



Poster session 3 – Wednesday 6 July

P3.072 Background evaluation for the STEREO experiment

F Kandzia

Institut Laue Langevin, France

on behalf of STEREO collaboration

In the last years an improved prediction of reactor antineutrino spectra and a subsequent reanalysis of short baseline experiments (<1000 m) revealed a global deficit of observed with respect to predicted event rates. This so called reactor antineutrino anomaly could be explained by neutrino oscillations towards a light sterile state. Considering the constraints on the corresponding oscillation parameters set by the previous experiments, this hypothesis can be investigated best at very short baselines (<20 m). The STEREO collaboration is constructing an antineutrino detector centered at 10 m from the core of the research reactor of the Institut Laue-Langevin, Grenoble, France. Antineutrinos will be detected by inverse beta decay in six optically separated cells with a total volume of 1.8 m^3 , filled with Gd-doped liquid scintillator.

The ILL provides a favourable site, considering the compact fuel element ($d < 0.4$ m), the highly enriched fuel and an overburden for the detector by a water filled transfer channel, which significantly reduces cosmic background. On the other hand challenges arise from a number of beamtubes, extracting neutrons from the reactor for other experiments, causing a high neutron and gamma background at the STEREO site.

Several measurement campaigns have been performed on-site to characterise the gamma, neutron and muon background. Based on these measurements simulations have been performed to specify the detector shielding in a way that the remaining dominant sensitivity limiting factor will be cosmic background. This poster will present the measurements and simulations relevant for the shielding design, the final shielding layout and the expected resulting background conditions.