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A scintillating fibre tracker for neutrino physics at LHC

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SND@LHC is a compact and stand-alone experiment that performed the first collider neutrino observation at the LHC.

The detector, located 480 m from the ATLAS interaction point, is composed of a target region, followed downstream by a hadronic calorimeter and a muon identification system.

The target region is instrumented with five walls of emulsion cloud chambers, each followed by a scintillating fiber (SciFi) tracker plane, whose function is to assign a timestamp to the reconstructed neutrino events and measure the energy of electromagnetic showers.

Both the scintillating fiber layers and the multichannel SiPM arrays of the SciFi modules were originally developed for the LHCb SciFi tracker and are here also exploited to perform timing and calorimetric measurements for the first time.

The read-out electronics, based on the TOFPET2 ASIC, has been therefore optimised to meet the stringent time resolution requirements and to allow the measurement of signal amplitudes from the photo-detectors.

After an overview of the SND@LHC detector, the talk will focus on the SciFi tracker, the read-out electronics, and the characterisation of their performance, particularly in terms of time resolution and energy measurement.

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