The Borexino experiment at Gran Sasso

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We report on the status, technology, and physics reach of Borexino (1). Borexino is a real time detector built to measure the 862 keV ^{7}Be neutrinos from the sun through liquid scintillator spectroscopy in the sub-MeV region.
The active target is 300 tons of liquid scintillator (100 tons fiducial mass), with 2200 photomultiplier tubes detecting the scintillation light.
The primary challenge of the experiment, which has dictated the design of the detector, is achieving an unprecedented low level of radioactivity in the sub-MeV region (1,2). The background requirement for the experiment translate into an allowable contamination in uranium and thorium of 10^{-16} g/g and of 10^{-18} g/g for the cosmogenic ^{14}C. Very stringent limits are also set for the contamination of the scintillator in radioactive gases and for their emanation rate from constructing materials, in particular for radon emanation from the nylon containment system of the scintillator.
The installation of the detector in Gran Sasso is nearing completion. Commissioning and filling of the detector are expected to take in the summer of 2002.
Borexino will be a powerful probe of the currently allowed solar neutrino oscillation parameters and an important test of our basic understanding of solar neutrino physics. In addition, Borexino will perform interesting observations on antineutrinos from the earth's crust and from European power reactors and eventually on supernova neutrinos.

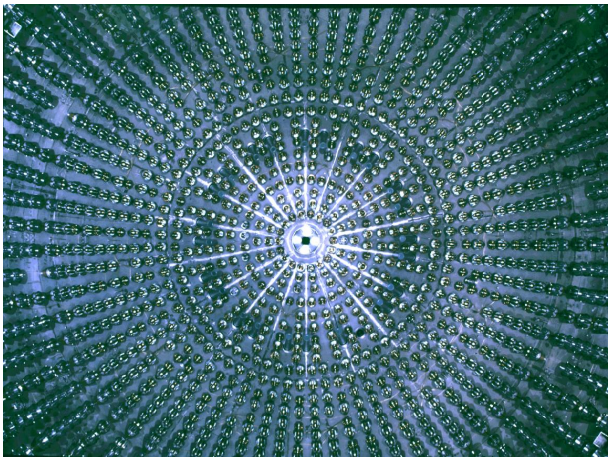

Figure 1: The Borexino Stainless Steel Sphere, view from the south pole.

References

[1] Borexino Collaboration, Astroparticle Physics **16** (2002) 205.
[2] Borexino Collaboration, Hep-ex/010931.