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DUNE Analysis Methods and Systematic Uncertainties

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The twin challenges facing the DUNE long-baseline analysis are to extract the maximum statistical power from the Far Detector data while minimizing the impact of systematic uncertainties.

The liquid argon TPCs that make up the DUNE Far Detector will provide outstanding spatial resolution, and should allow neutrino flavours to be separated with high efficiency and purity. However, taking full advantage of this information requires improvements in the state-of-the-art in pattern recognition and particle identification. I
will describe our reconstruction algorithms, and the various deep-learning techniques we are employing in pursuit of this goal.

With the large datasets expected, the second challenge, to minimize systematic uncertainties grows in importance. I will discuss our main sources of uncertainty, how we plan to evaluate their impact, and the
ways in which the analysis procedures are intended to mitigate them.

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