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Measuring Muon Trigger Efficiencies in CMS with Early Data for Top Physics Analyses

With a projected design luminosity of $10^{34} \text{ cm}^{-2} \text{ s}^{-1}$ the LHC will provide about 10^9 proton collisions per second within the CMS detector. Thus, an efficient trigger system to select interesting events is essential. A good knowledge of these trigger efficiencies is inevitable, e.g. for cross section measurements. This study presents data-driven approaches applied to first 7 TeV data to measure the performance of the CMS muon triggers that are used for top physics analyses. The efficiency is extracted by comparing offline reconstructed muons to muon trigger objects in unbiased control samples. As alternative approach the muon trigger efficiency is measured applying tag-and-probe methods. Following both strategies the muon trigger efficiency is parameterised in different regions of transverse momentum and pseudo rapidity of the offline reconstructed muons. The results are compared with expectations obtained from simulations and their impact on physics analyses is discussed.

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