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The New Small Wheel Upgrade Project of the ATLAS Experiment.

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The instantaneous luminosity of the Large Hadron Collider at CERN will be increased up to a factor of five with respect to the design value by undergoing an extensive upgrade program over the coming decade.

Several sub-systems of the ATLAS detector will also be upgraded in order to cope with the higher particle rate and to further improve the excellent performance provided during the first run period.

The largest upgrade project for the ATLAS Muon System is the replacement of the present first station in the high-rapidity regions with the so-called New Small Wheels (NSWs), to be installed during the LHC long shutdown in 2018/19.

The NSWs consist of eight layers each of Micromegas and small-strip Thin Gap Chambers (sTGC), both providing trigger and tracking capabilities, for a total active surface of more than 2500 m². It represents the first system with such a large size based on Micro Pattern (Micromegas) and wire detectors (sTGC).

We will describe the technological novelties and the expected performance of the NSW system, including the detector design, prototypes construction and test results, the trigger and readout electronics based on a new front-end ASIC (VMM) and the first deployment of a readout architecture based on commercial components.

The status of the project and the plan for the completion will also be discussed.

Summary

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