

T561 - MRPC R&D -

(Univ. of Tsukuba, Vanderbilt Univ.)

A R&D experiment has been carried out at KEK-PS T1 beam-line to test a new gaseous time of flight detector: Multi-gap Resistive Plate Chamber (MRPC), which will be used in the high energy heavy ion experiment (PHENIX) at Relativistic Heavy Ion Collider (RHIC) located at Brookhaven National Laboratory (BNL). The schematic figure of the MRPC is shown in the figure.1, it consists of several layers of glass and Freon gas mixture between layers. The high voltage ($\sim\pm 7\text{kV}$) is supplied between the outer glass layers. The ionization and avalanche created in several gaps induce a simultaneous signal on the most outer read-out pad, which will be read out with pre-amp electronics. The aim of this test is to investigate the detector performance (timing resolution and efficiency) as a function of design parameters (high voltage, pad shape, incident position and read-out electronics parameters).

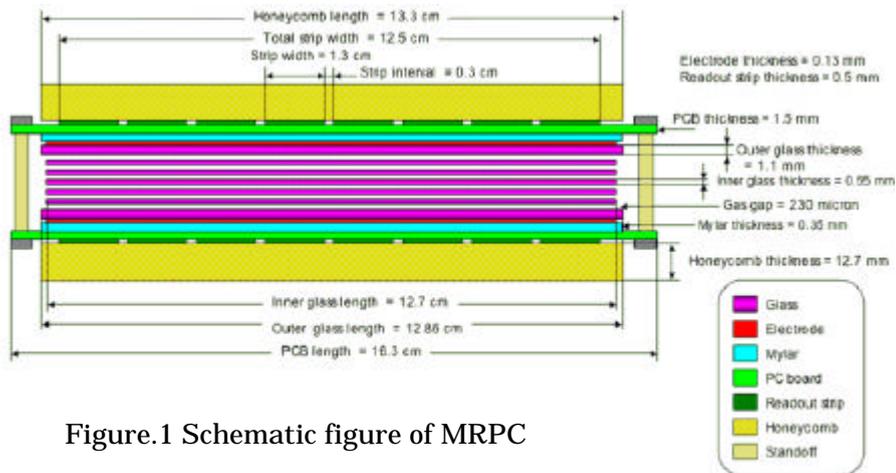


Figure.1 Schematic figure of MRPC

The figure.2 shows the results of timing resolution and efficiency for several different prototypes, which have several different read-out pad sizes and shapes. We have fixed some of the design parameters and the operation conditions according to the results we have accumulated during this test experiment at KEK-PS.

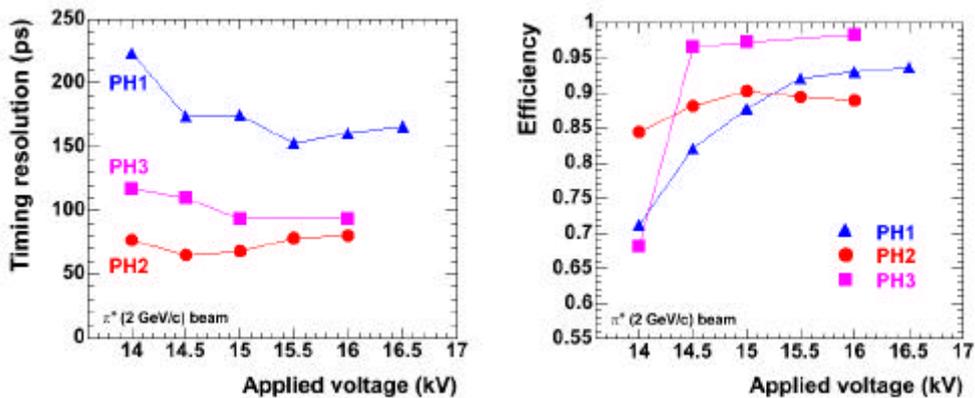


Figure.2 The intrinsic timing resolution of MRPC (left) and the efficiency (right) of the different prototypes are shown as a function of high voltage.