EP Seminar

SPEAKER: CABRERA SERRA, A. (IN2P3/CNRS)

TITLE: **Double Chooz Improved Multi-Detector Measurements**

DATE: Tue 20/09/2016 11:00

PLACE: 500-1-001 - Main Auditorium

ABSTRACT

The Double Chooz experiment (DC) is a reactor neutrino oscillation experiment running at Chooz nuclear power plant (2 reactors) in France. In 2011, DC first reported indication of non-zero θ_{13} with the far detector (FD) located at around oscillation maximum, thus challenging the CHOOZ non-observation limit. A robust observation of θ_{13} followed in 2012 by the Daya Bay experiments with multiple detector configurations. Since 2015 DC runs in a multi-detector configuration making thus the impact of several otherwise dominating systematics reduce strongly. DC's unique almost "iso-flux" site, allows the near detector (ND) to become a direct accurate non-oscillation reference to the FD. Our first multi-detector results at MORIOND-2016 showed an intriguing deviation of θ_{13} with respect to the world average. We will address this issue in this seminar. The combined "reactor-θ_{13}" measurement is expected to remain as the world reference for decades. Since this measurement relies on systematics uncertainties in the unprecedented per mille level in neutrino physics, the redundancy of multiple experiments (Daya Bay, DC, RENO) is considered most critical to ensure the robustness of both the accuracy and the precision. This combined measurement is today a critical reference throughout the field, having leading impact to possible indirect manifestations of neutrino CP-violation and atmospheric mass ordering when combined with the world measurements — one of the key highlights of the NEUTRINO-2016 conference. In this seminar, DC will release — for the first time — the results of a novel analysis method aimed to maximise the accuracy; i.e. the goodness of the central value of θ_{13}. Despite a major increase of statistical power, a conservative approach on systematics has been adopted for now. Beyond oscillation physics, DC will release — also for the first time — our most precise single-detector results allowing high precision reactor spectrum characterisation, including both shape and normalisation. This is a particularly hot topic since DC provided the first evidence of a sizeable spectral distorsions in May 2014 — confirmed later on by RENO (June) and Daya Bay (July) — questioning the accuracy and precision of today's reactor neutrino predictions technology.

Organised by: C. Lourenço, G. Unal.....Refreshments will be served at 10h30