

Search for Oscillations with a Lithium-6 Detector at the SCK•CEN BR2 reactor

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Several anomalies in the neutrino sector are pointing towards the existence of a new (sterile) neutrino state with a mass around 1 eV. The SoLid experiment is located at the SCK•CEN BR2 research reactor in Belgium and will investigate this possibility. Using the large flux of anti-neutrino generated in the reactor, it will collect a high statistics sample of Inverse Beta Decay (IBD) events. These will be used to study the energy and distance dependence of the neutrino flux, which in turn will be used un-ambiguous support or reject the evidence of sterile neutrinos being the cause of these anomalies.

The measurement is challenging as one has to operate a detector very close to the high radiation environment of a nuclear reactor and on the surface with little overburden to shield against cosmic rays. SoLid is employing a new technology using highly segmented scintillators with excellent particle ID to face these challenges.

The 1.6-tons detector was installed towards the end of 2017 and is taking data since early 2018. We will describe the detector design, the experimental setup at BR2 and the detection principle. This will be followed by a first look at the data.

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