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Neutrinos at a Forward Physics Facility: Production, Interactions and Astroparticle Physics Connections

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Neutrino experiments at a proposed Forward Physics Facility (FPF) would collect neutrino and antineutrino interaction data from one million muon neutrinos, 100,000 electron neutrinos and 10,000 tau neutrinos in the High-Luminosity era of the Large Hadron Collider (LHC). Already during Run 3, the experiments FASER ν and SND@LHC are installed and collecting data. In the forward region where neutrino rapidities are 6.9 and higher, fluxes of neutrinos extend to few TeV energies. An overview of neutrino forward production at the LHC will be presented. Opportunities for tests of the standard model and searches for BSM physics with these neutrinos will be reviewed. We describe connections between forward neutrino production at the LHC and the atmospheric neutrino flux.

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