



Status of RPC Construction & Cassette Assembly

Qingmin Zhang

Argonne National Laboratory

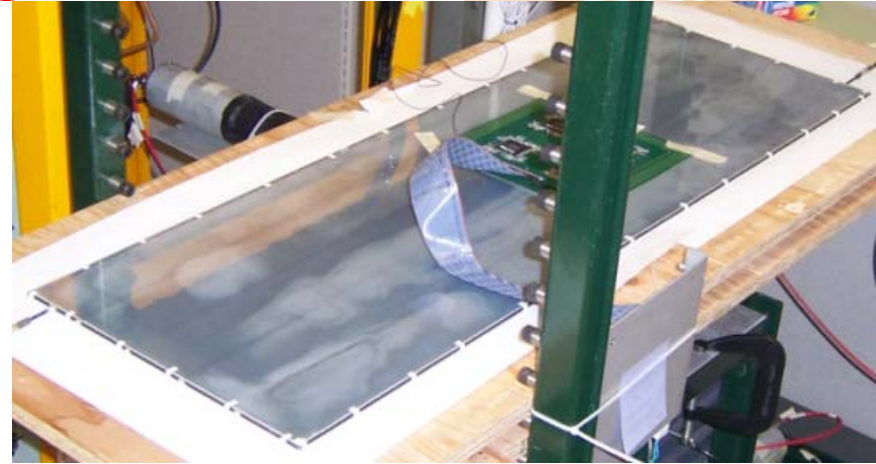
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Outline

■ Preparation List

1. Glass sheets
2. Edge Frames + HV Connection Holder
3. Insulating tubing and fishing line
4. Resistive Paint
5. **Accessories:** gas tube, HV connectors
6. **Tools:** epoxy, injector, mixer gun, mixer, RTB, clips



■ Prototypes of Larger RPCs

- 5 RPCs (3 thick-thick RPCs, 2 thick-thin RPCs)
 - 2 small exotic RPCs were repainted with the preferred paint.
1. Mechanical Performance (**ok!**)
 2. Performance Test (different paints, difference design.)

■ RPC Manufacture, Yield Estimation

■ Cassette (Module) Assembly

Preparation List



◆ Glass: delivered ✓

300 thick glass sheets + 300 thin glass sheets

Thickness: thick(1.09mm), thin(0.84mm)

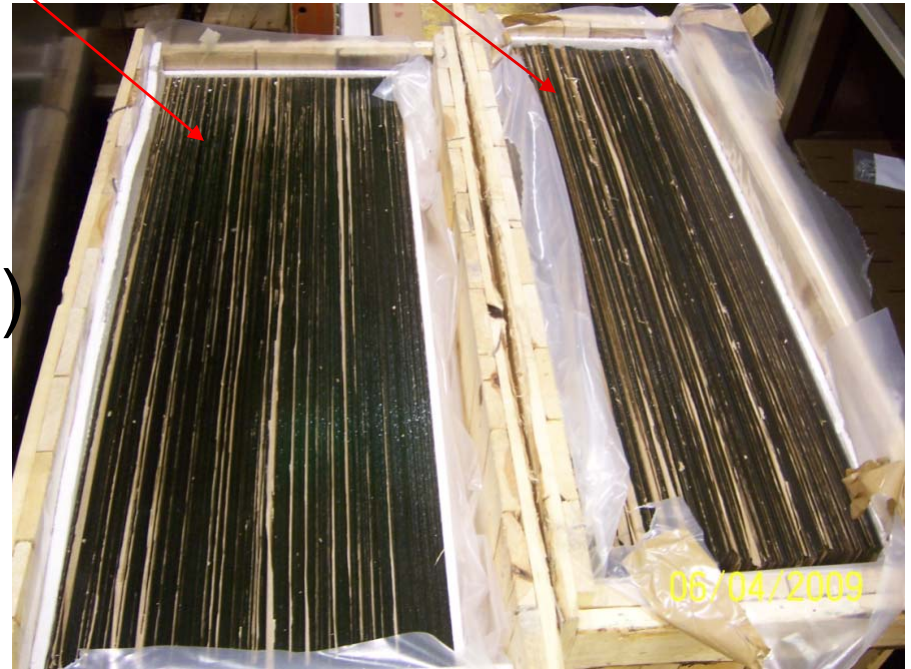
Dimension: 32.0cm*96.0cm, not perfectly identical(<+/-0.5mm)

