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Effects of the electronic threshold on the performance of the RPC system of the CMS experiment

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Resistive Plate Chambers (RPCs in the following) play a very important role as the dedicated system for muon triggering both in the barrel and in the endcap of the CMS experiment at the Large Hadron Collider. It is therefore of primary importance to tune the operating voltage and the electronic threshold of the front-end boards reading the signals from these detectors in order to optimize the RPC system performance. In this study we present the results of a threshold voltage scan, and in particular the effects of changing the electronics threshold voltage on the RC efficiency, cluster size and detector intrinsic noise rate. According to this study, decreasing the applied threshold voltage by 5 mV results in an average efficiency gain of about 0.9% in the barrel without any significant increase of the cluster size and the noise rate.

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