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Search for Sterile Neutrino at Short Baseline using a Nuclear Reactor (15' + 3')

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The existence of sterile neutrinos may explain the discrepancy between the recent calculation and experimental measurements for the reactor anti-neutrino flux. The sterile neutrino can be searched by measuring the distortion of the anti-neutrino energy spectrum at a very short distance from the reactor core. NEOS, Neutrino Experiment for Oscillation at Short Baseline, measured the anti-neutrino energy spectrum at 24m baseline, in the tendon gallery of a 3 GW_{th} commercial reactor in Yeonggwang, South Korea. A homogeneous target with 0.5% Gd doped liquid scintillator was used to detect e⁺ and neutron coincidence from the inverse beta decay. The experiment has taken data for about 8 months, reactor off for 2 months and reactor on for the last 6 months. We observed about 2,000 IBD events per day with the signal to background ratio 20. We also observed the energy spectrum discrepancy around 5 MeV between the calculation and experimental data for the first time in the short baseline reactor experiments, as in the θ_{13} experiments. In this talk, we will present the sterile neutrino search with our data sample.

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