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Increased Neutrino Yield with the new NOvA Target Design: Simulation Study

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NOvA (NuMI Off-axis ve Appearance) is a long baseline neutrino oscillation experiment designed to search for both ve appearance and v μ disappearance. Fermilab NuMI (Neutrinos at Main Injector) facility produces an intense neutrino beam (narrow band v μ beam peaked at 2 GeV in energy) colliding 120 GeV protons from the Main Injector into a long target with a set of two magnetic horns (Horn1 and Horn2) to focus the pions produced at the target. We studied different target designs and Horn2 configuration. Here, we present the New Target design which increases the v μ (anti-v μ) yield at the NOvA Near and Far detectors by about 17% (20%) compared to the event yield with the current NuMI target.

Primary author: Ms DAISY KALRA, Daisy (Panjab University)
Presenter: Ms DAISY KALRA, Daisy (Panjab University)
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