Improvement of the CMS Muon Reconstruction Performance due to Precise Track-based Alignment MALACHI BROWN, Texas AM University — The performance of the CMS muon system depends on a precise knowledge of the positions and orientations of all its elements. The muon tracks reconstructed in proton-proton collision data at the LHC are used to align the individual muon detectors with respect to the inner silicon tracker. The alignment procedure measures these positions and provides geometries of the muon system that must be validated to ensure the performance of the detectors. In this report we present a set of sophisticated validation tools, developed to test the accuracy of a given muon system geometry with data from collisions. The validation procedure uses events with pairs of muons from Z-boson decays and events with very high pT muons, in order to quantify the reconstruction performance of the muon system for a given geometry. Kinematic properties of muons reconstructed using information from the muon system are compared to the properties of muons built using information from the tracker. We demonstrate improvements of the muon reconstruction performance after track-based alignment procedures are performed with 2016 data.

Malachi Brown
Texas A
M University

Date submitted: 01 Oct 2016   Electronic form version 1.4