MRPC rate

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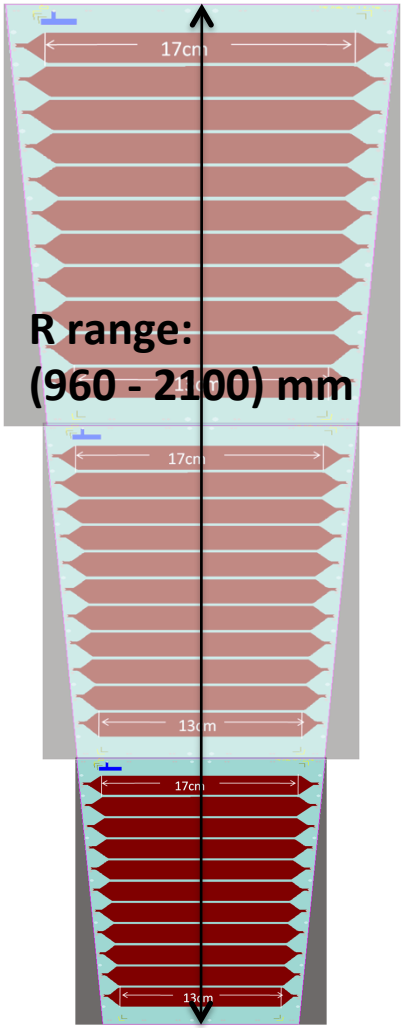
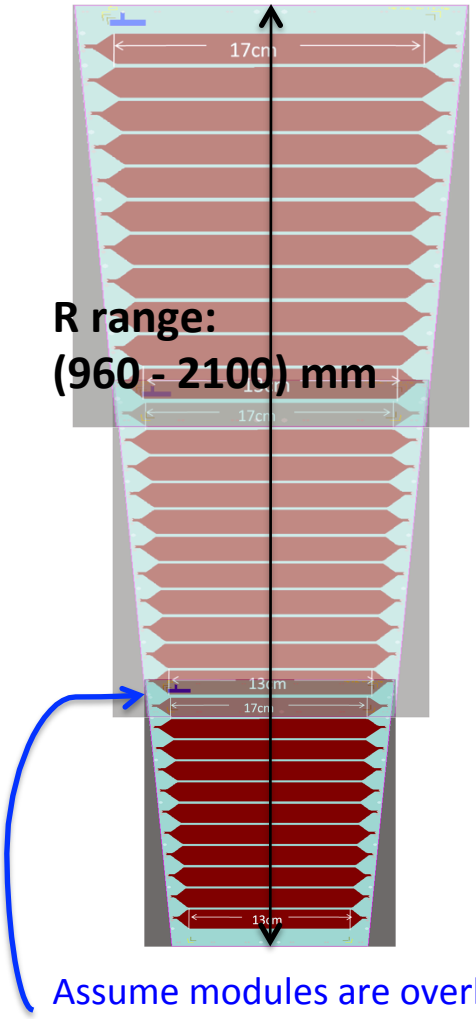
Supermodule design



