Contribution ID: **417** Type: **Parallel**

Study of tau-neutrino production at the CERN SPS

Friday 6 July 2018 09:15 (15 minutes)

At the CERN SPS, the DsTau project has been proposed to study tau-neutrino production aiming at providing important information for future ν_τ measurements. Precise measurement of the ν_τ cross section would enable a search for new physics effects in ν_τ-nucleon CC interactions. It also has practical implications for neutrino oscillation experiments. The dominant source of ν_τ is the sequential decay of D_s mesons produced by proton interactions, whose uncertainty dominates current uncertainty in the ν_τ cross section measurement. The project aims at reducing the systematic uncertainty from about 50% to 10% by measuring the D_s differential production cross section. For this purpose, emulsion detectors with a nanometre-precision readout will be used to detect small kinks of the $D_s \to \tau$ decay. An emulsion detector has a position resolution of 50 nm, allowing for the detection of $D_s \to \tau \to X$ double kinks in a few mm range. Results from the beam tests in 2016-2017 will be presented together with a prospect for a pilot run in 2018 and a physics run in 2021.

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Session Classification: Neutrino Physics

Track Classification: Neutrino Physics