

Forward Detector: software updates & status

Rafał Lalik

April 11, 2017



FD

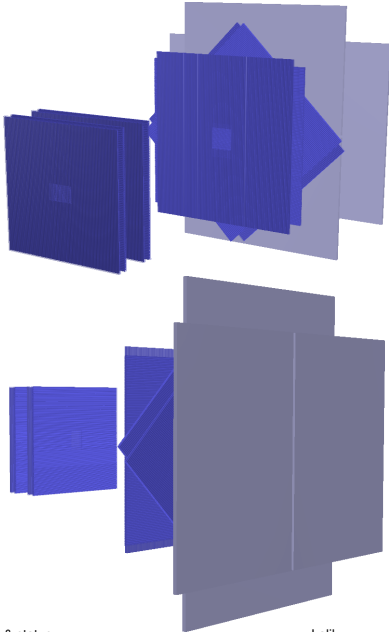
- ▶ New geometry:
 - ▶ beam hole → short/long straws
 - ▶ simplification of the geometries for Straws and RPC
 - ▶ many overlaps removed
- ▶ Changes in the hgeant structure → changes in geometry
- ▶ Some bugfixes

Other changes

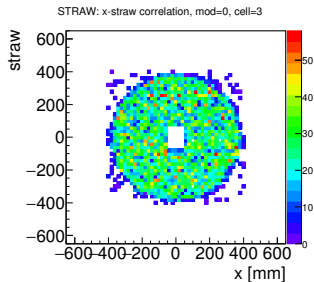
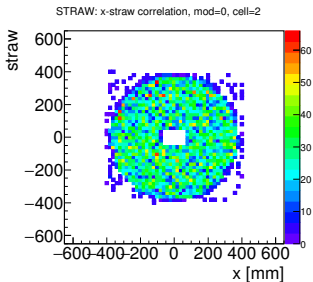
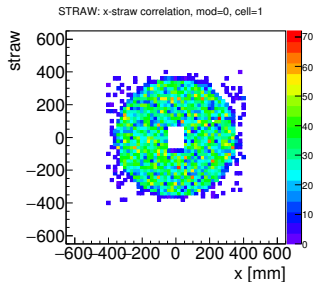
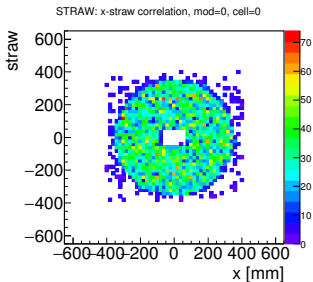
- ▶ meeting page moved from wiki to indico:
<https://indico.gsi.de/categoryDisplay.py?categId=352>
- ▶ Artwork for Forward Detector :)

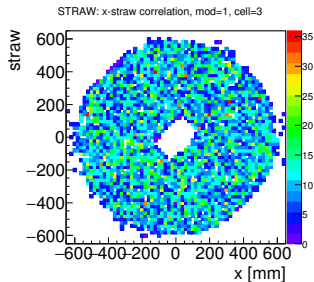
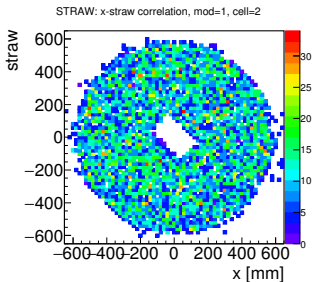
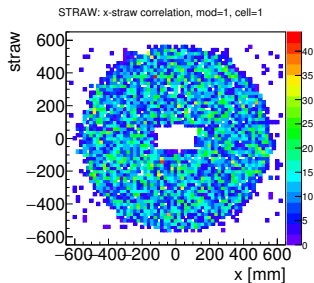
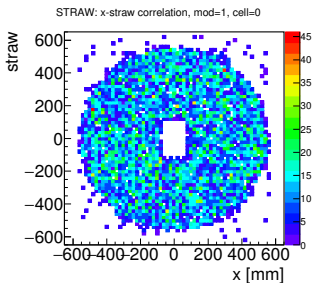


Renders of the new geometry



- ▶ module 0:
 - ▶ long straws: 800 mm
 - ▶ short straws: 350 mm
 - ▶ beam hole: 100 mm \times 16 straws (32 straws)
- ▶ module 1:
 - ▶ long straws: 1250 mm
 - ▶ short straws: 500 mm
 - ▶ beam hole: 250 mm \times 16 straws (32 straws)





