

## Measurement of reactor neutrino oscillation by the Double Chooz experiment



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### Abstract:

Measurements of reactor neutrino oscillation from the Double Chooz experiment will be presented. Double Chooz measured reactor electron anti-neutrinos at a distance of 1050m from Chooz reactor cores in France via inverse beta decay (IBD) reactions. Double Chooz doped Gd in liquid scintillator with which total 8MeV gamma rays are released by neutron capture. Background is largely suppressed by requiring delayed coincidence of positron and neutron capture signals. In addition, Double Chooz developed new analysis using neutron captures on hydrogen, which provide cross-check to the Gd channel. The value of  $\theta_{13}$  is measured from a comparison of the observed IBD rate and the energy spectrum to the prediction. In the recent observation with increased statistics, deviations from the reactor anti-neutrino prediction were observed above the prompt positron energy of 4MeV and the same feature was confirmed later by other reactor neutrino experiments. The cause of the distortion is currently under investigation.

Double Chooz finished construction of the second detector at 400m from reactor core by end of 2015 and currently collecting the data with two detectors. Prospect for the  $\theta_{13}$  measurement with the two detectors will be also presented.