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Performance of the ATLAS Muon Spectrometer and of Muon Identification at the LHC

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The large cosmic data samples collected in fall 2009 by the ATLAS experiment have been used to study the performance of the Muon Spectrometer. Detailed studies of the basic Muon spectrometer performance in terms of sagitta resolution, tracking efficiency and momentum resolution are presented and provide an update with respect to the results recently published. The results are also compared with a cosmic data simulation recently improved with a more realistic drift chamber response. The recent collision data collected at a CM of 7 TeV have also been analyzed to determine basic Muon Spectrometer performance.
The performance of the ATLAS muon identification was studied with 1 inverse nanobarn of LHC proton-proton collision data at a centre of mass energy of 7 TeV. Measured detector efficiencies, hit multiplicities, and residual distributions of reconstructed muon tracks are well reproduced by the Monte Carlo simulation. Exploiting the redundancy in the muon identification at detector and reconstruction level the performance of the identification steps could be checked with data. 4.5 muons per microbarn with pT > 6 GeV and $|\eta|<2.5$ were identified as predicted by Pythia minimum bias Monte Carlo. The pseudorapidity, ϕ, and pT distributions of the reconstructed muons are in reasonable agreement with the Monte Carlo prediction.

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