Contribution ID: **95** Type: **oral**

Short Distance Neutrino Oscillations with Borexino

Tuesday, 30 September 2014 16:15 (20 minutes)

The Borexino detector has convincingly shown its outstanding performances in the in the low energy, sub-MeV regime through its unprecedented accomplishments in the solar and geo neutrinos detection. These performances make it the ideal tool to accomplish a state-of-the-art experiment able to test unambiguously 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 solar neutrino experiments, and the recently hinted reactor anomaly.
The SOX project will exploit two sources, based on Chromium and Cerium, respectively, which deployed under the experiment, in a location foreseen on purpose at the time of the construction of the detector, will emit two intense beams of neutrinos (Cr) and anti-neutrinos (Ce). Interacting in the active volume of the liquid scintillator, each beam would create an unmistakable spatial wave pattern in case of oscillation of the nu-e (or anti nu-e) into the sterile state: such a pattern would be the smoking gun proving the existence of the new sterile member of the neutrino family. Otherwise, its absence will allow setting very stringent limit on its existence.
The talk will outline the project and discuss in detail the sensitivity of both Cerium and Chromium measurements.

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Session Classification: Parallel Session C