

Title: Sterile neutrino physics at NOvA experiment

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Abstract: NOvA sterile neutrinos search via neutral current (NC) disappearance analysis is moving to a two-detector fit method to be able to fit to a wider range of sterile neutrino oscillations parameters. This introduces among other things a bigger contribution of the neutrino flux systematic uncertainty, which currently makes up the largest overall uncertainty for the ongoing NC disappearance analysis. This thesis focuses on reducing this uncertainty and looks for different ways of making a more precise prediction of the neutrino flux. We point out Horn-Off analysis as the base for doing so and describe the production of a new Horn-Off simulation and the analysis of the Horn-Off results. We were not able to draw any conclusions that would reduce the NC disappearance systematic uncertainty, but the results showed herein can be helpful in the future attempts at a better neutrino flux prediction and a lower neutrino flux systematic uncertainty.

Keywords: sterile neutrino neutrino flux NOvA