

Search for heavy neutral leptons decaying into muon-pion pairs in the MicroBooNE detector

Tuesday, 28 July 2020 17:00 (15 minutes)

We will present upper limits on the production of heavy neutral leptons (HNLs) decaying to muon-pion pairs using data collected with the MicroBooNE liquid-argon time projection chamber (TPC) operating at Fermilab. This search is the first of its kind performed in a liquid-argon TPC and the first beyond the Standard Model result obtained with the MicroBooNE detector. We use data collected in 2017 and 2018 corresponding to an exposure of 2×10^{20} protons on target from the Fermilab Booster Neutrino Beam, which produces mainly muon neutrinos with an average energy of about 800 MeV. HNLs with higher mass are expected to have a longer time-of-flight to the liquid-argon TPC than Standard Model neutrinos. The data are therefore recorded with a dedicated trigger configured to detect HNL decays that occur after the neutrino spill reaches the detector. We set upper limits at the 90% confidence level on the element $U_{\mu 2}$ of the extended PMNS mixing matrix in the range for Dirac HNLs and Majorana HNLs, assuming HNL masses between 260 and 385 MeV.

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