



Poster session 1 - Monday 4 July

P1.089 Triggers and readout electronics for the STEREO experiment

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The STEREO experiment, aiming to probe short-baseline neutrino oscillations and precisely measure the reactor anti-neutrino spectrum, is currently under construction at short distance of the compact research reactor core of the Institut Laue-Langevin, in Grenoble, France. STEREO consists of a segmented Gd-doped liquid scintillator (LS) detector vetoed by a cosmic muon Cerenkov detector. Antineutrinos emitted by the reactor interact in the LS via Inverse Beta Decay (IBD) producing a positron prompt signal in coincidence with a neutron capture signal in a window of a few 10 μ s. Background reduction is an important issue that can be achieved by combining massive shielding, an active veto muon detector and the ability of the LS to perform pulse shape discrimination (PSD) between neutron and gamma interactions.

A dedicated electronics, hosted in a single μ TCA crate, was designed for this experiment. It performs triggering in two stages with various selectable conditions, processing, readout and on-line calibration of the 68 eight-inch photomultipliers (PMTs) continuously digitized at 250 MSamples/s. For that purpose the μ TCA crate is equipped with ten front-end electronics boards (FE8) shared between the 48 PMTs of the neutrino detector and the 20 PMTs of the veto detector. One trigger and readout board is used to perform the second level trigger, to collect and aggregate the processed data provided by the FE8 boards. Additionally, for detector performance monitoring, electronics allow online calibration by driving LED synchronously with the data acquisition.

This poster will describe the electronics requirements, architecture and the performances achieved. We will show how intrinsic PSD properties of the LS are preserved and how custom adaptable logic will be used to improve the veto muon efficiency. A brief description of the veto muon detector will also be presented.



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