

# Simulation study on gamma-ray sensitivity of low-resistive phosphate glass electrode RPC using GEANT4 MC

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## Abstract

The phosphate glass used as electrode in the configuration of resistive plate chamber (RPC) and it improves the rate characteristics of the detector. In the present study, we describe the performance of such type of RPC. For the detector a simulation test is performed with a Monte Carlo simulator based on GEANT4. Gamma rays in the energy range 0.1 to 1.0 GeV were inserted on the detector surface and their simulation response is reported. The sensitivity results both for single and double-gap phosphate glass RPC's are reported. As an example, the obtained simulation results are applied to CMS barrel regions. Also in those regions total sensitivities and hit rates are evaluated. The simulated results are compared with the available Bakelite-RPC results, which were found consistent with our studies.

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Sensitivity of double- and single-gap phosphate glass RPCs for  $\gamma$ -rays emerging on its surface has studied.

Advantages of low resistive glass-electrode (phosphate glass electrode) in the RPC construction may solve the difficulty of detectors in the region of extra high rate of incoming particles.

The prototype low-resistive glass RPC has a good performance in such condition and also it has shown a possibility as a proper detector for the gamma ray source.

From the results of our present gamma rays simulation, the phosphate glass electrode construction method is proper in the region of high rate environment as like LHC experiments.