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Search for a Higgs Portal scalar in MicroBooNE

Monday, August 10, 2020 12:10 PM (15 minutes)

I will present a search for the decays of a neutral scalar boson produced by kaons decaying at rest, in the context of the Higgs Portal model, using the MicroBooNE detector. We analyze data triggered in time with the spill of the Fermilab NuMI neutrino beam (the neutrino beamline used by e.g. the NOνA experiment), with an exposure of 1.93×10^{20} protons on target. We look for monoenergetic scalars coming from the direction of the NuMI hadron absorber, 100 m away from the detector, and decaying to electron-positron pairs. We observe 5 candidate events, with a Standard Model background prediction of 2.0 ± 0.8. We set an upper limit on the scalar-Higgs mixing angle $\theta < (4.3 - 5.8) \times 10^{-4}$ at the 95% confidence level, for scalar masses in the range $(100 - 200)$ MeV$/c^2$. We exclude at the 95% confidence level the remaining model parameters required to explain using this model the central value of the anomalous excess of $K_L^0 \to \pi^0 +$ invisible decays recently reported by the KOTO experiment.

Summary

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