- ▶ new dimension (subcell) added for short cells

Geant name	module	layer	cell	subcell
Straw:	module	layer	straw	type
Long straw	1-2	1-4	1-160/224	3
Short straw (+)	1-2	1-4	65-96/97-128	1
Short straw (-)	1-2	1-4	65-96/97-128	2
RPC:	module	layer	side (f/b)	gas gap
RPC	7	1-4	1-2	1-6

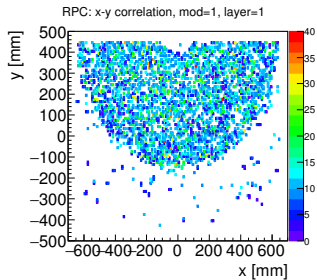
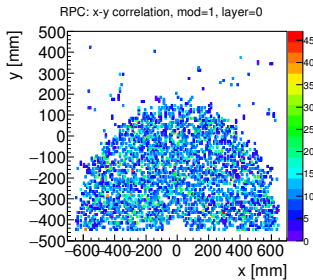
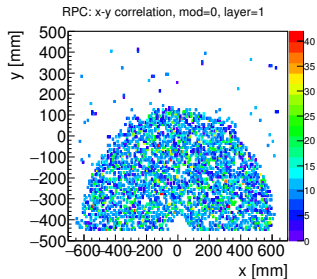
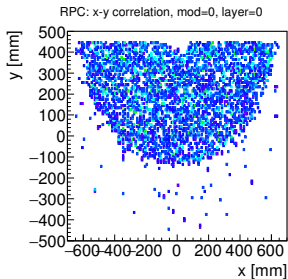
- ▶ when finding hits (two layers of straws) we have to pair straws
- ▶ cannot match short straws from lower and upper segment

back plane		1	2	3	4	...	n	
front plane		1	2	3	4	...	n	

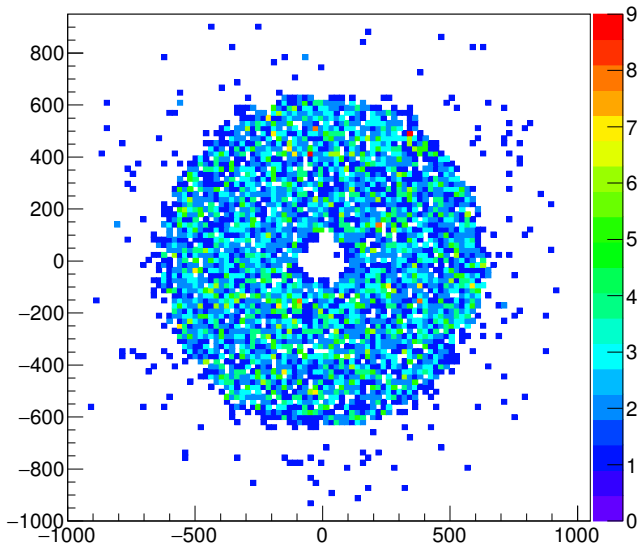
- ▶ straws have types:
 - ▶ long = 3 (bin: 11)
 - ▶ short upper = 1 (bin: 01)
 - ▶ short lower = 2 (bin: 10)
- ▶ pairing
 - ▶ long straws: $11 \ \& \ 11 == \text{true}$
 - ▶ long straws with short upper: $11 \ \& \ 01 == \text{true}$
 - ▶ long straws with short lower: $11 \ \& \ 10 == \text{true}$
 - ▶ shorts of the same type: $01 \ \& \ 01 == 10 \ \& \ 10 == \text{true}$
 - ▶ shorts of different types: $01 \ \& \ 10 == \text{false}$
- ▶ two passes:
 1. long+long, long + short upper
 2. long + short lower

Component	module	layer	cell	subcell
RPC:	module	layer	side (f/b)	gas gap
RPC	7	1-4	1-2	1-6

- ▶ geant module (gm) 0 → digitizer module (dm) 0-1
- ▶ geant layer (gl) 0-3 → digitizer layer (dl) 0-1 (left/right, up/down)
 - ▶ binary encoding: 0'b ml
 - ▶ $dm = gl \gg 1$
 - ▶ $dl = gl \& 0x1$
 - ▶ 0,0 → 0,0
 - ▶ 0,1 → 0,1
 - ▶ 0,2 → 1,0
 - ▶ 0,3 → 1,2



RPC Hit: X-Y



Reconstruction vector finder

