2m x 2m RPCs: At the finishing line!
RPC R&D at TIFR: Scaling up
Glass electrode preparation

Glass cleaning

Spray painting
Surface resistivity measurement

Measurement jig

Measurement data
2m x 2m RPC:
Gas gap preparation - 1

Bottom glass in place

Gluing of buttons
Placing the top glass

Vacuum jig for gluing
2m x 2m RPC: Gas gap preparation - 3

Ready to glue top-side spacers

Turning table to glue bottom-side spacers
Leak testing the gap

Fully fabricated gas gap; ready to be assembled
Signal reference plane. 
1 Plastic honey comb. 
2 Copper pickup strips. 
3 Graphite/Paint. 
4 Top glass. 
5 Button spacer. 
6 Bottom glass. 
7 Edge spacer. 
8 Gas nozzle. 
9 Bottom pickup panel. 
A
2m x 2m RPC in the Cosmic test stand

Cosmic test stand

Front-end electronics

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November 23-24, 2009
**SF_6 studies:**
**RPC pulse profile**

![Graph showing SF6 studies](image)

- **SF6 = 0%**
  - Streamer Pulse
  - Avalanche Pulse
  - Trigger Pulse

- **SF6 = 0.32%**
  - Trigger Pulse
  - Avalanche Pulse

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SF₆ studies: Chamber current

V-I characteristics

Chamber current
**SF$_6$ studies:**
Collected signal charge

**Charge distributions**

**Charge parameters**

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SF\textsubscript{6} studies: Important operating parameters

- **Efficiency**
- **Noise rate**

![Graphs showing Efficiency and Noise rate vs. SF\textsubscript{6} concentration](image-url)
SF$_6$ studies: Timing characteristics

**Time response**

**Time resolution**
Efficiency plateau

Monitoring operating parameters

Noise rate profile
Charge and time distributions

Charge

Timing

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Future plan

- More 2m x 2m to be made; at least three more
- Installation and commissioning of electronics
- Common, large area cosmic telescope setup
- Timing studies with long pickup strips
- Gas systems studies with RGA
- Cascading of gas lines; optimisation of gas flow
- Studies using new pickup panel designs
- Essentially –
  - *BigStack* for long-term, cosmic, tracking studies etc.
  - New lab for optimising RPC design for industrial production and testing for ICAL operating conditions
The TIFR RPC R&D team