



Test of Spliced single-GEM

Jing.Dong
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outline



- 1 Structure
- 2 Experimental setup
- 3 Find **right position** of the gluing region
- 4 Experimental results at the junction
- 5 Conclusions



1. Structure

- ❖ Spliced-GEM with the sensitive area $100 \times 100 \text{mm}^2$ and gluing region in the middle(Fig.1(1));
- ❖ Single pad;
- ❖ Electrodes on both sides of gluing region
- ❖ The gaps of drift and induction region are:12,2mm(Fig.1(2))
- ❖ 6 connectors: Cathode(CAT); GEM-up(GUP); GEM-down(GDW); Electrode-up(EUP); Electrode down(GDW); Readout(RO)
- ❖ Definition: $\Delta V_{Eup} = V_{EUP} - 1430$; $\Delta V_{EDW} = V_{EDW} - 1000$

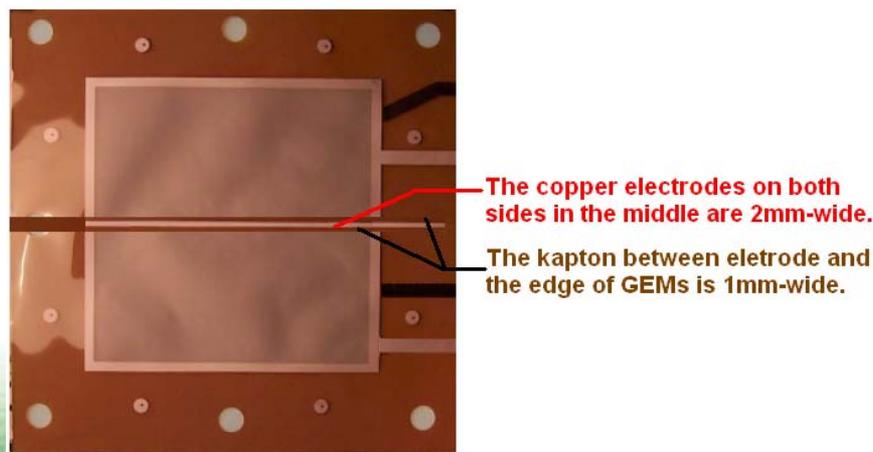


Fig.1(1)