Design Plan:

1) **baseline:** 2-glass design
(thick + thin)

2) **Option:** 1-glass design (thick)

Difficulty: two Front-End Board per RPC.
How to connect them and keep the
same size as the glass sheet.



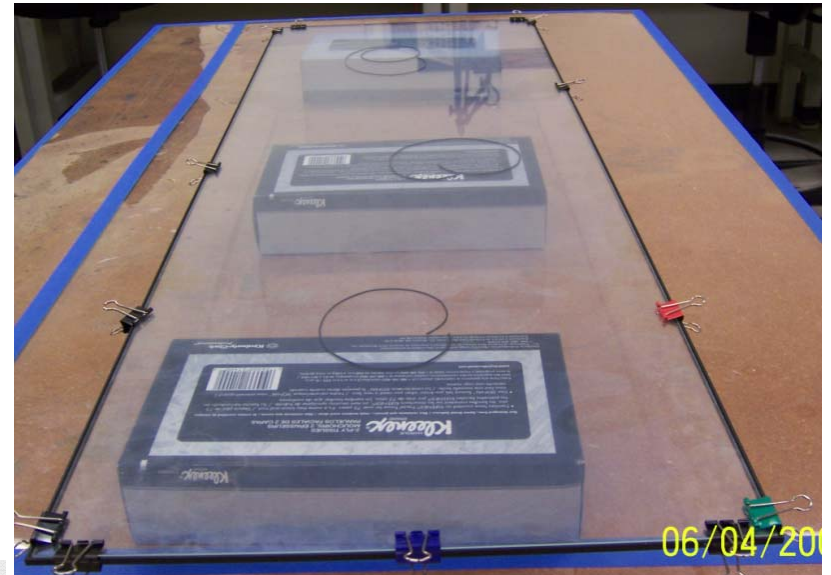
Preparation List (cont.)

- Edge Frames

5 mins per set



1. Close to finalizing the fixture
2. Need to build one RPC with the frames produced by this fixture to check whether the longer sides of RPC are acceptably even and straight.



Preparation List (cont.)

- Insulating tubing & fishing line: **Delivered,**

✓

Same as the tubing we used before

- Resistive Paint:

1-5M Ω / \square , good uniformity, smooth surface

1. Most difficult part.

2. struggling on this issue. After tried all the possibilities we can try, we finally have one solution. (60% black component+40%green component. **Need to try out**)

Delivered ✓ **need to order again and delivery is quick.**

3. Developing a spraying machine to control the quality of the paint.



Preparation List (cont.)

- Resistive Paint:

