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Sterile neutrino search in the NOvA Far Detector.

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The majority of neutrino oscillation experiments have obtained evidence for neutrino oscillations that are compatible with the three-flavor model. Explaining anomalous results from short-baseline experiments, such as LSND and MiniBooNE, in terms of neutrino oscillations requires the existence of sterile neutrinos. The search for sterile neutrino mixing conducted in NOvA uses a long baseline of 810 km between Near Detector (ND) at Fermilab and Far Detector (FD) in Minnesota. The signal for sterile neutrino oscillations is a deficit of neutral-current neutrino interactions at the FD with respect to the ND prediction. In this poster, I will present the analysis improvements that we are implementing for future NC sterile neutrino searches with NOvA. These include: improved modelling of our detector response; the inclusion of NC 2p2h interaction modelling; implementing a better energy reconstruction technique; and including possible oscillation due to sterile neutrinos in the ND. This improvements will enable us to do a simultaneous ND-FD shape fit of the NC energy spectrum covering a wider sterile mass range than previous analyses.

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