



Poster session 3 – Wednesday 6 July

P3.062 Search for a sterile neutrino at the ILL reactor - The inner detector of the STEREO experiment

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Past reactor and source experiments have observed deficits of neutrinos with respect to the expected rates that could be explained by the existence of a sterile neutrino at the 1 eV mass scale. The Stereo experiment has been designed to test this hypothesis by searching for a new oscillation pattern at short distance from the compact reactor of the Institut Laue-Langevin (ILL) in France.

The chosen detection strategy is the measurement of relative distortions of the neutrino energy spectrum in 6 identical cells filled with Gd-loaded liquid scintillator. The performances demonstrated by this technology allow reaching a high enough sensitivity to cover the expected parameter space of the sterile neutrino. The installation of the inner detector vessels has started in Grenoble-France and first data are expected this autumn.

The response of the inner detector will be presented based on simulations and data collected in a scale 1 prototype cell operated with various radioactive sources and a light injection system. Thanks to the development of a specific reflective coating of the inner walls of the cell the response in the whole detector volume is quite homogeneous, preserving the high intrinsic resolution of the liquid scintillator. We will show how we plan to control the energy scale using several calibration systems and a continuous monitoring of the detector stability. Finally the sensitivity to new oscillation patterns and the production of an experimental reference spectrum of pure U235 fission neutrinos will be discussed.