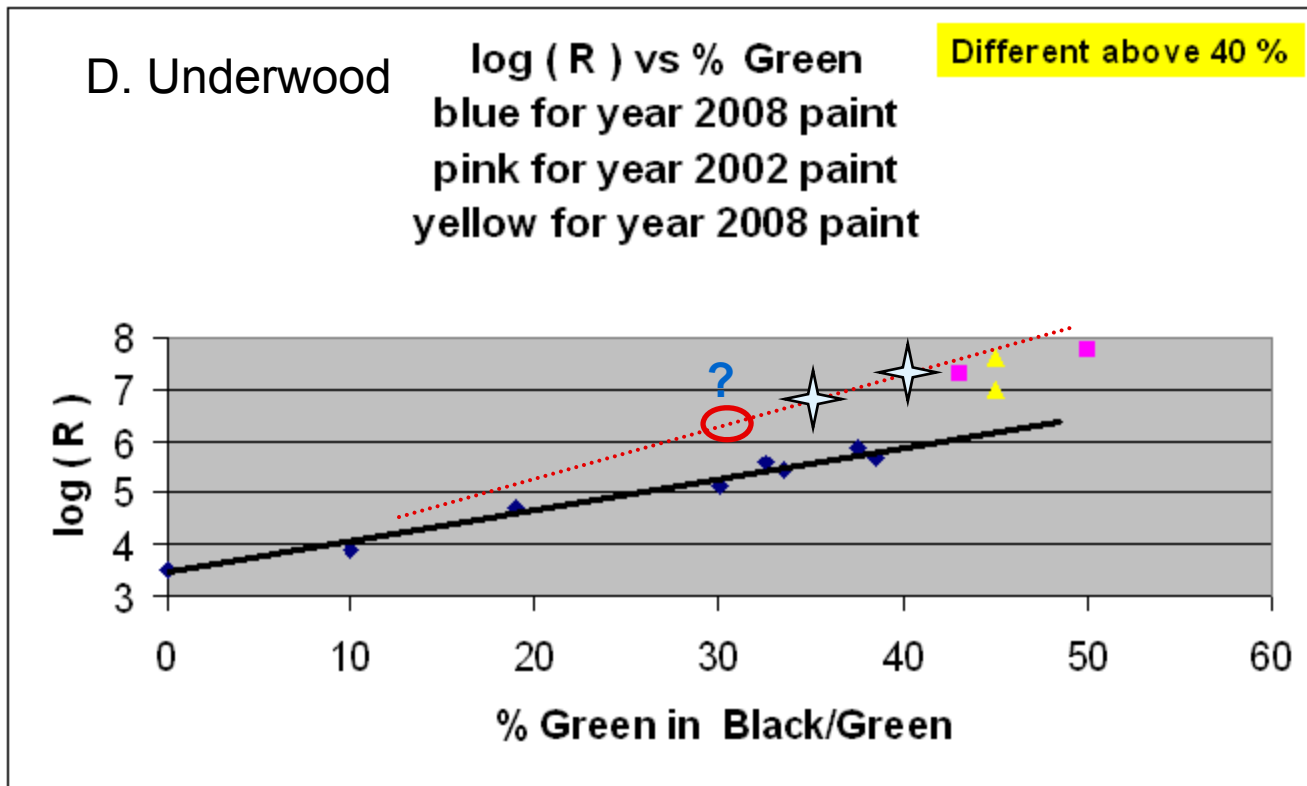


Preparation List (cont.)

- Resistive Paint:

Resistance (Ohm / square) vs Percent Green in Mix

Brushing paint onto glass gives pretty uniform results.



Prototype Performance

■ 3 Larger RPCs

Three of them are 2-glass design

- 1) 1.2mm+1.2mm glass sheets with old Licron paint.
- 2) 1.2mm+0.85mm glass sheets with white paint
- 3) 1.2mm+0.85mm glass sheets with black paint. (surface resistivity is quite large)

