Contribution ID: **232** Type: **Asynchronous Talk**

Accurate measurement of the pure-235U antineutrino spectrum by the STEREO experiment.

STEREO is a short baseline experiment measuring antineutrinos emitted by the highly-enriched compact core of the ILL reactor in Grenoble (France). It consists of a segmented detector, located at 10m from the core, aiming to search for oscillations towards sterile neutrinos and to provide an accurate measurement of the 235U fission antineutrino spectrum.
In this talk, we report the most accurate measurement of the 235U absolute antineutrino rate to date. This result points towards a deficit of antineutrinos with respect to the rate predicted by the 235U Huber model, similar to the deficit observed by experiments with low-enriched nuclear fuel and referred to as the "Reactor Antineutrino Anomaly" (RAA). Then, we present the STEREO oscillation analysis that disfavors the sterile neutrino hypothesis as an explanation to this measured deficit. Finally, we detail the results of the STEREO shape analysis of the spectrum, relying on the unfolding of the measured antineutrino spectrum in antineutrino energy space. The comparison of the unfolded shape to the Huber prediction features a 3.5 sigma local excess of events around 5.3 MeV, similar to the excesses reported by several other reactor experiments. We ultimately discuss the extension of this work to a joint analysis of the 235U experimental spectra of the STEREO and PROSPECT experiments.

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Session Classification: Neutrino Physics Session 2

Track Classification: Neutrino Physics