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The ATLAS New Small Wheel Upgrade Project

The luminosity upgrade of the Large Hadron Collider at CERN foresees a luminosity increase by a factor 5 compared to the LHC. To cope with the corresponding rate increase, the ATLAS detector needs to be upgraded. The upgrade will proceed in two steps: Phase I in the LHC shutdown 2018/19 and Phase II in 2023-25. The largest of the ATLAS Phase-1 upgrades concerns the replacement of the first muon station of the high-rapidity region, the so called New Small Wheel. It employs eight layers of micromegas detectors (MM) and eight layers of small-strip Thin Gap Chambers (sTGC). This configuration copes with the highest rates expected in Phase II and considerably enhances the performance of the forward muon system by adding triggering functionality to the first muon station.
We describe the limitations of the present muon detector and the expected improvements, the requirements for the NSW, the layout, and the detector design, including trigger & readout electronics based on a new design front end ASIC and the first deployment of a new ATLAS off-detector readout architecture based on commercial components. We will conclude with an update of the status of the project and the steps towards a complete operational system, ready to be installed in ATLAS in 2018/19

Summary

This oral presentation will be on behalf of the ATLAS Muon Collaboration

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