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Maximizing NOvA's Sensitivity to Sterile Neutrinos using Covariance Matrices

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NOvA is a 810 km long-baseline neutrino oscillation experiment designed to measure muon (anti-)neutrino to electron (anti-)neutrino oscillations. NOvA can also search for evidence of oscillations to a sterile neutrino. NOvA's sterile neutrino search uses its Near and Far Detectors in conjunction to look for oscillations over a wide range of mass splittings. However, this means that the Near Detector cannot be used to predict the neutrino spectrum at the Far Detector. We use a covariance matrix to encode correlations between the detectors to enable the search for possible active to sterile oscillations. The covariance matrix allows for simultaneous fitting of the two detectors and capitalizes on the statistical power of the Near Detector. Using our covariance matrix we generate NOvA's sensitivity to detecting possible sterile neutrinos

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