



Contribution ID: 438

Type: Poster

Strategy of detection of solar CNO neutrinos with Borexino Phase-III data

The strategy to detect solar CNO neutrinos in Borexino is reported. Borexino is the only experiment that has measured the low-energy pp-chain solar neutrinos thanks to its exceptionally low radioactivity backgrounds. The CNO-cycle is a catalytic mechanism to fuse hydrogen into helium, and is important in most heavy stars. It has not been directly detected experimentally yet, but only as an inferred component of an integral neutrino measurement. This detection of solar CNO neutrinos would be its first direct experimental proof. In phase-III, after commissioning of a new temperature stabilization system, the detector convection current is significantly reduced which allows Borexino to track the content of Bi-210 decays through the decay of its daughter Po-210. Bi-210 has similar spectral shape of CNO neutrinos, and measurement of its rate paves the way to direct detection of CNO neutrinos.

Mini-abstract

Prove CNO-cycle with CNO neutrinos in Borexino

Experiment/Collaboration

BOREXINO

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Session Classification: Poster Session 2