

Development of hole-type MPGD with funnel-capillary plate

A new glass capillary plate (CP) has been developed for a hole-type micropattern gas detector (MPGD). The developed CP has a funnel structure (funnel-CP) fabricated by utilizing a special manufacturing process for a standard CP. The open to surface area ratio is 83% for the funnel-CP. The higher ratio is expected to improve the collection efficiency of primary electrons created by the radiation because most of the electrons can enter the multiplication region without terminating on the upper CP electrode. Moreover, the higher optical transparency is reliable for digital X-ray radiography and cold neutron imaging. The funnel-CP developed for the first prototype MPGD has a thickness of 300 μm and an effective diameter of 20 mm. The diameter of each hole is 50 μm . The metal electrodes are fabricated onto the two flat surfaces of a plate. Basic performance tests of the hole-type MPGD were carried out with X-ray beams for several gas mixtures based on Ne and Ar at 1 atm. A gain of up to 1×10^4 and an energy resolution of 16% were obtained for 6 keV X-rays. An excellent imaging capability was demonstrated by the X-ray image. We report on the characteristics of the novel hole-type MPGD with the funnel-CP.

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