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Test for upgrading the RPCs at very high counting rate

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Very large systems of RPCs with 2 mm gas gap are presently working at LHC as muon trigger detectors. In order to conceive a new generation of RPCs, fully adequate to the needs of the high luminosity super-colliders of the next future, two aspects have to be reconsidered: the gap width which determines the amount of charge delivered in the gas per detected avalanche and the front end electronics which determines the minimum charge that can be discriminated from the noise. Both aspects have a crucial effect on the rate capability.

We present here the results of a cosmic ray test carried out on small size RPCs of gap width 2.0, 1.0 and 0.5 mm respectively. The wave forms of both the prompt signal due to the fast drifting electrons and the signal generated in the HV circuit, which is dominated by the slow ion drift, are recorded for each detected cosmic muon. The analysis of these signals is crucial to understand the RPC working features.

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