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# Performance simulation of a MRPC-based PET Imaging System

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The low cost and high resolution gas-based Multi-gap Resistive Plate Chamber (MRPC) opens a new possibility to find an efficient alternative detector for Time of Flight (TOF) based Positron Emission Tomography, where the sensitivity of the system depends largely on the time resolution of the detector. Suitable converters can be used to increase the efficiency of detection of photons from annihilation. In this work, we perform a detailed GEANT4 simulation to optimize the converter thickness thereby improving the efficiency of photon conversion. Also we have developed a Monte Carlo based simulation of MRPC response thereby obtaining the intrinsic time resolution of the detector, making it possible to simulate the final response of MRPC-based systems for PET imaging. The result of the cosmic ray test of a four-gap Bakelite-based MRPC operating in streamer mode is discussed.

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