

## CMS RPC trigger performance

The Level 1 RPC trigger is part of the Global Muon Trigger of the CMS experiment. The RPC trigger uses a Pattern comparator logic. We review its performance during the pre-beam cosmic data taking period in 2009. During the cosmic data taking also known as CRAFT09 (Cosmic Rays at Four Tesla), the RPC trigger was extensively used and helped in the accumulation of millions of cosmic muons. Synchronization is a key issue in the RPC trigger for several reasons. One due to large area covered by the RPC chambers that make the muon detector all signals must be properly digitized and transmitted and then synchronized for the final processing and determination of the best muon candidates. For this special procedures must be taken into account. The plans for calibration and synchronization of the system during normal operation of the CMS with LHC collision are also described.

### **Summary (Additional text describing your work. Can be pasted here or give an URL to a PDF document):**

During the Cosmic Ray at Four Tesla also known as CRAFT in 2009 which span for a period of almost 1 month of continuous data taking, the CMS Resistive Plate Chambers or RPC trigger was used for the collection of millions cosmic muons. The work done helped in the calibration and commissioning of the not only of the RPC trigger itself (hardware improvement, final commissioning, online software) but also in the calibration and alignment of the RPC chamber detectors. Noise studies were carried out and compared with 2008 results, where significant improvements were observed. Special focus was made on the readiness of this trigger, in view of the upcoming LHC collisions.

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