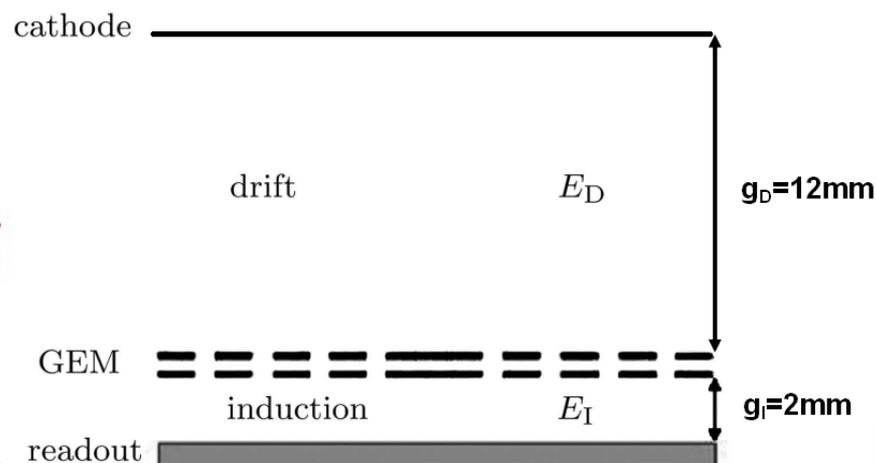
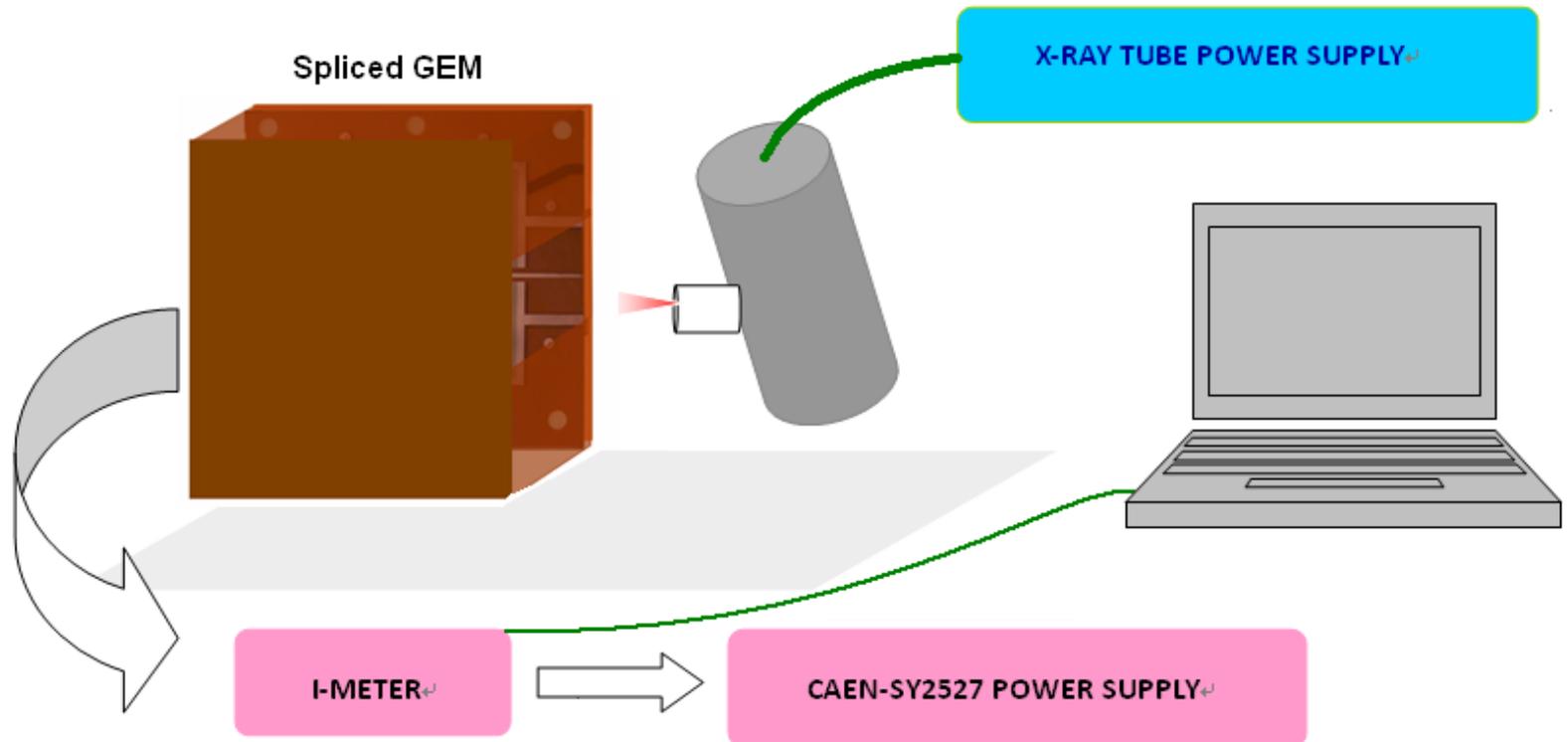


Fig.1(2)

2. Experimental setup



- ❖ Scan the X-ray paralleled to gluing region through the window ($9 \times 35 \text{mm}^2$) between Cathode and GEM foil;
- ❖ Monitored by a ruler glued on the surface of GEM.



