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Type: **Short talk (15min. + 5 min. Q/A)**

The Water Cherenkov Test Experiment as a Demonstrator of Machine Learning Techniques for Neutrino Experiments

Monday 27 October 2025 13:55 (15 minutes)

The Water Cherenkov Test Experiment (WCTE) is a 30-ton water Cherenkov detector that received 100-1200 MeV electrons, muons, charged pions and protons from the CERN East Area T9 beam, as well as observing secondary neutrons captured on Gadolinium and tagged photons through operation in a dedicated setup. With a suite of beamline detectors to characterise and tag the particles entering the tank, the WCTE is used to study the water Cherenkov detector response and physics interactions of particles typically produced in neutrino detectors. This provides a unique opportunity for novel technologies and techniques to be demonstrated on real data with known particle fluxes, towards reaching 1% level systematic uncertainties for GeV scale neutrino interactions. This talk will provide an overview of WCTE itself, its physics goals and their potential to enhance future neutrino measurements. Central to this will be the machine learning based improvements to event reconstruction and detector calibration, with plans for demonstrating these new technologies on data collected over the past year, presenting opportunities for their first ever real-world validation with a water Cherenkov detector in a fully characterised testbeam.

Presenter: PROUSE, Nick

Session Classification: Experiments - SK/HK