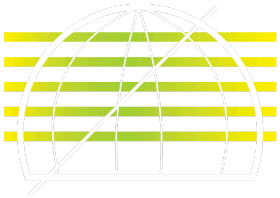

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Study of time resolution of MRPC for cosmic rays and 0.511MeV photons

Wednesday, 28 September 2022 14:00 (25 minutes)

The traditional TOF-PET(Positron emission tomography) mainly uses the structure of a scintillator detector connected to a photomultiplier tube. The structure has the disadvantages that time resolution is not good enough (greater than 50ps), the thickness of the scintillator is large (greater than 3cm), and the reception is small, resulting in a waste of information, long detection time, and poor accuracy. The high cost of traditional TOF-PET limits its widespread use in medical and other fields. The excellent time resolution (about 20ps) of MRPC makes MRPC TOF-PET a good application prospect. This paper shows the time resolution of two 32-gap MRPCs with 128 μm gap thickness on cosmic rays and 0.511MeV photons. By using the fast amplifier and waveform digitizer system, the time resolution of 27 ps for cosmic rays and 72 ps for 0.511 MeV photons are obtained. The reason for the analysis is related to the different ways different particles act and the thickness of the detector.

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