3. Find right position of the gluing region



Two configurations were considered. One was by setting $\Delta V_{EUP} = \Delta V_{EDW} = 0$ (Fig.3(1)); The other was by floating both sides electrodes in order to simulate the prototype we have now (Fig.3(2)).

They were shown that the currents of 6 connectors are decreased when the X-ray tube is out of the window or around the junction.

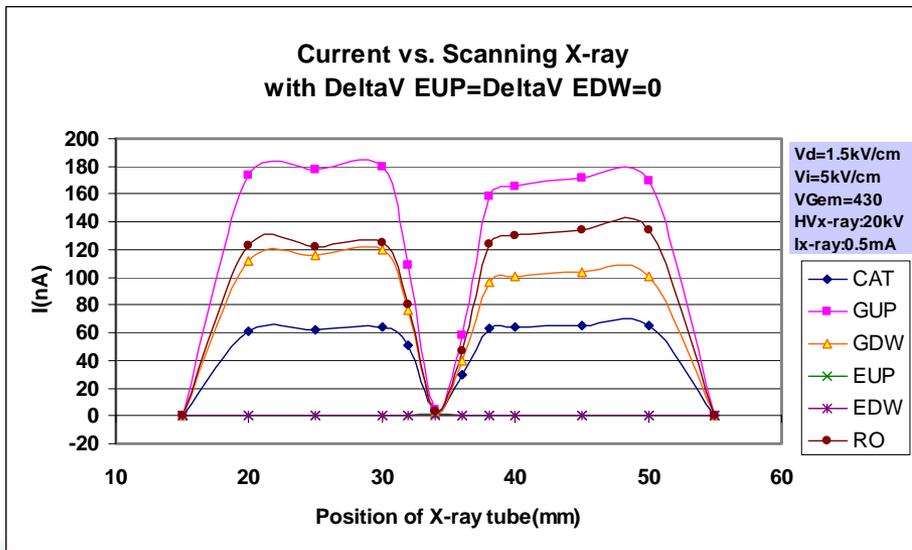


Fig.3(1)

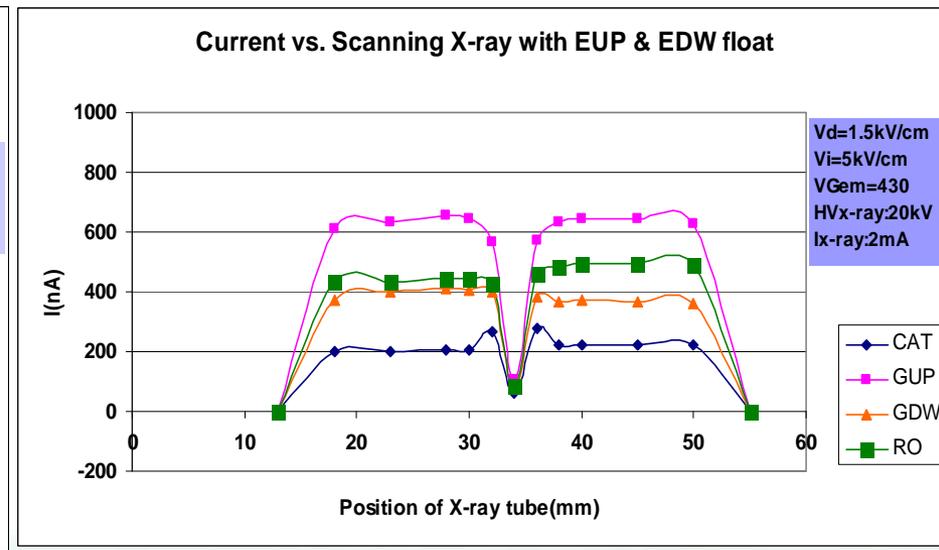


Fig.3(2)

4. Experimental results at the junction



1). The currents as a function of ΔV_{EUP} with $\Delta V_{EDW}=0$ is shown in Fig.4(1).

