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Reactor spectral rate and shape measurement in Double Chooz detectors

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Recently, a new generation of reactor-based neutrino experiments aiming to measure the θ13 mixing angle characterizing the neutrino oscillation phenomena was developed. For this purpose, the Double Chooz experiment is looking for a disappearance of the antineutrinos emitted by the two 4.25 GWth Pressurized Water Reactor cores of the Chooz power plant in the French Ardennes. In this view, two identical detectors detecting the antineutrinos via inverse beta decay reaction are installed at different baselines of the cores (400m and 1050m). For the first phase of the experiment, in which only the far detector was taking data, an antineutrino spectrum prediction based on full core simulations of the cores was achieved.

In 2015, Double Chooz reported a distortion above 4 MeV in the IBD spectrum observed in the far detector compared to the prediction. This deviation from the flux prediction cannot be explained by the θ13 driven oscillation. At the same time, Double Chooz completed the construction of the near detector allowing a precise measurement of reactor antineutrino spectrum emitted by the cores.

This poster presents the latest Double Chooz results about the shape and rate of the antineutrino measurement i

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