

Muon identification algorithms in ATLAS

In the midst of the intense activity that will arise from the proton-proton collisions at the LHC, muons will be very useful to spot rare events of interest. The good resolution expected for their momentum measurement shall also make them powerful tools in event reconstruction. Muon identification will thus be a crucial issue in the ATLAS experiment at the LHC. Their charged tracks can be reconstructed in the external spectrometer only, but the combination of such "stand-alone" tracks with tracks from the inner detector shall increase the precision and reliability of the reconstructed muon. This is particularly true in the lower part of the p_T spectrum, where the inner detector is more performant. We will present here the various strategies for combined muon identification in the ATLAS experiment. The main algorithms, called Staco and Muid, perform the combination of existing tracks in the inner detector and in the muon spectrometer, allowing the best identification of muon tracks. Their efficiency is completed by muon tagging algorithms, which identify inner tracks as muons using raw information from the outer spectrometer; they are very useful for regions with limited detector coverage and for low energy muons. Finally, calorimeter tagging algorithms extract additional muon candidates from their minimum ionization deposits in the calorimeter cells. The performance of all those algorithms both on collisions simulation and cosmic data will be detailed, along with their latest developments aiming at first data at the end of 2009.

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