THEORY OF ATOMIC NUCLEUS AND FUNDAMENTAL INTERACTIONS

ACTUAL STATUS OF «DANSS» PROJECT

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DANSS [1] spectrometer is a relatively compact (~ 1 m^3) detector of reactor antineutrinos which doesn't contain liquid scintillator, has appropriate Signal-to Background (S/B) ratio and could be moved within few meters from the reactor core. The spectrometer detects about 5000 neutrinos per day and measure their energy spectrum. On-line varying of the core-detector distance within a range from 10.7 to 12.7 m allows us to perform «neutrino diagnostics» of the reactor, namely fuel composition and reactor thermal power. It also lets us to check the «reactor neutrino anomaly» hypothesis – the existence of new «sterile» type of neutrino. Sterile neutrinos are searched for assuming a 4ν model (3 active and 1 sterile ν). The exclusion area in the Δm^2_{14}, $\sin^2(2\theta)_{14}$ plane is calculated using the ratios of positron energy spectra collected at different distances. Therefore results do not depend on the shape and normalization of the reactor $\tilde{\nu}_e$ spectrum and on the detector efficiency.

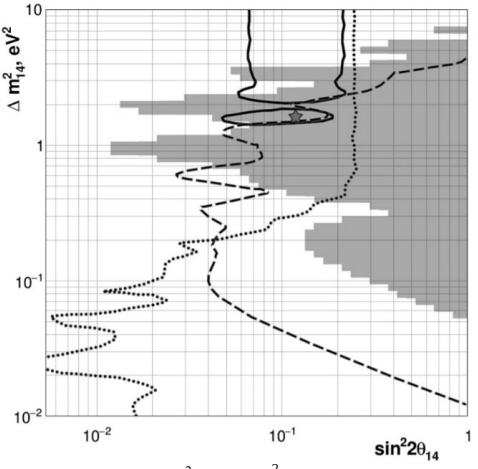

Fig. 1. 90% C.L. exclusion areas in Δm^2_{14} and $\sin^2(2\theta_{14})$ parameter space. Shaded areas are this analysis. Dashed line is the Bugey limit [2]. Dotted line is the Daya Bay limit [3]. Solid line is allowed region from the RAA and GA fit and the star is its best point [4].

1. I.Alekseev *et al.* // arXiv: 1606.02896 v3, 2016.
2. A.Achkar *et al.* // Nucl. Phys. B. 1995. V.434. P.503.
3. P.Adamson *et al.* // Phys. Rev. Lett. 2016. V.117. 151801.
4. G.Mention *et al.* // Phys. Rev. D. V.83. 073006.