

SOX : Short Distance Neutrino Oscillations with Borexino

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The Borexino detector has convincingly shown its outstanding performances in the low energy regime through its accomplishments in the solar and geo neutrinos detection. These performances make it the ideal tool to accomplish a state-of-the-art, source based experiment able to test the long-standing issue of the existence of a sterile neutrino, as suggested by the several anomalous results accumulated over the past two decades, i.e. the outputs of the LSND and Miniboone experiments, the results of the source calibration of the two Gallium experiments, and the recently hinted reactor anomaly.

The SOX project will exploit a Cerium based source, which deployed under the experiment, in a location foreseen on purpose at the time of the construction of the detector, will emit an intense beam of anti-neutrinos. Interacting in the active volume of the liquid scintillator, the beam would create an unmistakable spatial wave pattern in case of oscillation of the anti ν_e into the sterile state: such a pattern would be the smoking gun evidence of the presence of the new sterile member of the neutrino family. Otherwise, its absence will allow setting very stringent limit on the existence of the hypothesized sterile state.

The talk will outline the project, discuss in detail its sensitivity and update about the status of the ongoing efforts to prepare the measurement.

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