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Sterile Neutrino Search at MINOS

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The MINOS experiment is a long-baseline on-axis neutrino oscillation experiment. The two detectors are separated by 734km and optimised for sensitivity to the disappearance of muon neutrinos delivered by the NuMI beamline at Fermilab. Due to the different possible beam configurations, MINOS has accumulated $10.56e20$ protons on target (POT) from a muon neutrino dominated beam and $3.36e20$ POT from a muon antineutrino enhanced beam. The LSND and MiniBooNE experiments have observed electron antineutrino appearance in their neutrino oscillation analyses. A possible explanation to account for this is the 3+1 sterile neutrino model where one adds an additional neutrino to the current three-flavour neutrino model. MINOS is sensitive to this model by looking at the charged current neutrino energy spectrum to probe any deviations from the three-flavour muon neutrino survival probability. A neutral current neutrino event depletion is also investigated. In this talk, new limits for sterile neutrinos using a 3+1 model are presented using the MINOS dataset in neutrino mode along with a sensitivity for an equivalent search by using a simulation for antineutrino mode.

Primary author: Mr CHEN, Rui (the University of Manchester)

Presenter: Mr CHEN, Rui (the University of Manchester)

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