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Shower reconstruction performance studies for DUNE far detector

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Two of the flagship analyses at the DUNE far detector are to determine the neutrino mass hierarchy and to measure the CP violating phase, using the appearance of electron-neutrino signal events in the far detector. To efficiently select signal events, we require robust shower reconstruction tools to achieve the maximal electron/photon separation. We present a summary of existing shower reconstruction algorithms, and their efficiency and performance by calculating the shower purity and completeness, as well as the dE/dX distributions for electron and photon showers. We also explore possible areas of improvements for the electron shower reconstruction for better electron-neutrino signal reconstruction.

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