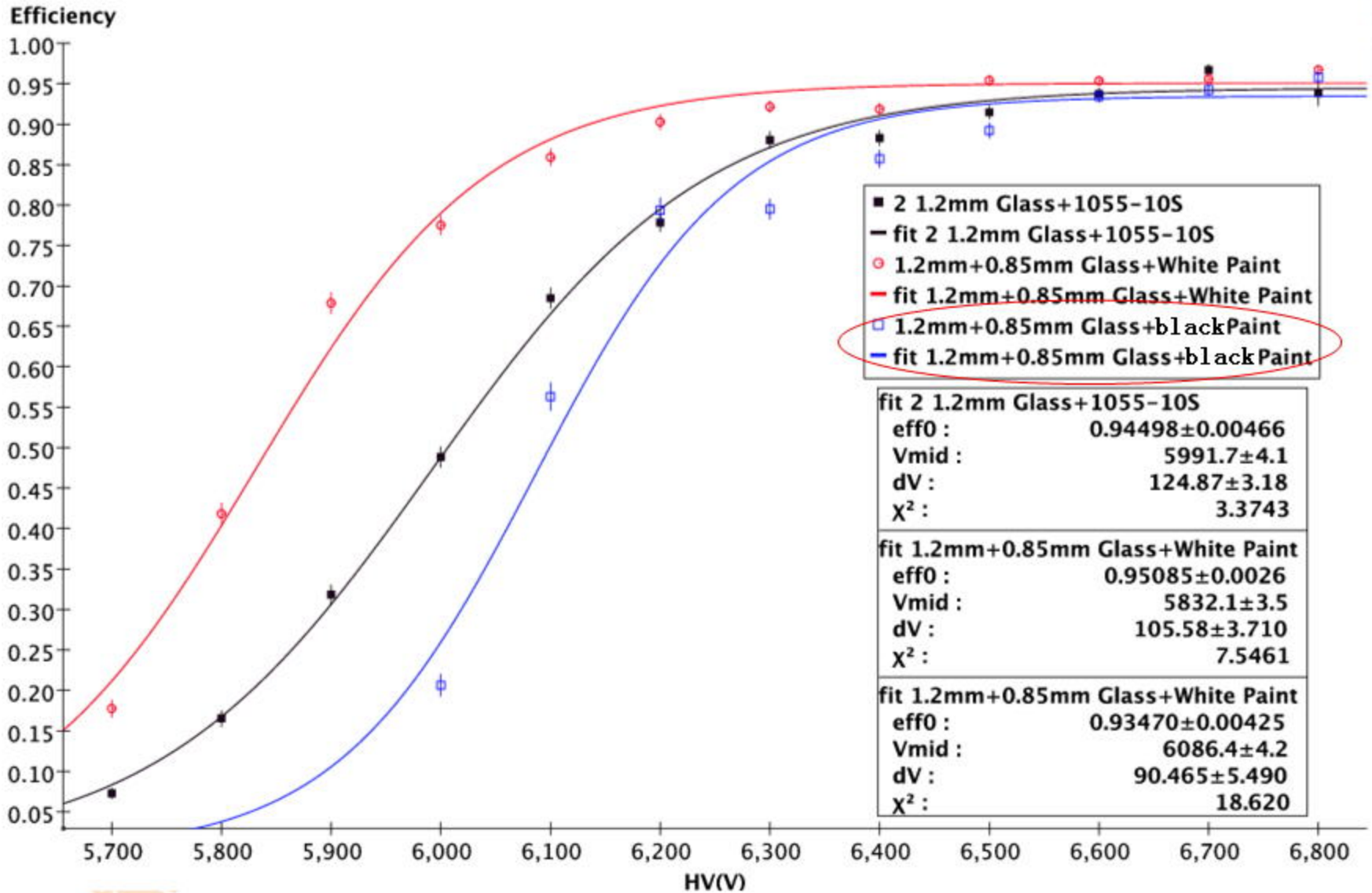
■ 2 exotic RPCs repainted with the black paint

Lei spayed the paint really well: 2~4M Ω /sq.