- # supermodules: 50
- # strips: 33
- Strip width: 25mm, gap: 3mm

- Model #1:
  - Consistent top and bottom margins → 36.5 mm for each edge

Supermodule design



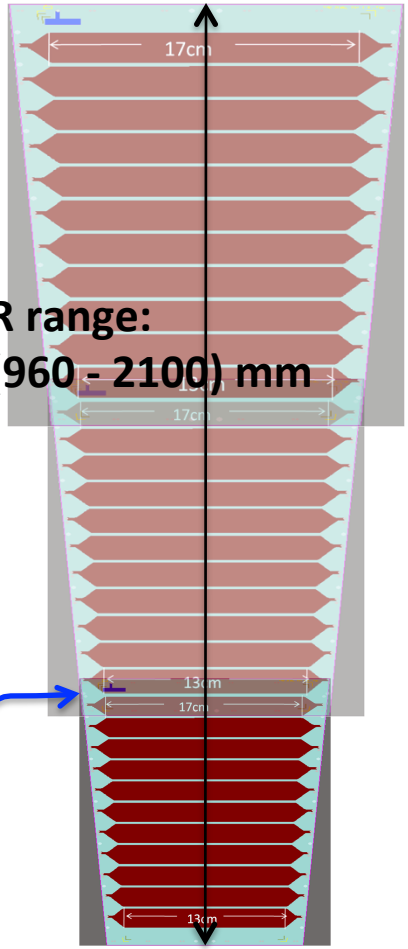
R range:
(960 - 2100) mm

Assume modules are overlapping to reduce blind region

- # supermodules: 50
- # strips: 33
- Strip width: 25mm, gap: 3mm

- Model #2:
  - Consistent strip gap width within a supermodule → 109.5 mm for the most inner and outer edges

Supermodule design



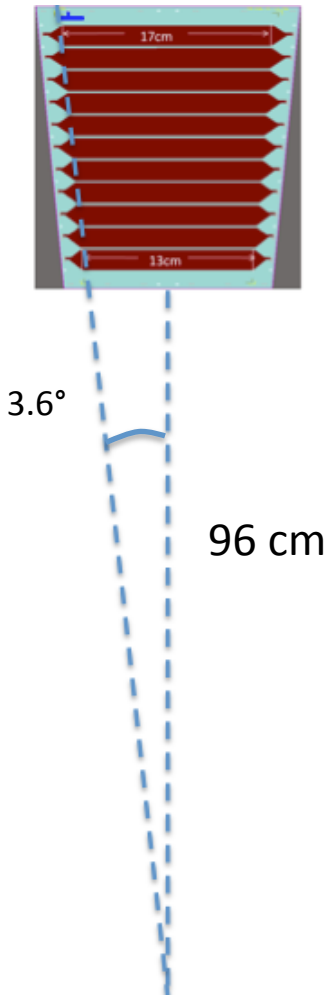
R range:
(960 - 2100) mm

Assume modules are overlapping to reduce blind region

- # supermodules: 50
- # strips: 33
- Strip width: 25mm, gap: 3mm

- Model #3:
  - Start the first strip at R=1050 mm (details in the next slide)

Module design



- Assum 50 supermodules: each module has 7.2 of azimuthal angle coverage
- 3.6 degree is ~ 6.28e-2 rad
- Minimum radial position of the first trip in order to set it to 130 mm:
  - R_{bottom}: 1033.15 mm (at least)
- 11^{th} strip is supposed to have a strip length of 170 mm according to the pCDR
- With this initial condition, 11^{th} strip would be located at R_{bottom} of 1033.15 + 250 + 30 ≅ 1313
- To follow the pCDR design: 25 mm strip width, 3mm interval → the length of 11^{th} strip would be limited to 165.2 mm instead of 170 mm.
  - In order to have the 11^{th} strip with a length of 170 mm, the bottom of the first strip should be located at least at 1071 mm from the center.
- At R = 960 mm, the maximum strip length is ~ 120.8 mm
- The bottom/top edge design would depend on physics?

