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Multi-detector results from the Double Chooz experiment

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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 θ13 with the far detector (FD) located at the maximum of oscillation effects (i.e. disappearance), thus challenging the CHOOZ non-observation limit. A robust observation of θ13 followed in 2012 by the Daya Bay experiments with multiple detector configurations. Since 2015 DC runs in a multi-detector configuration strongly reducing the impact of several otherwise dominating systematics. 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, presented at MORIOND-2016 based on the neutron capture on Gadolinium, were dominated by the statistical error. The combined observation of neutron capture on Gadolinium and Hydrogen allowed us to overcome this issue and reduce the statistical error by about 40%. In this talk the new results will be presented, showing that we are today dominated by the detection systematic and that a final sensitivity on sin2(2θ13) of better than 0.01 is within reach.

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