

DsTau (NA65) Experiment at CERN-SPS

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Tau neutrino is the least known particle of the Standard Model, first discovered by DONUT experiment in 2001. In DONUT, using tau neutrino interaction cross section was measured with large systematical ($\sim 50\%$) and statistical ($\sim 30\%$) errors. The main source of systematical error is due to a poor knowledge of the tau neutrino flux from Ds decays. The DsTau experiment at CERN-SPS has been proposed to measure an inclusive differential cross-section of a $\bar{\nu}_\tau$ production with a consecutive decay to tau lepton in p-A interactions. The goal of experiment is to reduce the systematic uncertainty from 50% to 10%. The accurate measurement of the cross-section is not only important for future neutrino experiments but also for testing the Lepton Flavour Universality (LFU) of Standard Model. In addition to the tau neutrino production study, DsTau can also study charmed particle production in proton interactions. About 10^5 charm events are expected to be detected in DsTau. The detector is based on nuclear emulsion providing a sub-micron resolution for the detection of short length and small “kink” decays. Therefore, it is very suitable to search for peculiar decay topologies (“double kink”) of $Ds \rightarrow \tau \rightarrow X$.

After successful pilot runs and data analysis, CERN had approved the DsTau project as a new experiment NA65 in 2019. About an order of magnitude more data than the pilot runs will be collected in physics runs scheduled in 2021-2022. In this talk, the results of the pilot run data analysis will be presented and the prospect for physics runs in 2021-2022 will be given.

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