Strip mapping and finding a fired strip

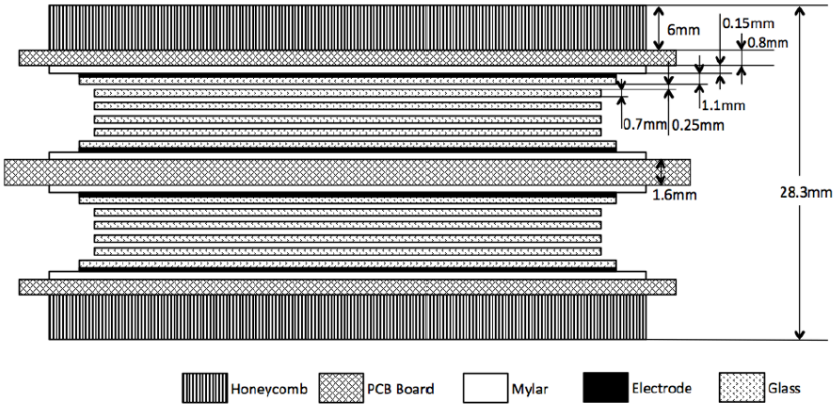
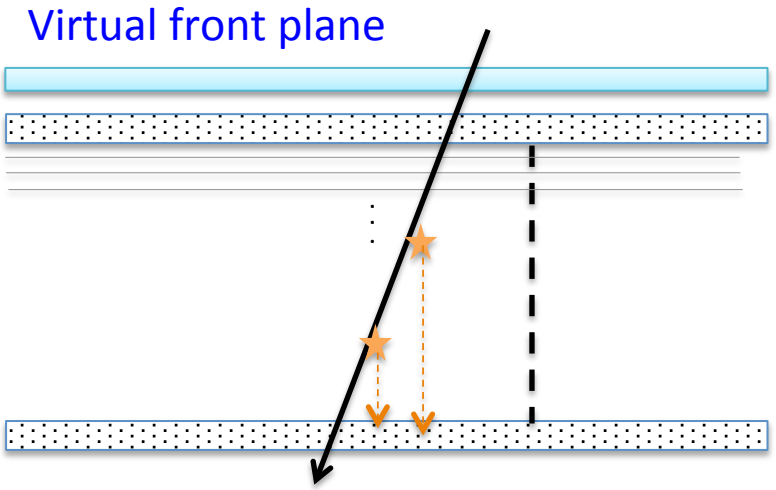
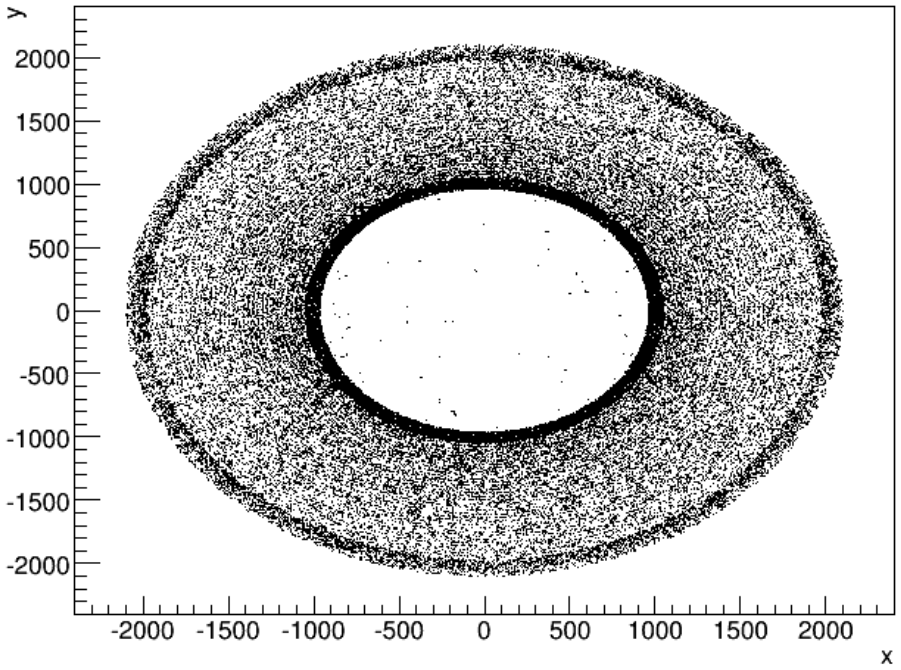


Figure 108: The structure of the MRPC prototype

- Primary ionization Z positions
  → randomly distributed (Poisson)
- Line equation: hit position at the virtual front plane and average position inside the gap
- X, Y positions of primary ions

