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Vertex reconstruction at DUNE experiment

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The Deep Underground Neutrino Experiment (DUNE) is a next-generation neutrino oscillation experiment that will examine neutrino interactions to ultimately address some of the most fundamental questions in particle physics. To study neutrinos is very difficult and a more sophisticated reconstruction approach must be developed to fully exploit the high-resolution detection technology used by the DUNE Collaboration. The goal of this project is to develop innovative algorithms to optimize the reconstruction of neutrino interactions in the DUNE 'Far Detector'(FD), while exploiting the full potential of the detector design to maximize the sensitivity to neutrino oscillation parameters. Building on existing efforts in the DUNE Collaboration, the researchers plan to develop a Machine Learning (ML) based framework to perform neutrino event reconstruction in the FD of the DUNE experiment. As such, this project holds great potential to improve techniques crucial to the reconstruction of neutrino energy, which is the key challenge when performing neutrino oscillation analysis with DUNE's wide spectrum of neutrino energies.

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