2). The currents as a function of ΔV_{EDW} with $\Delta V_{EUP}=900$ is shown in Fig.4(2).

3). In Fig.4(3), the ratio as a function of ΔV_{EDW} and ΔV_{EUP} is shown, here it is defined $\text{Ratio} = I_{RO}(\text{at the junction}) / \overline{I_{RO}}$ (with $\Delta V_{EUP} = \Delta V_{EDW}=0$ at the GEM).

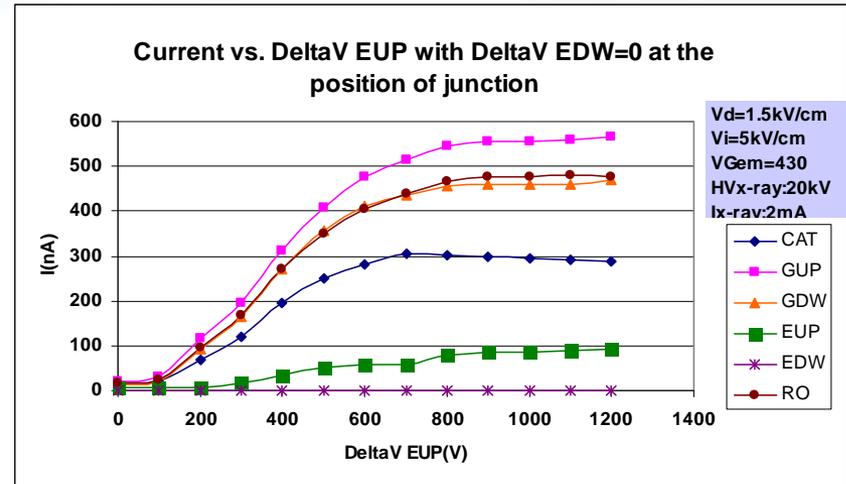


Fig.4(1)

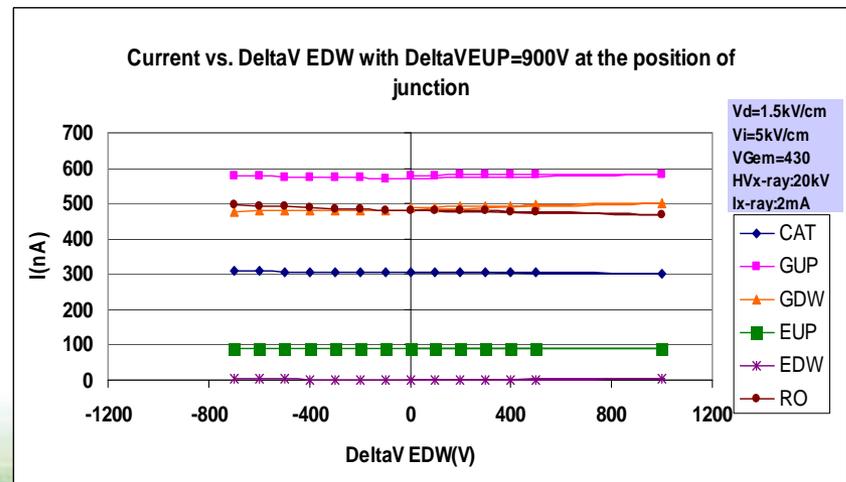


Fig.4(2)

