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Solar neutrino and terrestrial antineutrino fluxes measured with Borexino at LNGS

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Borexino is a real time liquid scintillator detector for low energy neutrino and antineutrino spectroscopy located at the Gran Sasso National Laboratories (Italy). Thanks to the unprecedented radiopurity of the target mass it is providing the first direct and simultaneous measurement of the solar neutrino survival probability in both vacuum-dominated (${}^7\text{Be } \nu$) and matter-enhanced regions (${}^8\text{B } \nu$) by a single experiment. The measured interaction rates are in fair agreement with the SSM predictions in case of the LMA-MSW oscillation solution and a further confirmations of the LMA scenario is provided by the absence of a day-night asymmetry in the ${}^7\text{Be}$ signal.

Very recently the signal of geoneutrinos, electron antineutrinos produced in β decays of radioactive isotopes in the Earth has been clearly observed (at 4.2 s C.L.) and it gives an important contribution to the understanding of our planet composition and heat balance.

The antineutrino signal coming from European nuclear reactors has been detected too and it allows to probe for the first time antineutrino propagation properties on a baseline of about 1000 km. Our measurement excludes the non-oscillation hypothesis at 99.60% C.L. and it rejects the hypothesis of an active geo-reactor in the Earth's core with a power above 3 TW at 95% C.L.

In the presentation all the recent results will be reviewed and the future science goals discussed.

Author: ZAVATARELLI, sandra (INFN Genova Italy)

Presenter: ZAVATARELLI, sandra (INFN Genova Italy)

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