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Muon Reconstruction Software in CMS

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The CMS detector has a sophisticated four-station muon system made up of tracking chambers (Drift Tubes, Cathode Strip Chambers) and dedicated trigger chambers. A muon reconstruction software based on Kalman filter techniques has been developed which reconstructs muons in the standalone muon system, using information from all three types of muon detectors, and links the resulting muon tracks with tracks reconstructed in the silicon tracker. The software is designed to work for both, offline reconstruction and for online event selection within the CMS High-Level Trigger (HLT). Since the quality of the selection algorithms used in the HLT system is of utmost importance the software has been designed using modern object-oriented software techniques and is implemented within the CMS reconstruction software framework. The system should be able to select events with final-state muons, indicating interesting physics. The design implementation and performance of the CMS muon reconstruction software is presented. We will show that offline code with little modifications can be used in the HLT system, by making use of the concepts of regional and conditional reconstruction. The implementation and performance of possible HLT selection algorithms are illustrated.

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