Ratio vs. DeltaV EDW

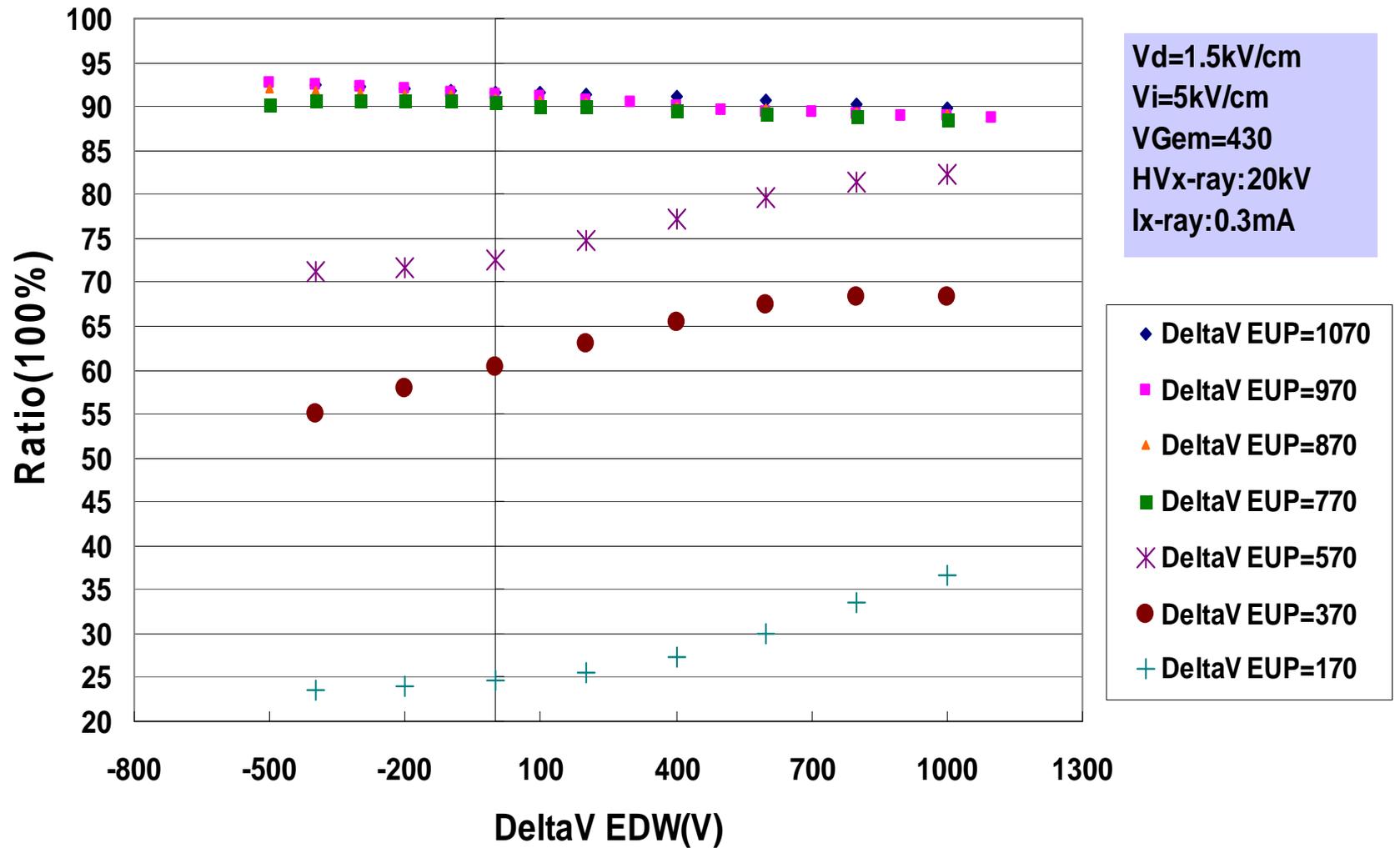


Fig.4(3)



4). The currents as a function of ΔV_{EUP} with EDW floating is shown in Fig.4(4).

