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The STEREO search for a sterile neutrino at the ILL reactor with full data sample

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During the last decades, several parameters describing the neutrino oscillation phenomenon have been characterized thanks to reactor neutrino experiments, in particular the precise measurement of the last-to-be-measured mixing angle θ_{13}.
Following a reactor antineutrino flux re-estimation in 2011, a ~6% deficit between observed and predicted reactor antineutrino fluxes, known as the Reactor Antineutrino Anomaly, has been observed.
The Reactor Antineutrino Anomaly could be explained by an oscillation toward an additional non-interacting, (thus "sterile") neutrino. The parameters that best explain the RAA are a mixing angle value of $\sin^2(2\theta)$ =0.17 and a mass splitting value of Δm^2_{41} =2.3 eV^2.
Additionally, a discrepancy between the measured and predicted antineutrino energy spectrum taking the form of an excess of events around 5 MeV has been observed by several reactor neutrino experiments. This discrepancy has yet to be fully understood but could be caused by incorrect predictions of the neutrino spectra.
The STEREO experiment, located at Institut Laue-Langevin in Grenoble (France), was designed to test the above mentioned oscillation hypothesis independently of shape and rate predictions. The segmented detector, located at ~10 m of a compact reactor core, allows for a measurement of the antineutrino energy spectrum at various baselines, sensitive to the oscillation toward a sterile neutrino that would distort the spectrum differently at each baseline.
The experiment could also help to disentangle isotopic contributions to the neutrino energy spectrum by providing a measurement of the spectrum shape and rate originating from a core with highly enriched (93%)235U.
The experiment took data between November 2016 and November 2020. This talk will present the latest limits set in the oscillation parameter space with the full data sample, amounting to 334 (544) days of reactor-on (off), as well as the updated rate and spectrum shape measurements.

Reference to paper (DOI or arXiv)

Your gender (free text)

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