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(G*) ATLAS small-Strip Thin Gap Chamber Signal Strength Studies

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The New Small Wheel (NSW) is the largest major upgrade of the ATLAS Muon Spectrometer and was installed during the Large Hadron Collider (LHC) Long Shutdown 2 (2019-2021). The NSW replaced both of the 9-metre-diameter 'small' wheels constituting the part of the Muon Spectrometer closest to the beam line. The NSW is composed of two technologies: MicroMegas and small-Strip Thin Gap Chambers (sTGC). The sTGCs provide the primary triggers for the NSW. The detector layers of the sTGC consist of a wire plane centred between two cathode planes. One cathode plane is segmented into thin strips of constant width and the other into larger pads with variable sizes that define regions of interest for the first-level trigger.

The sTGC detector performance in a high background environment was studied at the CERN Gamma Irradiation Facility (GIF++). From signal strength studies of test beam data, it has been demonstrated that the pads of the sTGC are able to distinguish muon signals in high-background environments and are capable of operating well with background conditions similar to those expected during the High-Luminosity LHC.

Keyword-1

LHC

Keyword-2

ATLAS

Keyword-3

thin gap chambers

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