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A novel method for event reconstruction in Liquid Argon Time Projection Chamber

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The Liquid Argon Time Projection Chamber (LArTPC) has the potential to provide exceptional level of detail in studies on neutrino interactions - a high prioritory field of Intensity Frontier research. Liquid Argon serves as both
the target for neutrino interactions and the sensitive medium of the detector, which measures ionization produced by
the reaction products. The LArTPC has characteristics suitable for precise reconstruction of infividual tracks as well
as for calorimetric measurements. In order to gain sensitivity to reactions with very small cross-sections, modern
LArTPC devices are built at a considerable scale, currently in hundreds of tons of instrumented volume of Liquid Argon.
Future experiments such as the Deep Underground Neurtino Experiment (DUNE) will include tens of kilotons of
the cryogenic medium. To be able to utilize sensitive volume that large while staying within practical limits of
power consumption and cost of the front-end electronics, it is instrumented with arrays of wire electrodes grouped in readout planes, arranged with a stereo angle. This leads to certain challenges for object reconstruction
due to ambiguities inherent in such scheme. We present a novel reconstruction method inspired by principles used in tomography, which brings the LArTPC technology closer to its full potential.

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