

Recent Borexino Measurements of Solar Neutrinos from the pp-Chains with Prospects for Detection of CNO Neutrinos

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Borexino is a 300-ton liquid scintillator detector located in the Gran Sasso Underground Laboratory in Italy. This detector has been taking solar neutrino data for the past ten years, and recently completed new measurements of the pp, pep, ^7Be , and ^8B solar neutrinos. The data comprise the most complete direct experimental confirmation of Bethe's 1939 theory of the pp-chains of nuclear reactions that produce the Sun's energy. The new data also confirm a feature of the MSW theory of neutrino oscillations which predicts a transition from "vacuum oscillations" to "matter effect oscillations" over the solar neutrino energy spectrum. Experimental methods that achieved the ultra-low backgrounds necessary for these results will be described, as will continuing research toward lower backgrounds for a possible future observation of CNO neutrinos.

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