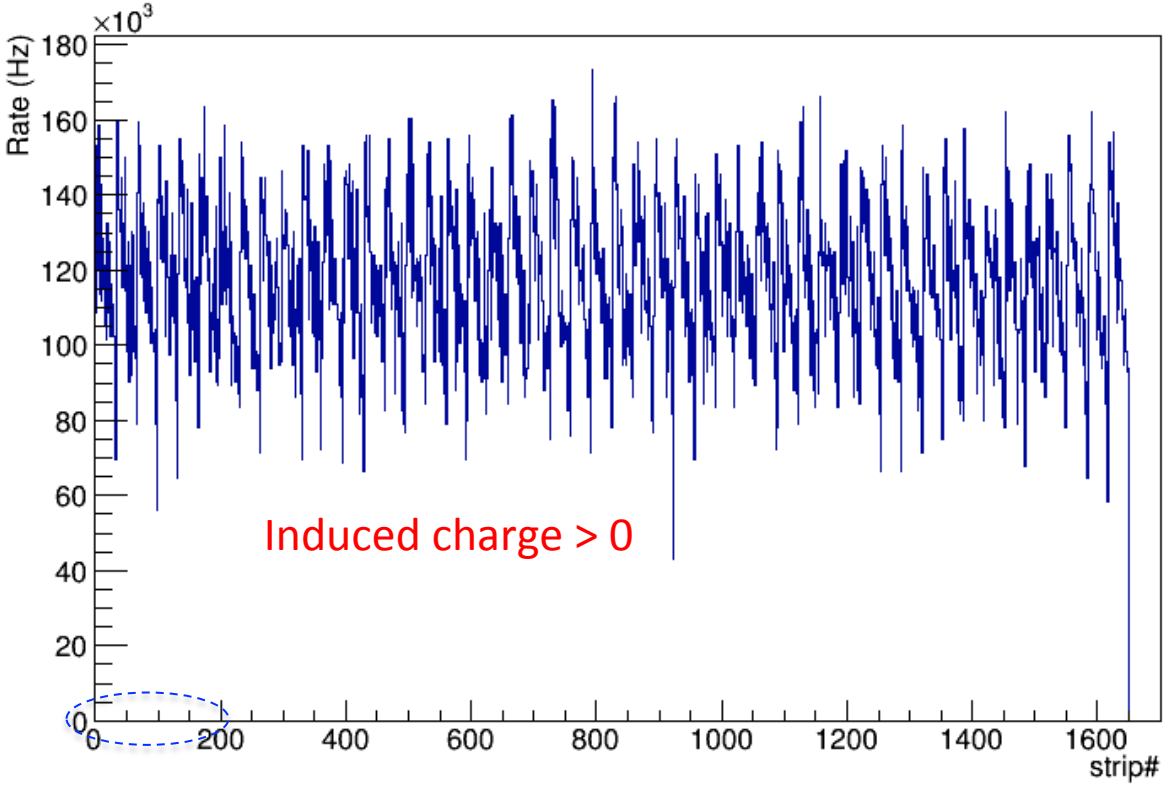


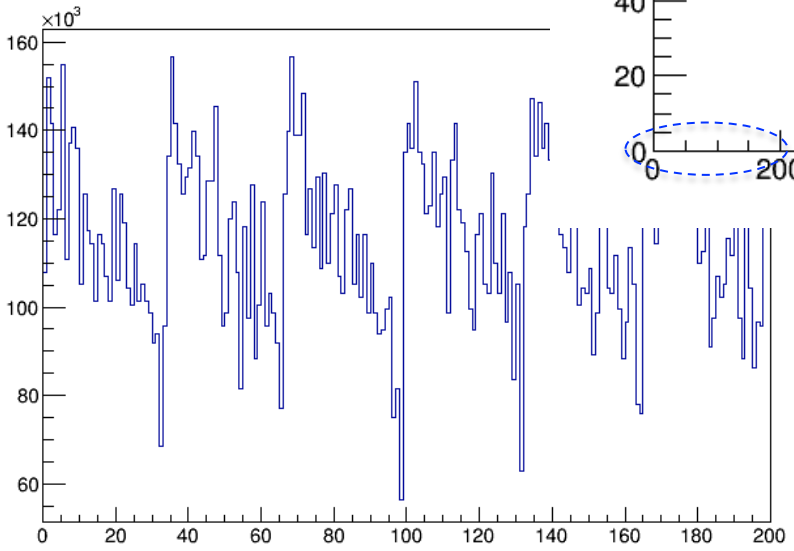
Charge sharing

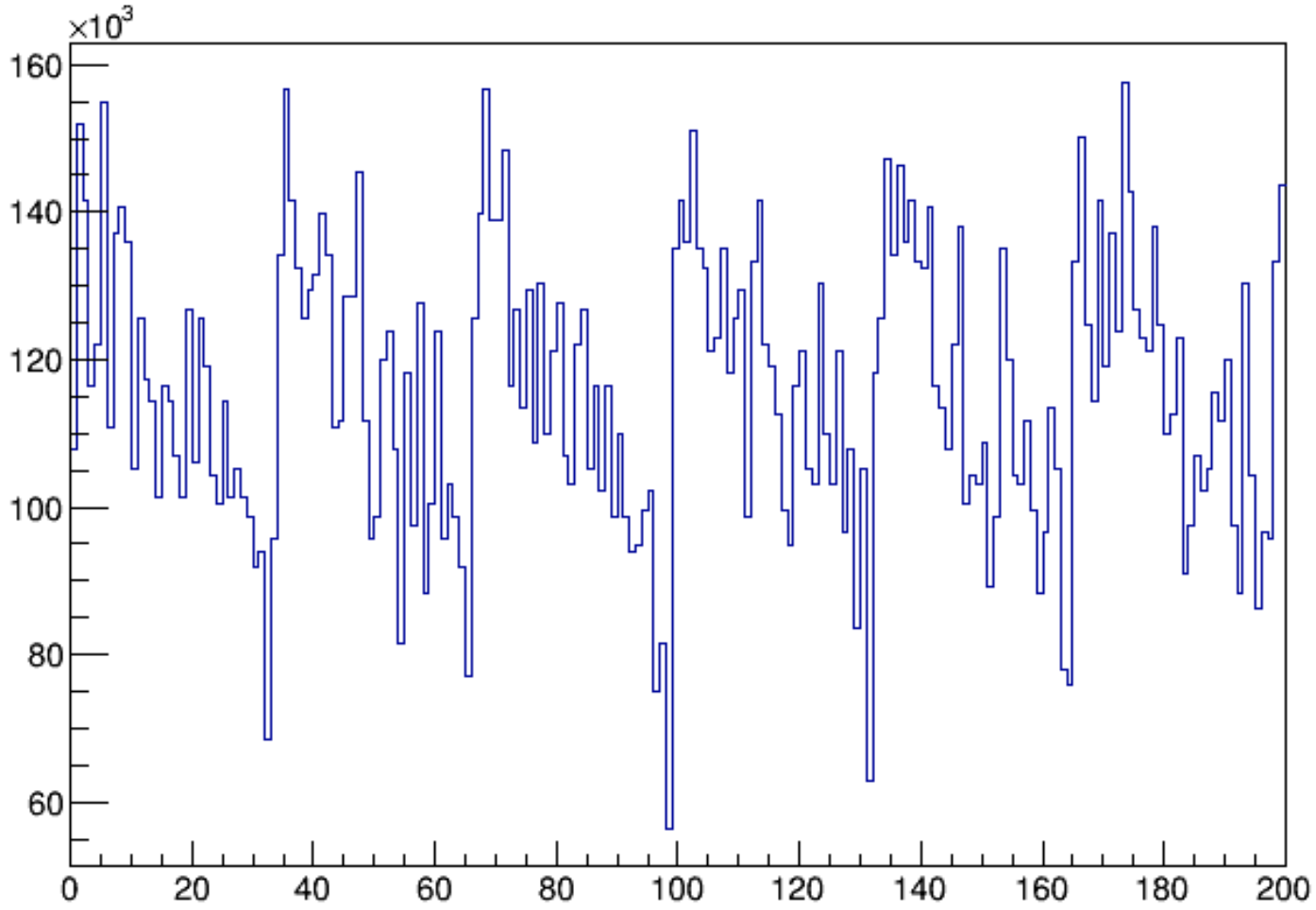


- Uncounted # of hits (not particles): ~ 26% of total hits from all 10 gaps
- strip spacing: 3mm
- For now, hits that are recorded at this region are assigned to a nearby strip.

model2


×10^3
Rate (Hz)
180
160
140
120
100
80
60
40
20
0
0
200
400
600
800
1000
1200
1400
1600
strip#
Induced charge > 0


×10^3
160
140
120
100
80
60
0
20
40
60
80
100
120
140
160
180
200


×10^3
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