

Performance Study of HL-LHC ATLAS RPC Prototype

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A new type of RPC chamber prototype, consisting of a triplet of $50 \times 100 \text{ cm}^2$ RPCs, having 1 mm gas gap, 1.2 mm electrodes and new high sensitivity front end electronics, has been designed for the HL-LHC ATLAS upgrade program. Beam test of this prototype chamber was performed in GIF++ using 100 GeV muons and a 14 TBq ^{137}Cs gamma source to simulate the HL-LHC environment. The amplified analog signals of the chamber have been read out by 32 channels of high speed digitizer, permitting to study in details the various aspects of the detector physics in different condition of gamma background and field applied in the gas. Analysis methods and results of these data will be presented, illustrating in details the most relevant features of this new detector: $\sim 98\%$ efficiency, $400\text{ps} \sim 500\text{ps}$ time resolution and $\sim 0.1 \text{ cm}$ spatial resolution, cross talk in between the singlets and cluster size.

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