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P3.075 Novel sterile neutrino oscillation search utilizing a stopped kaon source and the SBN program

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Evidence arising from recent experiments, such as LSND and MiniBooNE, can be interpreted as additional physics beyond the standard three-neutrino flavors. These anomalous results can be explained by the existence of an additional sterile neutrino, with a mass of around 1 eV. So far, the evidence for this new particle has been inconclusive, with some results appearing contradictory. This poster proposes a novel approach to searching for these sterile neutrinos, utilizing monoenergetic neutrinos produced by the kaon decays-at-rest (KDAR). The approach uses existing and soon-to-be existing detectors and an existing beam at Fermi National Accelerator Laboratory. The Short-Baseline Neutrino Program consists of three LArTPCs at varying distances which are exposed to neutrinos from two beams, on-axis from the BNB beam and off-axis from the NuMI beam. The intense NuMI beam results in a large sample of KDAR events in the LArTPCs. Searches for sterile neutrinos are often hampered by uncertainties related to the neutrino flux and interaction models, reducing their sensitivity. Using these monoenergetic KDAR neutrinos in the SBN will overcome many of these uncertainties allowing for a precision measurement. The calculated sensitivities to sterile neutrino oscillation will be presented.