

Cosmic results with the final Micromegas sectors for the ATLAS Muon upgrade

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With the upgraded beam luminosity in LHC run-3, the detector technology for the innermost end-cap muon station (Small Wheel) of the ATLAS detector needs to be upgraded. The new technology should be able to meet the demands of better position resolution, high efficiency, fast response at the expected high background rate. The detectors for precision tracking and triggering at the New Small Wheel (NSW) will be Micromegas (MM) and small strip Thin Gas Chamber (sTGC). The detectors are also complementary to each other. Each of the two NSWs will consist 8 large and 8 small sectors. A sector is a combination of the sTGC wedges on either side of a double Micromegas wedge. The Micromegas quadruplets are received at CERN from different construction sites. 4 MM quadruplets are integrated to build a MM double wedge. After the electronic integration is completed, the double wedges are tested with cosmic muons at the Cosmic Stand of B899 at CERN (BB5). There is a sequence of procedures for testing the double wedges at the Cosmic Stand. Here, we make sure of the final high voltage configuration, measure the efficiency, cluster size, strip multiplicity per readout layers of the double wedge and qualify the Micromegas sector for the final integration with the sTGC wedges before mounting them on the New Small Wheel. The procedure and the final results from the MM double wedges will be presented.

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