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Study of tau neutrino production property with measuring open-Charms at 400 GeV proton beam dump

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The property of tau neutrino is not well known, due to difficulty of its production and detection.
The comparison of the neutrino-nucleon cross-section of tau neutrinos and other neutrino flavours is one of the interesting topics.
The tau neutrino cross-section has been measured by the DONUT experiment, but with a large statistical error of $\sim 30\%$ and a systematical uncertainty of $\sim 50\%$.
The statistics of detected tau neutrinos will be improved by a planned experiment such as SHiP experiment at CERN in near future.
The DsTau collaboration aims to reduce the systematic uncertainty to 10% by measuring the mother particles(Ds mesons) of tau neutrinos at the beam source.
Ds mesons are generated by proton interactions with the beam dump target, which decay in sequence Ds$\rightarrow$ tau $+\nu_\tau$ and tau$\rightarrow \nu_\tau + X$.
DsTau will collect 1000 Ds$\rightarrow$ tau associated events in 2×10^8 proton interactions with the tungsten target using the 400 GeV/c proton beam at CERN SPS.
The rate and xf distribution of the Ds production will be measured and the reduction of uncertainty on the tau neutrinos production will be achieved as the result.
Since Ds and tau mass difference is small, the kink angle($\sim 7mrad$) in the Ds to tau trajectory within a short distance of a few mm decay flight is difficult to detect.
Emulsion Cloud Chambers, ECCs, dedicated structure with tungsten plates and nuclear emulsion plates are used to detect small angle kinks at Ds to tau decays.
Since large number,10^5 events, of associated charm production will be accumulated and analyzed in ECCs, physics of open-charm could be studied as a byproduct.
In this talk, the DsTau project introduction and results from small scale test exposure in 2016, 2017 will be shown.

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