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Prospect for Charge Current Neutrino Interactions Measurements at the next CERN neutrino facility.

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In the last few years the experimental results on neutrino/antineutrino oscillations at Short-Baseline (SBL) have shown a tension with several phenomenological models. The recent and carefully recomputed antineutrino flux from nuclear reactors has further increased this tension suggesting the need of a better study of the neutrino physics at SBL. In this paper we present a proposal for two magnetic spectrometers designed to measure the momentum and charge of the leptons produced in Charged Current (anti-)neutrino interactions at the future CERN neutrino facility. The spectrometers are the natural complement of a large LAr detector used as a target. The magnetic spectrometers have been designed in order to measure the charge and momentum of the muons in wide energy range, from few hundreds MeV, using a 0.3T magnetic field in air, up to several GeV measuring the bending and range of the muon in a large RPC instrumented 1.5 T iron dipolar magnet. The RPC are operated in streamer mode and digitally readout. The bending of the muon in the magnetic field in air is measured using RPC detectors in streamer mode with 1 cm wide strip with analog readout. The paper presents the design of the two spectrometers with the foreseen performances in terms of charge misidentification, muon momentum measurement and sensitivity of the experiment, in conjunction with a LAr detector and as a stand-alone experiment, to the oscillation parameters.

for the collaboration

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