

## **Search for sterile neutrinos by the short-baseline reactor neutrino oscillation experiment STEREO**

Oscillations between the three neutrino flavours of the standard model of particle physics are well-established experimentally and the oscillation parameters have been determined with high precision. However, several experiments are inconsistent with predictions. In particular, experiments at short baselines from reactors have observed less antineutrinos than expected which is called the “Reactor Antineutrino Anomaly”. Similar deficits were observed for neutrinos from intense beta sources used to calibrate the solar neutrino oscillation experiments GALLEX and SAGE. These and other results may indicate the existence of one or several light neutrinos that do not participate in weak interaction and are therefore called “sterile neutrinos”. This has triggered several experiments searching specifically for oscillations towards sterile neutrinos.

The STEREO collaboration between CEA Saclay, ILL Grenoble, LAPP Annecy, LPSC Grenoble, and MPIK Heidelberg searches for reactor antineutrino oscillations at very short baseline, covering the favoured parameter space for a light sterile neutrino. Antineutrinos are detected in a liquid scintillator by their reaction with protons to positron and neutron, measured in delayed coincidence. A multi-chamber setup [arXiv:1804.09052] measures the antineutrino spectrum in function of the distance from the reactor core, allowing to search for oscillations independent on the incident antineutrino spectrum or intensity. STEREO has published first results [arXiv:1806.02096] and will continue data taking until the end of 2019. Final results are expected during the course of this PhD thesis.