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New electron (anti-)neutrino appearance analysis from NOvA

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NOvA (the NuMI Off-Axis ν_e Appearance Experiment) utilizes a near detector at Fermilab and a far detector 810km away in Ash River, MN, to study the properties of neutrinos. Using a beam originating at Fermilab, NOvA studies neutrino oscillation via the disappearance of $\nu_\mu, \bar{\nu}_\mu$ in the beam and the corresponding appearance of $\nu_e, \bar{\nu}_e$. Prior results from NOvA have studied $\nu_\mu \rightarrow \nu_e$ with the accumulated neutrino interactions from approximately 9×10^{20} protons on target (POT), full detector equivalent. In the time since, NOvA has accumulated antineutrino data to study $\bar{\nu}_\mu \rightarrow \bar{\nu}_e$ with approximately 7×10^{20} POT. Though adding to the level of complexity in the analysis, this combined data set provides enhanced sensitivity to important unresolved oscillation parameters, such as mixing angles, mass splitting and ordering, and the CP violating phase. Aspects of the appearance channel (ν_e and $\bar{\nu}_e$) analysis and results for NOvA's first study combining neutrino and antineutrino data will be discussed.

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