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Poster: Measurement of θ13 using reactor antineutrino events with neutron capture on hydrogen at RENO

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The RENO Collaboration reports a measured value of the smallest neutrino mixing angle (θ13) based on ˜2900 days of reactor electron antineutrino events with a delayed signal of neutron capture on hydrogen (H). The neutron captures on H emitting a 2.2 MeV γ-ray are not easily detected because of high environmental radioactivity below 3.5 MeV, Due to satisfactory purification of liquid scintillator, use of low–radioactivity photomultiplier tube (PMT) glass, and effective selection criteria, it is possible to extract the reactor neutrino signal against the high backgrounds and observe a clear deficit of the reactor neutrino rate. Based on a rate-only analysis, we obtain sin22θ13 =0.086±0.006(stat)±0.010(syst). This corresponds to a more precisely measured θ13 value of the n-H IBD candidates than the previous measurement from 1500 days of data. With the increased data sample, the statistical error of this measurement is reduced by roughly 40%. Based on improved background uncertainties and additional removal of PMT noise events, the systematic error is reduced by roughly 60%.

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