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New search for a sterile neutrino at MicroBooNE with BNB and NuMI beams

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In 2023, the MicroBooNE experiment published its first constraints on light sterile neutrino oscillations using neutrinos from the on-axis Booster Neutrino Beam (BNB). A limitation of this first result came from the cancellation between electron neutrino disappearance and muon neutrino to electron neutrino appearance oscillations leading to a degeneracy in the extracted oscillation fit parameters. A new search for a sterile neutrino is being carried out simultaneously using neutrinos from both the on-axis BNB at a baseline of ~470 m with mean neutrino energy at 800 MeV and the off-axis Neutrino from the Main Injector (NuMI) beam at a baseline of ~680 m with neutrinos up to a few GeV. MicroBooNE's two beam measurement allows to break this degeneracy leveraging the different intrinsic electron neutrino to muon neutrino ratios in BNB (~0.5%) and NuMI (~5%). This significantly expands the experiment's sensitivity, allowing to probe parameter space for test the sterile neutrino hypothesis compatible with short baseline anomalies from the LSND, Neutrino-4, Gallium, and BEST experiments. In this poster, the status of this analysis will be reported.

Poster prize

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