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Selecting electron anti-neutrino charge current events in the ND280 tracker at T2K

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In 2014 the T2K experiment will reverse the polarity of the magnetic horns and begin running with an anti-neutrino beam for the first time. Differences in the oscillation probabilities between neutrinos and anti-neutrinos may provide insight into charge-parity violation in the leptonic sector. In order to measure the anti-electron neutrino contamination in T2K's anti-muon neutrino beam, an anti-neutrino selection has been developed for the ND280 near detector and tested using Monte-Carlo simulations of an anti-neutrino beam. The electron anti-neutrino selection faces new challenges not seen in the electron neutrino selection. The most significant challenge is the removal of protons which were removed by the charge requirement in the electron neutrino selection but are a significant background in the electron anti-neutrino analysis.

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