Contribution ID: **33** Type: **poster**

ATLAS Muon Spectrometer Simulation and its Validation Algorithms

Wednesday, September 5, 2007 8:00 AM (20 minutes)

The ATLAS detector, currently being installed at CERN, is designed to make precise measurements of 14 TeV proton-proton collisions at the LHC, starting in 2007. Arguably the clearest signatures for new physics, including the Higgs Boson and supersymmetry, will involve the production of isolated final-stated muons. The identification and precise reconstruction of muons are performed using a combination of detector components, including an inner detector, comprising a silicon tracker, pixel detector, and transition radiation tracker, housed in a uniform solenoidal field, and a precision standalone Muon Spectrometer, comprising monitored drift tubes and cathode strip chambers, triggered by resistive plate chambers and thin-gap chambers, and housed in a toroidal field.

In order to manage the complexity and to understand the performance of the ATLAS MuonSpectrometer,a detailed full detector simulation is required and it should be kept under control by means of automatic validation procedures. We describe the implementation and the functionalities of the recently developed MuonValidation package, which has been developed as a dedicated tool to monitor and validate the performance of the Full Simulation and Digitization of the Muon System. Its flexible design allows comparisons between different Muon geometrical layouts and different software releases. Validation results based on fully simulated GEANT4 events, using the complete detailed geometrical description of the detector are shown.

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Session Classification: Poster 2

Track Classification: Event Processing