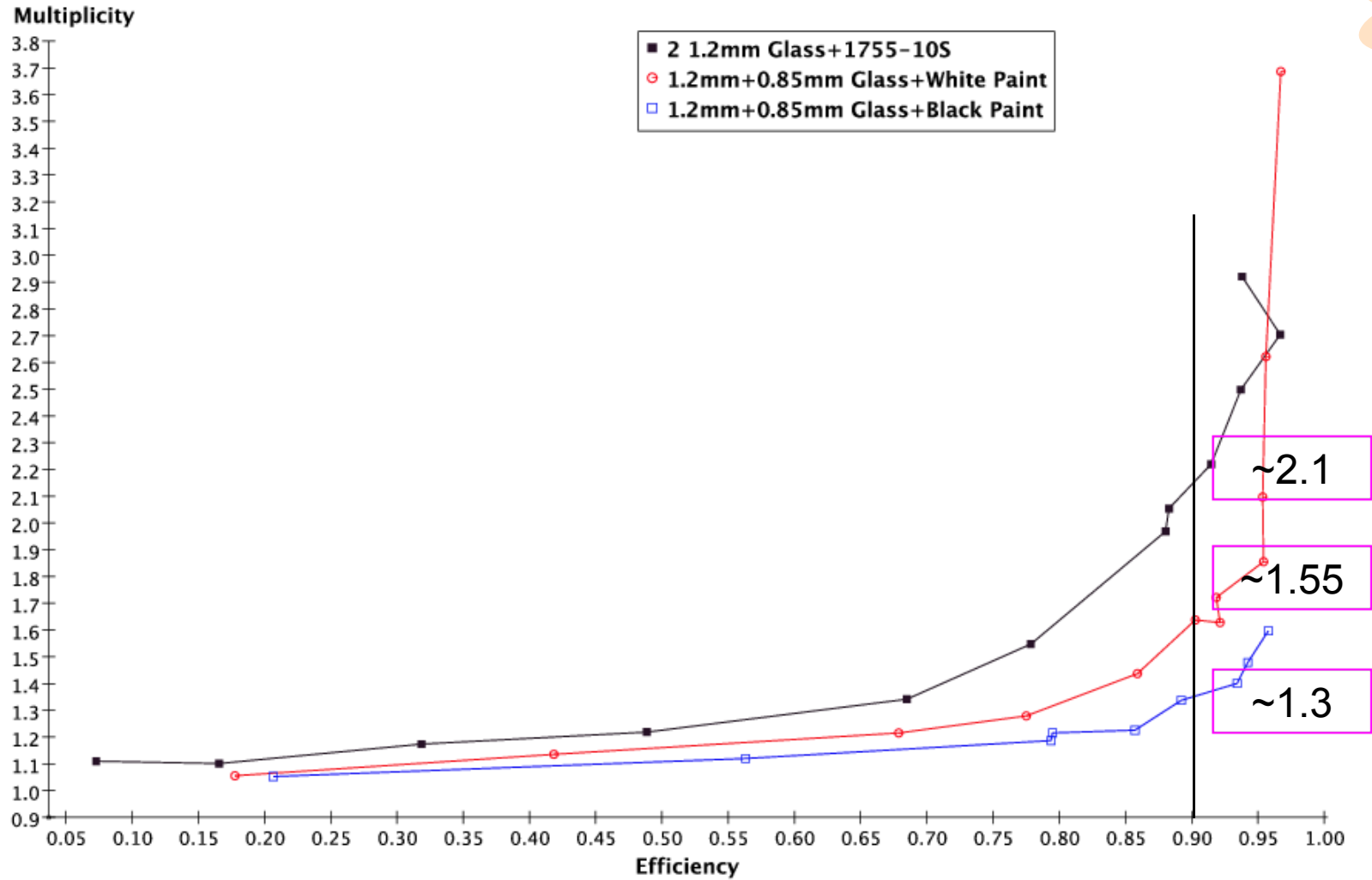
Measurement shows it's Humidity independent.

90% efficiency +1.02 Multiplicity@6.2kV

Efficiency Vs. HV (Th=110)



Multiplicity Vs. Efficiency (Th=110@Variable HVs)



Long-term Stability



- All the Larger RPCs haven't had anything bad for 3 months.
- 2 exotic RPCs are also running well after 1-month running.



