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Track-Based Alignment of the CMS Muon System ADRIAN RAPHAEL THOMPSON, Texas AM University, CMS COLLABORATION — The muon detection system of the CMS experiment provides fast trigger decisions and muon track measurements to identify muons produced in proton-proton collisions. An accurately aligned muon system is necessary for the reconstruction of events with muons of high transverse momenta, relevant to both precision measurements of the standard model processes and searches for new physics. The relative positions and orientations of the muon detectors with respect to the inner silicon tracker may be precisely measured using reconstructed tracks propagating from the interaction point. This track-based alignment procedure is capable of providing a geometry with individual muon detectors aligned to within 100 microns along sensitive modes. In this report, we present the alignment algorithm and a validation procedure which quantifies the reconstruction performance for such a geometry. We demonstrate improved muon reconstruction using the track-based alignment procedure performed with early 2017 data.

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