decay $0\nu\beta\beta$ in Xe-136 using Time Projection Chamber (TPC) technology. The experiment will use the combination of scintillation and ionization signals to reconstruct events with an energy resolution of 1\% σ/E at the \gls{onbb} Q-value. The scintillation light will be collected by silicon photomultipliers (SiPM) around the sides of the detector, and their collection efficiency will vary as a function of event position. We will deploy a suite of calibration sources, including external γ-ray sources and internal sources dissolved in the liquid xenon. In this talk, we present the strategy for simulating and calibrating light response in the nEXO detector. We study a method for fast generation of simulated light signal which involves training a Machine Learning (ML) algorithm with detailed optical simulation data to learn the detector hit pattern as a function of event position and energy. Photon simulation data is then generated for each light detection channel as a function of event position and energy. This method is used to study requirements for the calibration of nEXO light detection system.

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