RPC Manufacture



➤ Manufacture Procedures

Step 0: Spay resistive paint

Step 1: Fix the Edge Frames

Step 2: Glue One Side Glass Labor-Consuming

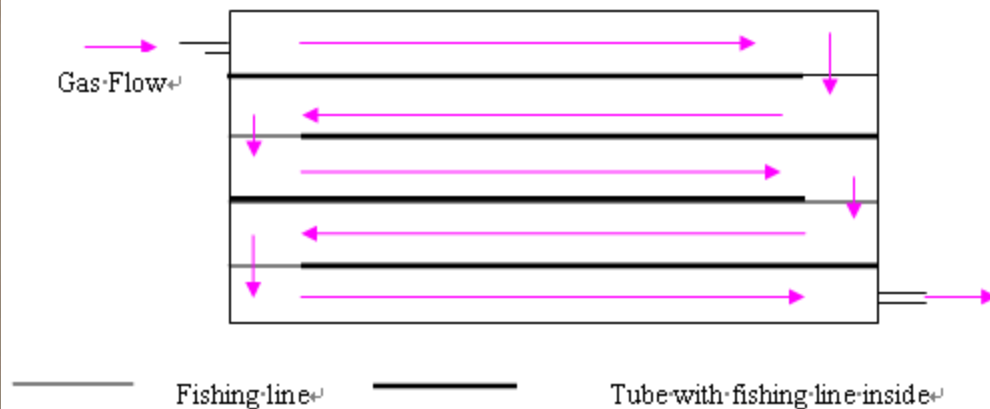
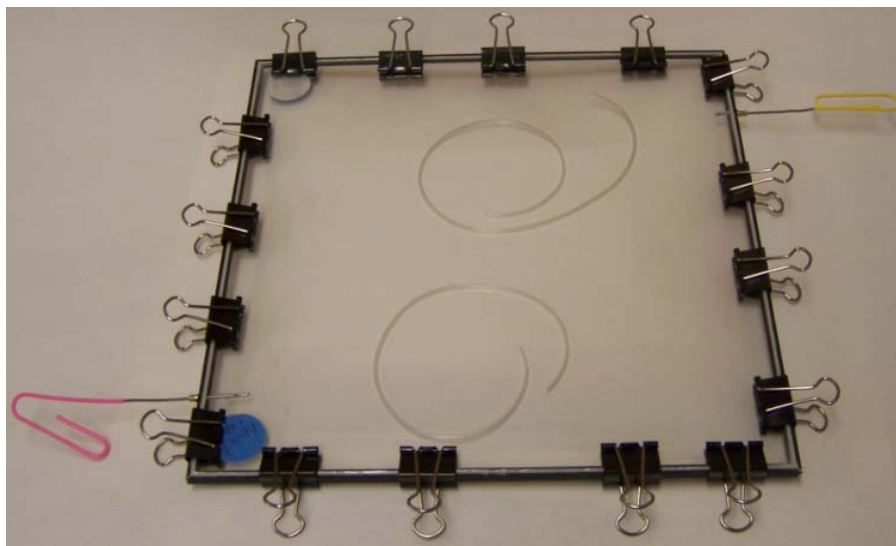
Step 3: Mount Fishing Line and gas pipes Labor-Consuming

Step 4: Glue the Other Side Glass Labor-Consuming

Step 5: Install HV Connector and holder

Easy to Learn and Operate

Have drafted an instruction



Yield Estimation

- We will parallelize RPC production and we will find enough space for this, so **1 Chamber per day per person** is reasonable.
- So far, we have two people who can do this job. We will train at least one more technician to join us.

120 RPCs -> ~2.5 months (2 technicians)

40 RPCs -> < 1 month(2 technicians)



Cassette Assembly



1. Hold all the 3 RPCs
2. Cooling the Front-End Board
3. Help lifting

← **Cassette (copper)**

Avoid to put much more weight on the Front-End Board and RPC

Fixture for assembly →

Summary

- We are ready for mass production if the following things are done:
 1. building one RPC with the frames produced by this fixture to check whether the longer sides of RPC are acceptably even and straight.
 2. Try 2 more ratios of the resistive paint to obtain the surface resistivity we need.

Coming Soon!

