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P2.080 **The Pandora multi-algorithm approach to automated pattern recognition in LAr TPC detectors**

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Pattern recognition is the identification of structures and regularities in data. In high energy physics, it is a vital stage in the reconstruction of events recorded by fine-granularity detectors. The development and operation of Liquid Argon Time Projection Chambers (LAr TPCs) for neutrino physics has created a need for new approaches to pattern recognition, in order to fully exploit the superb imaging capabilities offered by this technology. Whereas the human brain excels at identifying features in the recorded events, it is a significant challenge to develop an automated solution.

The Pandora SDK is a re-usable software development kit which aids the process of designing, implementing and running pattern recognition algorithms. In particular, it promotes the use of a multi-algorithm approach to pattern recognition: individual algorithms each aim to address a specific task in a particular topology. A series of many tens of algorithms then carefully build-up a picture of the event and, together, provide a robust automated pattern recognition solution.

Building on successful use of the Pandora SDK for pattern recognition at collider experiments, a sophisticated chain of algorithms has been created to perform pattern recognition for neutrino experiments utilising LAr TPCs, like MicroBooNE and DUNE. The input to the Pandora pattern recognition is a list of 2D hits. The output from the chain of over 70 algorithms is a hierarchy of reconstructed 3D particles, each with an identified particle type, vertex and direction.

In this poster, we will present details of the Pandora pattern recognition algorithms used to reconstruct cosmic ray and neutrino events in LAr TPCs. We will also present metrics that assess the current performance using simulated data.