



Contribution ID: 737

Type: **Parallel Talk**

## Duble Chooz latest results

*Thursday, 6 July 2017 10:45 (15 minutes)*

Nuclear reactor neutrinos were used on the first neutrino detection back in 1956. Since then our knowledge on neutrino physics haven't stopped broadening, and reactor neutrinos are still an important source of investigation. The Double Chooz (DC) is an experiment on neutrino oscillation based at Chooz nuclear power plant in France. Back in 2011 the DC collaboration reported an indication of non-zero  $\theta_{13}$ , the last unmeasured angle of the neutrino PMNS mixing matrix, for the first time using reactor neutrinos. This was confirmed and measured by independent experiments in the following year. The DC collaboration has improved its analysis over the last years, in order to reduce the uncertainty on  $\theta_{13}$  measurement. The use of a second detector, the Near Detector (ND), operating  $\sim 400$  meters from the reactors, improves the sensitivity by its nearly iso-flux location, in comparison to the Far Detector (FD), around the oscillation maximum  $\sim 1000$  meters. Further improvement is achieved by making both detectors identical, in order to highly suppress the detection induced systematics. DC is taking data with both detectors since January of 2015, and boosted the event statistics by a novel approach on the Inverse Beta Decay (IBD) selection, considering neutrons captures on Gadolinium and Hydrogen simultaneously, that increases the fiducial volume by more than three times. The precision and accuracy of  $\theta_{13}$  have a leading impact on the current explorations of the neutrino CP violation phase and atmospheric mass ordering, when combining all neutrino oscillation measurements in a global analysis. Thus the redundancy of multiple  $\theta_{13}$  experiments is critical, ensuring the findings robustness. In this talk the latest analysis and results towards  $\theta_{13}$  measurement by DC will be showed. The efforts of the DC collaboration beyond  $\theta_{13}$ , will also be addressed.

### Experimental Collaboration

Double Chooz

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