

New results from the T2K experiment

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The T2K (Tokai to Kamioka) experiment is a long baseline neutrino oscillation experiment designed to probe the θ_{13} neutrino mixing parameter by looking for the appearance of ν_e in an almost pure ν_μ beam. The concurrent measurement of ν_μ disappearance allows refined measurements of the atmospheric Δm^2 and of the θ_{23} mixing parameters. A neutrino beam is produced at the Japan Proton Accelerator Research Complex (J-PARC) in Tokai, Japan, and aimed at 2.5° off the direction of the Super-Kamiokande (Super-K) detector, 295 km away. The resulting narrow energy band neutrino beam at the Super-K location, peaked at about 600 MeV, is optimized to maximize the probability of oscillation at the atmospheric Δm^2 scale, minimizing at the same time the background for ν_e searches. The neutrino beam is monitored by an on-axis non-magnetic detector, INGRID, and an off-axis magnetic near detector, ND280, both located at J-PARC at 280 m from the target. In addition, the primary proton beam and the muons from the secondary pion decays in the neutrino beam-line are monitored on a spill by spill basis to provide further constraints on the determination of the neutrino beam. T2K has successfully operated since January 2010, and it has been presently paused due to the recent earthquake in Japan. Preliminary results on the search for ν_e appearance and measurements of ν_μ disappearance will be presented in this talk.

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