

## Recent results of the SoLid experiment

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The SoLid experiment intends to search for active-to-sterile anti-neutrino oscillations at the very short baseline (6.3-8.9 m) of the SCK•CEN BR2 research reactor (Mol, Belgium) to address the so-called “Reactor Anti-neutrino Anomaly”. This anomaly arose from the reevaluation of the predicted reactor anti-neutrino flux which resulted in a deficit observed by very short baseline experiments. This deficit could be explained by flavor oscillations to a new type of neutrino: the sterile neutrino.

High experimental sensitivity to inverse beta decay interactions can be achieved thanks to the innovative combination of highly segmented PVT scintillator that will serve as neutrino target and to measure the positron with a high neutron-gamma discrimination  ${}^6\text{LiF}:\text{ZnS}(\text{Ag})$  scintillator. This technology offers precise time and space localization of the IBD signals. The reconstruction of the full topology of the events allows a strong background rejection, necessary given the low overburden at the reactor building and the presence of  ${}^{214}\text{BiPo}$  background from the  ${}^{238}\text{U}$  decay chain in the neutron screens. From the analysis point of view many variables can be reconstructed and exploited with multivariate and boosted decision trees analysis to improve the background rejections.

The detector has been taking a first phase of physics data from 2018 to 2020. In this contribution we will present an overview of the experiment, the background rejections capabilities, the extraction of the reactor anti-neutrino signal and in particular for the first time the physics results with two years of data. The ability to probe the RAA with this result will be investigated. Finally the perspective of a full event topology analysis will be presented on the first opened dataset of 2018.

### Working group

WG5

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