

# Characterization of a double-grid-type MSGC with two-dimensional readout using LCD technology

\*Xuan Lian<sup>1</sup>, Yuki Mitsuya<sup>1</sup>, Hiroaki Miyoshi<sup>2</sup>, Kenji Shimazoe<sup>3</sup>, Hiroyuki Takahashi<sup>1</sup>

<sup>1</sup>Nuclear Engineering and Management, School of Engineering, The University of Tokyo,

<sup>2</sup>Sharp Co. Ltd., <sup>3</sup>Bioengineering, School of Engineering, The University of Tokyo.

## Abstract

A new example of two-dimensional double-grid-type MSGC using the latest LCD technology from Sharp, Co. Ltd was introduced here. The insulator layer between two electrode layers can stand over 800V which is very nice. The charge division relationship of two readout electrodes was measured. The energy spectral and the gas gain of the MSGC were measured.

**Keywords:** MSGC, Micro-pattern, Gas detectors, flat panel detector

## 1. Introduction

Recently, Liquid Crystal Display technology based on a fine electrode pattern on a glass is able to fabricate the pixels and switching amorphous transistor on the same glass. This technology intends to integrate many fine pixels as to ~100μm x 100μm on one device, which is compatible with micro pattern gaseous detectors such as micro-strip gaseous chambers (MSGC). We introduced a new example of two-dimensional double-grid-type MSGC using the latest LCD technology from Sharp, Co. Ltd. The two grid design means it is flexible to adjust the voltage and is able to achieve higher gain. And two read out electrodes, the grid 2 and cathode, were both designed to get the signal.

## 2. Design and Characterization of the MSGC

Figure 1 showed the design of MSGC electrodes. It's a double layer structure which contains two dimension readout. Figure 2 shows the charge division between Grid 2 and cathode when both of them voltage are 0V, which showed that the charge were divided almost equally in two electrodes. And when the voltage of Grid 2 increased the ratio of grid 2 to cathode was decreased due to the electric field change..

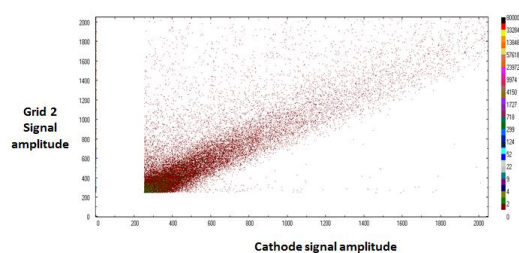
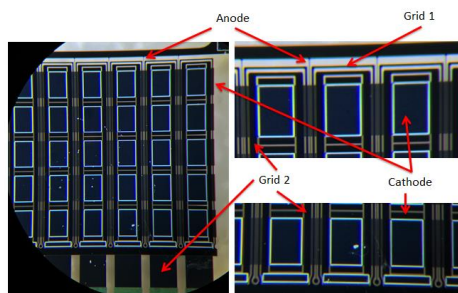


Figure 1. Structure of the MSGC electrodes.

Figure 2. Relationship of signal amplitude from two electrodes.

In our experiments the MSGC achieved the maximum gain of 870 when the voltages were 807V for anode, 400V for grid 1, and 0V for grid 2 and cathode.

## 3. Conclusion

The maximum voltage on the insulator layer between two electrode layers can stand over 807V which is very nice. The charge division relationship of two readout electrodes was very useful for the optimization of the design.

## References

- [1] Takahashi, H., et al "Development of a new multi-grid-type microstrip gas chamber." NUCL INSTRUM METH A, 2002, 477(1-3): 13-16.