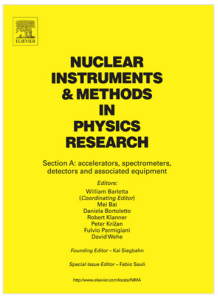
Accepted Manuscript



Gaseous flat-panel detector with glass gas electron multiplier coupled with micro-photodiode array

Yuki Mitsuya, Hiroaki Miyoshi, Takeshi Fujiwara, Mitsuru Uesaka, Hiroyuki Takahashi

PII: S0168-9002(17)30593-4
DOI: http://dx.doi.org/10.1016/j.nima.2017.05.040
Reference: NIMA 59878

To appear in: *Nuclear Inst. and Methods in Physics Research, A*

Received date : 30 November 2016
Revised date : 26 April 2017
Accepted date : 27 May 2017

Please cite this article as: Y. Mitsuya, H. Miyoshi, T. Fujiwara, M. Uesaka, H. Takahashi, Gaseous flat-panel detector with glass gas electron multiplier coupled with micro-photodiode array, *Nuclear Inst. and Methods in Physics Research, A* (2017), http://dx.doi.org/10.1016/j.nima.2017.05.040

Gaseous flat-panel detector with glass gas electron multiplier coupled with micro-photodiode array

Yuki Mitsuya[a]*, Hiroaki Miyoshi[b], Takeshi Fujiwara[c], Mitsuru Uesaka[a], Hiroyuki Takahashi[d]

[a]Nuclear Professional School, School of Engineering, The University of Tokyo, 2-2 Shirane, Shirakata, Tokai-mura, Naka-gun, Ibaraki 319-1188, Japan

[b]Department of Information Systems Engineering, Graduate School of Information Science and Technology, Osaka University, 1-5 Yamada-Oka, Suita, Osaka, 565-0871 Japan

[c]Research Institute for Measurement and Analytical Instrumentation, National Metrology Institute of Japan, National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba Central 2, 1-1-1 Umezono, Tsukuba, Ibaraki 305-8568, Japan

[d]Department of Nuclear Engineering and Management, School of Engineering, The University of Tokyo, 7-3-1, Hongo, Bunkyo-ku, Tokyo 113-8654, Japan

Corresponding author at: Nuclear Professional School, School of Engineering, The University of Tokyo, 2-2 Shirane, Shirakata, Tokai-mura, Naka-gun, Ibaraki 319-1188, Japan

Tel.: +81 029-287-8483

E-mail address: yukimitsuya@tokai.t.u-tokyo.ac.jp (Y. Mitsuya)

Abstract

In this study, we propose and demonstrate a novel imaging system, a gaseous flat-panel detector (FPD). The gaseous FPD consists of a glass gas electron multiplier (G-GEM) with a scintillation gas, which is optically coupled with photodiode panel fabricated with liquid crystal display technology. The G-GEM is ideal as a low energy deposition radiation detector because of its single stage high gas-gain and hence, its high photon yield. We obtained a preliminary X-ray image with the system by using a Ne/CF_4 90/10 gas mixture. The typical position resolution was 0.93 mm in FWHM, which was obtained from the fitting of edge profiles.

Keywords: Micro-pattern gaseous detector (MPGD), Glass gas electron multiplier (G-GEM), Gaseous flat-panel detector, Gas scintillation, X-ray imaging