Contribution ID: **6** Type: **not specified**

SND@LHC: a new neutrino detector at LHC

Thursday 14 September 2023 15:15 (15 minutes)

SND@LHC is a compact and stand-alone experiment to perform measurements with neutrinos produced at the LHC in the pseudo-rapidity region of $7.2 < \eta < 8.6$, complementary to all the other experiments at the LHC.
The experiment will be located 480~m downstream of the ATLAS interaction point, in a previously unused LHC service tunnel. The detector is composed of a hybrid system based on an 830~kg target mass with tracking capabilities, followed downstream by a calorimeter and a muon system. The target region is composed of bricks of emulsion cloud chambers and scintillating fibre tracker layers with good spatial and time resolution. The Veto, HCAL and Muon detector use scintillating bars with different geometries and photodetectors optimised for the physics performance. All active detectors are read out by silicon photomultipliers connected to a custom read-out electronics based on the TOFPET2 ASIC. It allows threshold-based noise suppression, and amplitude and time information measurement.
The data acquisition system operates in a trigger-less fashion, by sending all recorded hits to a central server, where online event building and noise suppression is performed.
The experimental configuration allows to efficiently distinguish between all three neutrino flavours, opening a unique opportunity to probe physics of heavy flavour production at the LHC in the region that is not accessible to ATLAS, CMS and LHCb.
The detector has been commissioned and installed in 2021-2022. A first set of data has been collected starting from April 2022, and it is currently being analysed, aimed at providing the first observation of neutrinos produced at a collider.
The first phase aims at operating the detector throughout LHC Run 3 to collect a total of 250~fb^{-1}. A thorough detector upgrade is foreseen for Run 4.

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