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The status of T2K and Hyper-K experiments

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T2K is an accelerator-based neutrino experiment providing world-leading measurements of the parameters governing neutrino oscillation. T2K data enabled the first 3sigma exclusion for some intervals of the CP-violating phase \delta_{CP} and precision measurements of the atmospheric parameters \Delta_m^{2}{32}, sin^2(\theta{23}). T2K uses a beam of muon neutrinos and antineutrinos produced at the Japan Particle Accelerator Research Centre (JPARC) and a series of detectors located at JPARC and in Kamioka, 295km away, to measure oscillation from neutrino event rates and spectra. The T2K beam will be upgraded with increased power in 2022 and, combined with an upgrade of the ND280 near detector, will usher in a new important physics period for T2K. In addition, the Super-Kamiokande detector has been loaded with 0.02% of Gadolinium in 2020, enabling enhanced neutron tagging. In preparation for the new physics run, the T2K collaboration is working on an updated oscillation analysis to improve the control of systematic uncertainties. A new beam tuning has been developed, based on an improved NA61/SHINE measurement on a copy of the T2K target and including a refined modelling of the beam line materials. New selections have been developed at ND280, with proton and photon tagging, and at Super-Kamiokande, where pion tagging has been extended to muon neutrino samples. After reviewing the latest measurements of oscillation parameters, the status of such new analysis developments and the plan to deploy the beam and ND280 upgrade will be presented.
The Hyper-Kamiokande experiment consists of a 260 kt underground water Cherenkov detector with a fiducial volume more than 8 times larger than that of Super-Kamiokande. It will serve both as a far detector of a long-baseline neutrino experiment and an observatory for astrophysical neutrinos and rare decays. The long-baseline neutrino experiment will detect neutrinos originating from the upgraded 1.3 MW neutrino beam produced at the J-PARC accelerator. A near detector suite, close to the accelerator, will help characterise the beam and minimise systematic errors. The experiment will investigate neutrino oscillation phenomena (including CP-violation and mass ordering) by studying accelerator, solar and atmospheric neutrinos, neutrino astronomy (solar, supernova, supernova relic neutrinos) and nucleon decays. An overview of the Hyper-Kamiokande experiment, its current status and physics sensitivity will be presented.

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