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Experiment DsTau (NA65) - study of tau neutrino production at CERN SPS

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The tau neutrino interaction cross-section is known with much larger uncertainties compare to other types of neutrinos. In particular, first time measured in 2008 in the DONuT experiment, it had a large systematical error of 50% due to a poor knowledge of the tau neutrino flux in beam dump experiments. If known with better accuracy, the cross section would allow testing the Lepton Flavour Universality (LFU) of Standard Model in neutrino interactions. Several results for B-meson decay asymmetry (LHCb, Babar, Belle) demonstrate hints of possible LFU violation, perhaps due to Physics Beyond Standard Model effects. The measurement of the tau neutrino interaction cross section is also needed for decreasing of systematics in the future neutrino experiments. The tau neutrinos in accelerator beams are mostly produced in □□ mesons decay to □ and □□, with a further decay of □ lepton providing another □ neutrino. DsTau experiment has been proposed to measure an inclusive differential cross-section of a □□ production in p-A interaction with a consecutive decay to tau lepton. This measurement will allow reducing the systematical error due to the tau neutrino flux uncertainty in the DONuT's result from 50% to 10%. The peculiar □□ to □ cascade decay topology ("double kink") in a few mm range will be detected by the nuclear emulsion tracker thanks to its excellent spatial resolution. Large amount of charmed particles decay events (˜10ˆ5) is expected to be detected as well, providing a possibility for interesting by-product studies, in particular a search for intrinsic charm in a proton.
A pilot data sample was collected at CERN SPS in 2018. Given the actuality of the study and encouraging results of the data analysis, CERN had approved in 2019 the DsTau project as a new experiment NA65. Main data sample (x10 more) will be collected in 2021-22.
In this talk, the status, prospects of NA65 as well as the results of the pilot run are presented.

I read the instructions

Secondary track (number)

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