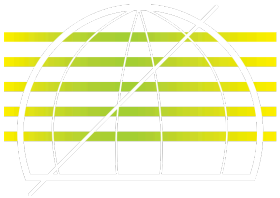

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Glass multi-gap RPCs for gamma-ray inspection

Tuesday, 27 September 2022 17:15 (25 minutes)

In the present R&D, multi-gap resistive plate chambers (MRPCs) are studied for non-destructive inspection of small airport cargos. A six-gap RPC of a line-scan type was constructed using soda-lime glass whose bulk resistivity is measured as 7 x 10ˆ11 Ωcm. The thicknesses of the gaps and the glass plates were 0.55 and 0.52 mm, respectively. The typical detector characteristics such as the efficiency and the strip multiplicity were measured using 661.7-keV gamma rays emitted from a Cs-137 source with a current activity of 4.8 GBq. The efficiency for the 661.7-keV gammas measured by the vertically mounted line-scan MRPC detector at a working-point (WP) high voltage of 12.1 kV is about 6% which well agrees with a simulation result performed by using a GEANT program. In order to demonstrate the quality operation of the MRPC detector, we deduced gamma-transmission images for various objects such as spanners, bottles, and fire extinguisher with a spatial resolution of about 2 mm.

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