



Poster session 3 – Wednesday 6 July

P3.074 Charged-current muon neutrino shape and rate analysis at the T2K off-axis near detector

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The experimental evidence that neutrinos can convert from one flavour to another and therefore have non-vanishing mass, has been recently honoured by a Nobel Prize. However, the completeness of the three-neutrino mixing paradigm, parametrised by the PMNS matrix, was challenged in the last two decades.

Sterile neutrinos - singlet fermions which contribute to weak interactions only through mixing with active neutrinos - might help to explain some anomalies to the three-neutrino scenario reported by several experiments. However, the existing results are puzzling and the existence of such particles is still an open question.

The T2K off-axis near detector (ND280), located at 280m from the proton target, can contribute to the search for sterile neutrinos. Shape and rate measurements for charged-current muon neutrino interactions are studied and tested against the current cross-section model uncertainties and the possibility to have short-baseline neutrino oscillations within the 3+1 model.