

Neutron Gas Scintillation Imager with Glass Capillary Plate

A glass capillary plate (CP) is a thin glass plate of 300 μm thickness with a large number of through holes (50 μm diameter with 64 μm pitch). The CP is one of a device for a hole-type micropattern gaseous detectors (MPGD) as represented by gas electron multiplier (GEM). We have been developing a neutron gas scintillation imager (n-GSI) consisting of a thin layer of ^{10}B , a CP gas detector, mirror and lens optics, and a cooled CMOS camera system. The performance of the neutron imager was investigated using a thermal neutron beam at the Kyoto University Accelerator-driven Neutron Source (KUANS) and Kyoto University Reactor (KUR). Owing to the high imaging capability the n-GSI, the practical position resolution of 200 μm was obtained for the neutron beam. The tracks of α -rays or ^7Li produced by the interaction between neutrons and ^{10}B were also clearly observed. We report on the properties of the neutron imager and describe the outlook for future developments on the basis of the results of Monte Carlo simulations using a particle and heavy ion transport code system (PHITS).

Authors: Mr KONDO, Haruyasu (Electron Tube Division, Hamamatsu Photonics K.K.); Mr SUGIYAMA, Hiroyuki (Electron Tube Division, Hamamatsu Photonics K.K.); Mr HAYASHI, Masahiro (Electron Tube Division, Hamamatsu Photonics K.K.); OKADA, Teruyuki (Electron Tube Division, Hamamatsu Photonics K.K.); Prof. HANAYAMA, Ryohei (The Graduate School for the Creation of New Photonics Industries); Prof. SUMIYOSHI, Takayuki (Graduate School of Science and Engineering, Tokyo Metropolitan University); Mr ISHIZAWA, Satoshi (Graduate School of Science and Engineering, Yamagata University); Mr MORIYA, Toru (Department of Physics, Yamagata University); Prof. TOKANAI, Fuyuki (Department of Physics, Yamagata University); Prof. TASAKI, Seiji (Department of Nuclear Engineering, Kyoto University); Mr HINO, Masahiro (Institute for Integrated Radiation and Nuclear Science, Kyoto University); Prof. HIROSE, Masanori (Graduate School of Science, Kyoto University)

Presenter: Mr MORIYA, Toru (Department of Physics, Yamagata University)

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