# First Joint Neutrino Oscillation Analysis of T2K and SK from a Bayesian Perspective

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Neutrinos have masses and their flavour eigenstates oscillate when travel. To measure the oscillation parameters precisely, including the CP violation phase, and to determine the mass ordering (i.e. whether m3 is the lightest or the heaviest) are open challenges in neutrino physics.

Located in Japan Gifu prefecture, Super-Kamiokande is the current largest water Cherenkov detector and is capable of detecting neutrinos of a wide range of energy from difference sources (e.g. solar, atmospheric, supernova, etc.). With Super-K as the far detector, the long baseline neutrino oscillation experiment T2K ("Tokai to Kamioka") is able to produce (anti)neutrino beam at J-PARC dominated by (anti)muon neutrinos and measure oscillation parameters associated with muon neutrino disappearance along with other physics goals, such as CP violation phase determination, sterile neutrino search and neutrino-nucleus cross-section measurements. Two experiments produce oscillation analyses independently and update the results regularly.

A joint oscillation analysis of the SK atmospheric neutrino and T2K beam neutrinos has the potential to combine T2K's sensitivity to CP violation phase and SK's sensitivity to mass ordering and thus gaining better constraint on CP violation phase, atmospheric oscillation parameters and mass ordering measurements. The first data fit result (Bayesian) of the joint analysis has been released recently after the joint effort of collaborators from the two experiments. Frequentist result and additional studies are underway. Stay tuned!