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Latest results of the STEREO sterile neutrino search at the ILL Grenoble

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Summary

STEREO is a coarsely segmented, Gd-loaded liquid scintillator calorimeter studying anti-neutrinos produced by the compact, nearly pure ^{235}U nuclear reactor core of the Institut Laue-Langevin at Grenoble (France). The experiment has been designed to test the light sterile neutrino explanation of the Reactor Antineutrino Anomaly (RAA) by comparing the neutrino energy spectra recorded by its six detector cells. The cells are located between 9 and 11 m away from the centre of the reactor core.

Using data collected since 2016, the STEREO experiment excludes a significant fraction of the RAA favoured region in the $\Delta m_{41}^2 - \sin^2(2\theta_{ee})$ parameter space, rejecting the RAA best-fit point at $>99.8\%$ C.L. We also measure the total anti-neutrino flux coming from the reactor. Finally, we present our first measurement of the energy spectrum of the reactor anti-neutrinos. A good agreement with the predicted spectrum is observed up to 6 MeV.

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