Contribution ID: **908** Type: **Poster Presentation**

Detector energy calibration in the STEREO neutrino experiment

The STEREO experiment was developed to confirm the hypothesis of a light sterile neutrino arising from the observed discrepancy between measured reactor antineutrino fluxes and revised flux predictions, known as the Reactor Antineutrino Anomaly. The detector is located at 10 m from the compact nuclear reactor core of the Institut Laue-Langevin, composed of >90% enriched 235U fuel. Antineutrino interactions are detected by the inverse β-decay reaction in Gd-loaded liquid scintillator. The segmentation of the detector target in 6 cells allows measuring the neutrino energy spectrum at different baselines. The target cells are surrounded by a segmented volume called Gamma Catcher filled with unloaded liquid scintillator. The Gamma Catcher helps recovering the energy that may escape from the target cells and detecting external background.
STEREO started taking data in November 2016. About 70 days of data have been recorded during reactor operation and about 25 during reactor shut down. STEREO plans to record 95 days more in 2017 and about 150 days in 2018.
To perform a correct energy reconstruction of neutrino events, the detector energy response must be determined accurately, taking into account the spatial in-homogeneities of the detector volumes. The STEREO energy calibration uses several radioactive sources that can be placed inside or outside the detector. In one case, sources are introduced in tubes immersed in some of the target cells. In the other, an automated system positions sources on the external perimeter of the Gamma catcher volume.
Different radioactive gamma-ray sources, from 0.5 to ˜4.4 MeV, are used to constrain the non-linearity of the scintillator response. Calibration data analysis provides the relation between the charge detected by the photo multipliers and the true deposited gamma energy obtained by simulations. The main goal is to reconstruct the energy scale within a 2% uncertainty.

Experimental Collaboration

STEREO

Author: SERGEYEVA, Viktoriya (Laboratoire Annecy le Vieux de Physique des Particules)

Presenter: SERGEYEVA, Viktoriya (Laboratoire Annecy le Vieux de Physique des Particules)

Session Classification: Poster session

Track Classification: Neutrino Physics