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Performing a Bayesian Oscillation Analysis at T2K

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T2K is a long-baseline off axis neutrino experiment producing world leading neutrino oscillation measurements using the neutrino beam produced at J-PARC. It consists of two key detectors: the near detector, ND280, located 280 meters downstream from the source, and the far detector, Super-Kamiokande, located 295 km away from the source. The near detector primarily constrains the properties of un-oscillated neutrinos, while the far detector measures the long-baseline neutrino oscillations. MaCh3 performs a Bayesian MCMC-based (Markov Chain Monte Carlo) analysis that simultaneously fits both the near and far detector data, extracting oscillation parameters and constraining systematic uncertainties. In this talk, I will present results from the oscillation analysis utilizing a new multi-ring muon-like selection at the far detector. Additionally, there will be a discussion of the official joint oscillation analyses with atmospheric neutrinos in Super-Kamiokande and the joint analysis with NOvA data.

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