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Counting analysis of Borexino Phase-III data for the detection of CNO solar neutrinos

An accurate measurement of the Solar Neutrino Flux from CNO cycle can shed light on the so called “solar abundance problem”: new determinations of the photospheric abundances of heavy elements indicates that the Sun metallicity is lower than previously assumed, however Solar Models incorporating lower abundances are no more able to reproduce the helioseismic results. We propose a method for detecting the CNO interaction in the Borexino detector from a counting analysis in a Region of Interest determined maximizing a Figure of Merit and using both analytical and Monte Carlo modeling of the detector response. In such a way we can keep under control all systematics and avoid unwanted sources of uncertainties. The procedure itself is inspired by a CNO sensitivity study pointing out that the sensitivity to CNO is basically given by the knowledge of the background from Bi210 and pep neutrinos, being the other backgrounds negligible or constrainable.

Mini-abstract

CNO interaction rate in the Borexino detector from counting analysis

Experiment/Collaboration

Borexino Collaboration

Primary author: Dr BIONDI, Riccardo (Laboratori Nazionali del Gran Sasso - INFN)

Presenter: Dr BIONDI, Riccardo (Laboratori Nazionali del Gran Sasso - INFN)

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