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Electron Neutrino Appearance with Multiple LArTPCS on the Booster Neutrino Beam

The MicroBooNE experiment at Fermilab - to begin taking data this year - will be the largest Liquid Argon Time Projection Chamber (LArTPC) yet constructed in the US. With its full 3 year data set of Booster Neutrino Beam events, MicroBooNE will address its goal of confirming and investigating the Low Energy Neutrino Excess observed by MiniBooNE. At the same time, the LAr1-ND collaboration plans to construct a new LArTPC at the source of the Booster Neutrino Beam and will collect a year of data in conjunction with the final year of MicroBooNE's run. These two detectors offer the opportunity to make a combined near/far comparison of the appearance of electron neutrinos in the booster beam that can determine the nature of the MiniBooNE excess while also interpreting any observed excess as a true oscillation signal. If the excess is not due to an oscillation, LAr1-ND will have the statistical sensitivity to make precision measurements of any observed, beam intrinsic phenomenon. In both detectors, the crucial task is to select and reconstruct electron neutrinos with high efficiency while rejecting single photon background, a task ideal for LArTPCs. This poster will present the combined, 2 detector analysis that will be possible for electron type neutrinos as well as the important steps in reconstruction and background rejection that will be performed.

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