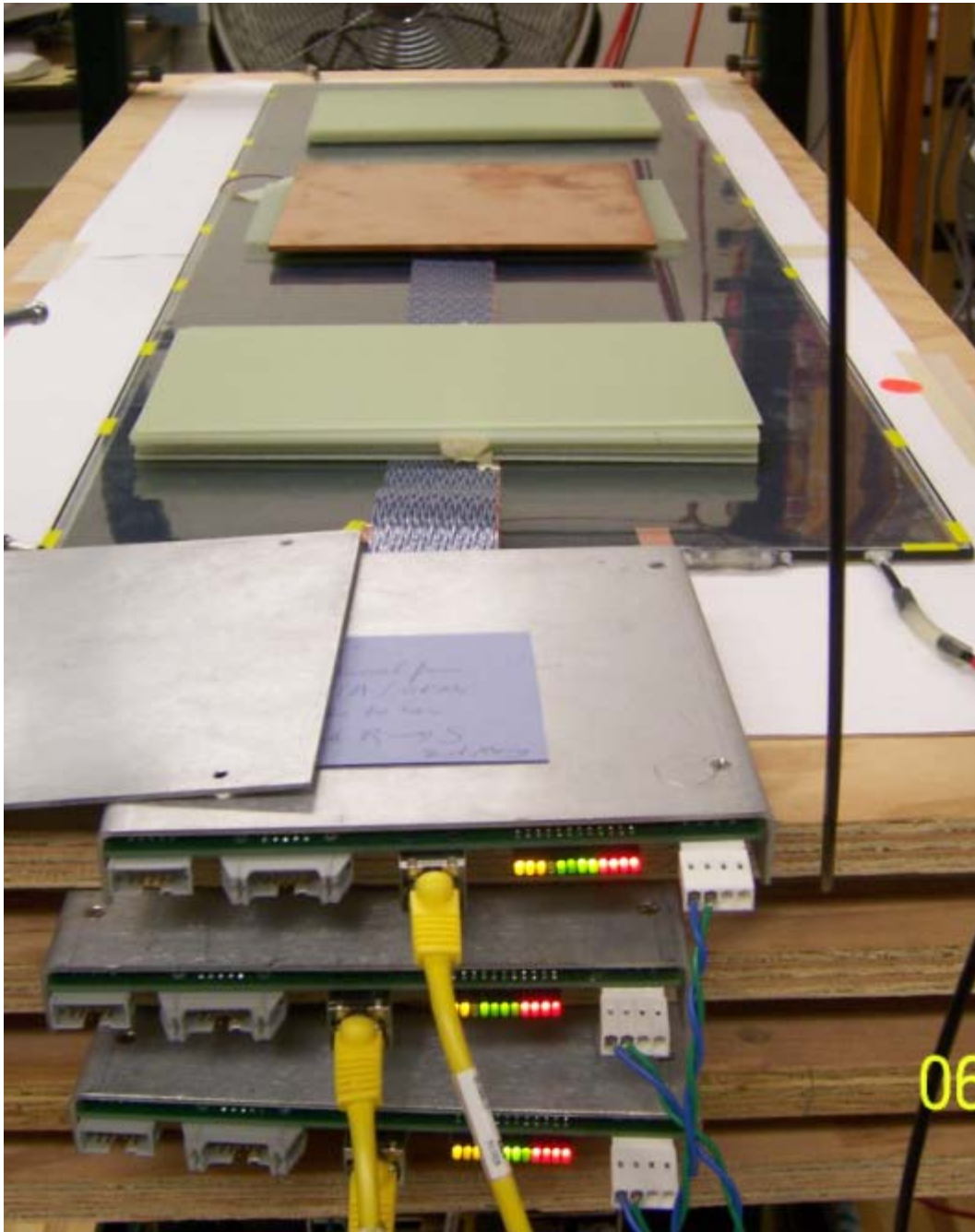
The End

吉祥如意

Thanks!



并行处理



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