The Borexino experiment is located in Hall C at LNGS at an average depth of 3800 m.w.e. It is a large, liquid scintillator \*\*\* what type of LS? \*\* detector in a 682 cm radius stainless steel sphere. Its shield is a domed, cylindrical water tank of radius 900 cm with 208 photo-multipliers to detect the Cerenkov light from muon tracks. The 278 ton active volume has a radius of 425 cm and is contained within a thin nylon vessel centered inside a buffer region. The buffer region offers additional shielding against radiogenic backgrounds from the outer stainless steel sphere and the ~2200 optical sensors which read out the scintillation light. The buffer is made of the same liquid scintillator as the sensitive volume, but contains a small amount of DMP to quench the scintillation. The muon track and the neutron capture locations are reconstructed.

Since the primary goal of the experiment is the spectroscopy of solar neutrinos, Borexino requires extremely low background levels in all its materials. Equally important is shielding from external and especially cosmic radiation.

Borexino will publish experimental results for cosmogenic muon-induced neutron production in the near future. Variables which have been extracted include the neutron capture yield for liquid scintillator, the neutron capture multiplicity distribution, as well as the distance distribution of neutron capture with respect to the parent muon track. In addition, the production yield for a set of short-lived radioactive isotopes was measured. For cosmogenic muons the flux, seasonal variations and angular distribution were measured with high accuracy.

The quality of the experimental results for liquid scintillator is unique compared to earlier measurements. Since the data acquisition system is live only ~30 us after the large saturating pulse from the parent muon, the majority of the created neutrons are recorded. The large spherical size of the detector and the fact that the shielding material consists of the same liquid scintillator reduces systematic uncertainties. It should be noted that the Borexino experiment cannot measure the muon or neutron kinetic energies, and multi-muon events (which occur at LNGS at a level of about 6%) cannot be resolved.

The measured results have been simulated with a dedicated FLUKA simulation and good agreement for the predictions is found. A similar study making use of the Geant4 framework is ongoing. \*\*\* Give some more detailed results? \*\*\*

**References**

G. Bellini et al., “Cosmic-muon flux and annual modulation in Borexino at 3800 m water-equivalent depth”, JCAP, 05, p015, 2012

G. Bellini et al., “Muon and Cosmogenic Neutron Detection in Borexino”, JINST, 6, p05005, 2011

G. Bellini, et al., “Cosmogenic Backgrounds in Borexino at 3800 m water-equivalent depth”, in preparation