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Atmospheric Neutrinos in DUNE

The Deep Underground Neutrino Experiment (DUNE) is a next generation neutrino oscillation experiment which will target the main outstanding questions of neutrino physics, including the neutrino mass ordering and the possibility of CP violation in the lepton sector. It will make use of a suite of 4x17kt large liquid argon (LAr) time projection chambers, located 1.5 km deep underground at SURF, South Dakota and 1300 kilometers from the LBNF beamline at FNAL, Illinois. In addition to DUNE's beam physics program, the experiment presents the exciting opportunity to extend its reach towards atmospheric neutrino analyses. This will allow for the exploration of a wider range of L/E than beam data and provide great complementarity in both standard and Beyond Standard Model (BSM) oscillation analyses. The excellent event reconstruction capabilities expected in the DUNE Far Detectors (FD) will be key in performing these analyses. This talk will present the ongoing work of the DUNE Atmospherics & Exotics physics working group towards the implementation and optimization of the reconstruction of atmospheric neutrino events in the DUNE FD. It will also delve into the developments being made on the software MaCh3 allowing straightforward joint fits with other oscillation analyses. In this context, I will focus on the recent integration of broad BSM applications such as sterile neutrinos or non-standard neutrino interactions to the MaCh3 framework.

Secondary track

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