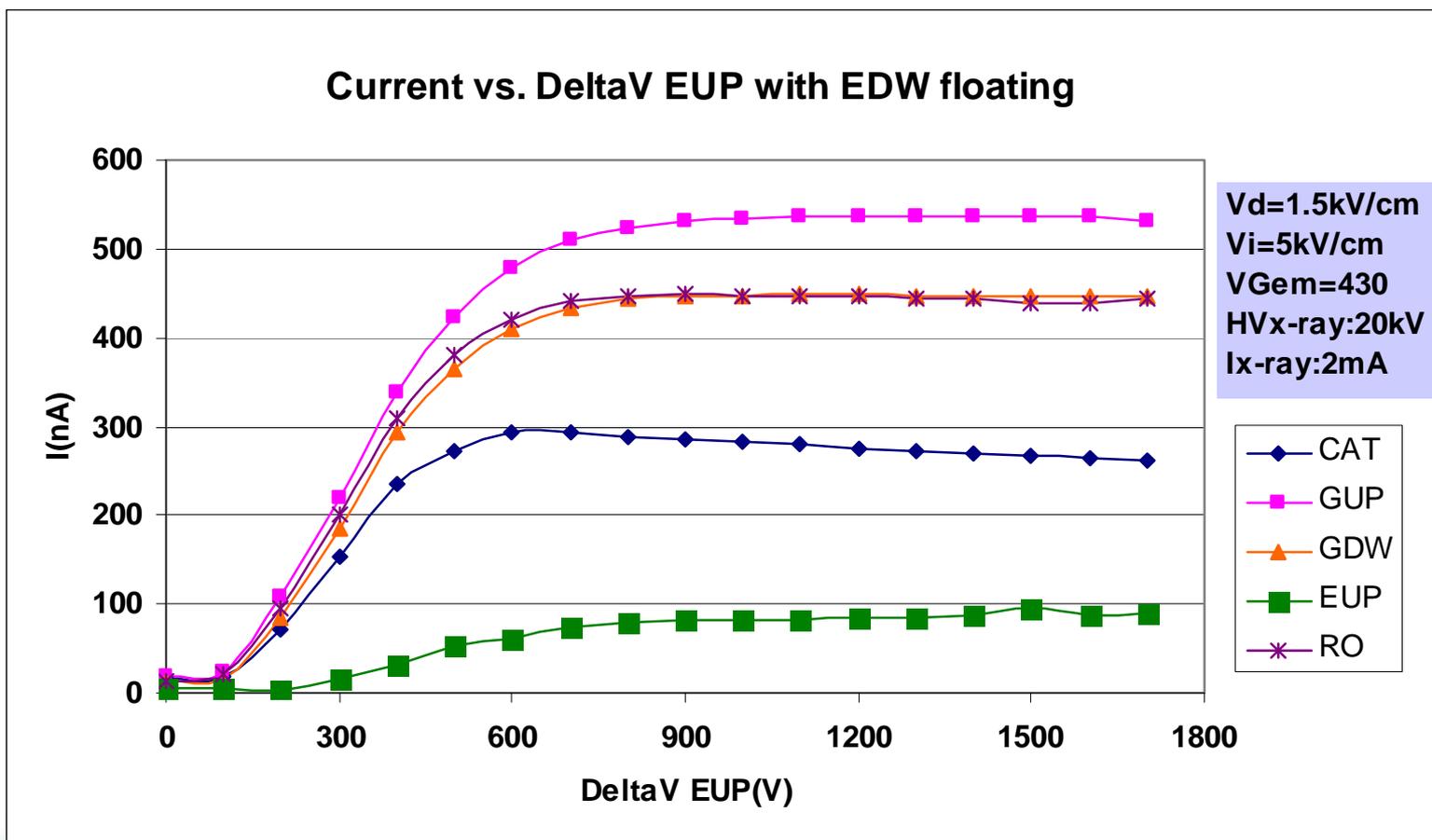


Fig.4(4)

5. Conclusions



- 1).By study of some operation properties of the spliced single-GEM, the novel idea of putting electrodes on the junction of gluing region showed the interesting results;
- 2). A triple-GEM with UV strips is being tested for studying in greater depth;
- 3).Associated simulation is needed to understand the principle well.