Abstract Submitted
for the APR16 Meeting of
The American Physical Society

Performance of the new small-strip Thin Gap Chamber for the ATLAS Muon System at the LHC. ALAIN BELLERIVE, Carleton University, ATLAS NSW STGC GROUP COLLABORATION — The instantaneous luminosity of the Large Hadron Collider (LHC) at CERN will be increased up to a factor of five with respect to the design value by undergoing an extensive upgrade program. The largest phase-1 upgrade project for the ATLAS Muon System is the replacement of the present first station in the forward region with the so-called New Small Wheel (NSW). The NSW consists of layers of Micromegas and small-strip Thin Gap Chambers (sTGC), both providing trigger and tracking capabilities. The precision reconstruction of tracks requires a spatial resolution of about 100 microns, and the trigger track segments have to be reconstructed with an angular resolution of approximately 1 mrad. The sTGC structure consists of a grid of gold-plated tungsten wires sandwiched between two resistive cathode planes. The precision cathode plane has strips with a 3.2mm pitch for precision readout and the cathode plane on the other side has pads for triggering. The pads are used to produce a 3-out-of-4 coincidence to identify muon tracks in an sTGC quadruplet. A full size sTGC quadruplet has been constructed and equipped with the first prototype of dedicated front-end electronics. The design of the sTGC will be described. The performance of the sTGC quadruplet has been characterized with data collected at the Fermilab and CERN test beam facilities. Spatial resolution and trigger efficiency results will be presented. An overview of the simulation and digitization model of the sTGC will also be summarized.

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Date submitted: 06 Jan 2016 Electronic form version 1.4