Development of a transparent MSGC with optical readout

*Xuan Lian¹, Yuki Mitsuya¹, Yang Tian², Kenji Shimazoe², Hiroyuki Takahashi¹

¹Nuclear Engineering and Management, School of Engineering, The University of Tokyo,
²Bioengineering, School of Engineering, The University of Tokyo.

Abstract

After the development of transparent Micro-strip Gas Chamber (MSGC), the optical readout of MSGC will introduce the indirect coupling of optical readout and MSGC electrodes which will ease the sparks problems, and the high gain of gaseous detectors seems an interesting feature when combined with the flat panel detector readout techniques. This work tested the performance of a transparent MSGC with optical output. The photon emitting and transmission efficiency were acquired and discussed.

Keywords: Micro-pattern, gas scintillation, flat panel detector, Medical Imaging

1. Introduction

The unique features of gaseous detector make it a promising way to develop low-cost, large area and good spatial resolution detectors. After the development of transparent Micro-strip Gas Chamber (MSGC), the optical readout of MSGC has become practical. The indirect coupling of optical readout and MSGC electrodes will help to prevent the sparks damaging the electronics, and the high gain of gaseous detectors will give enough signals to be collected by the photodiode which have been widely used in the flat panel detectors.

2. Test of the MSGC optical readout

A transparent Micro-strip Gas Chamber (MSGC) with IZO electrode was tested with a photodiode output. Both the electronic signal from the MSGC and optical signal from the photodiode was measured.

3. Conclusion

The performance of the optical output of current MSGC substrate was measured. Several parameters such as photon emitting efficiency and transmission of the substrate were measured for estimating the optical output performance and the optimization of the substrate design.

References