Drift Chamber Occupancy Studies Using Bhwide Bhabha Monte Carlo Generator with SuperB FastSim: June Update

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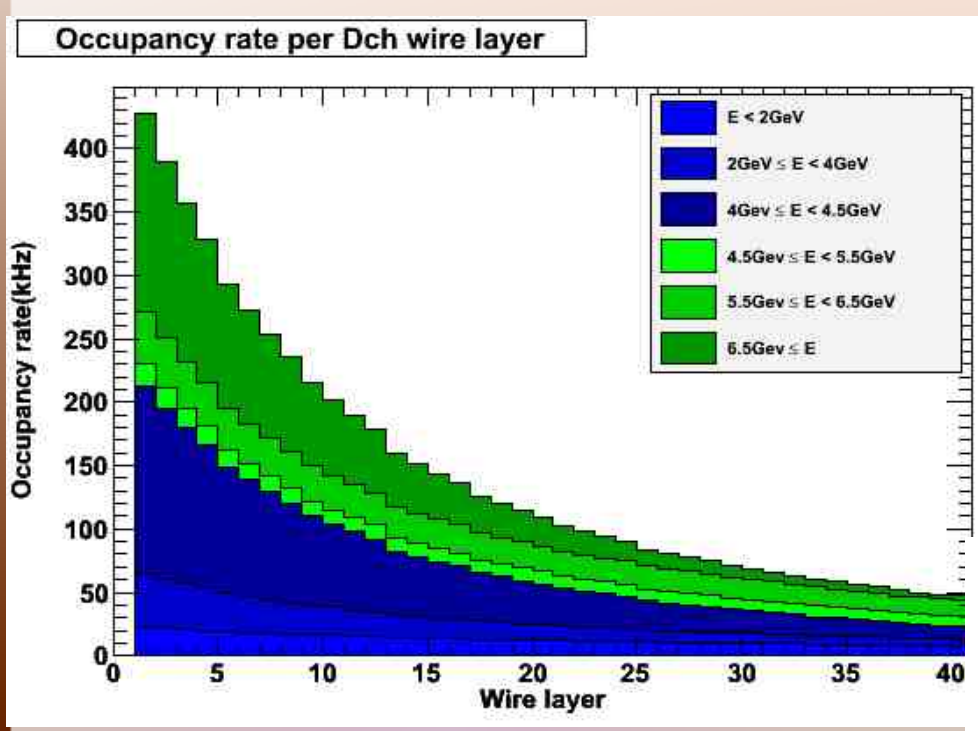
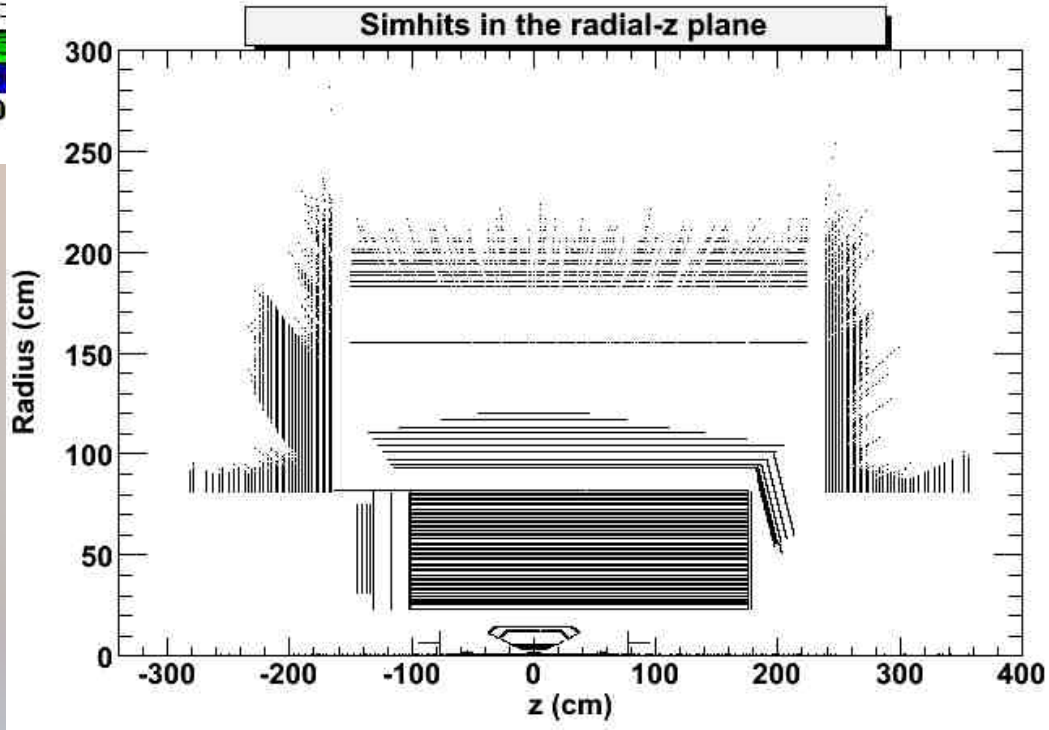
Overview

- V0.2.3 is partially working for me, problems arose after updating with development patches
  - Results for all geometries will be coming as soon as the problem is resolved, for now am still using V0.2.1
- Have constructed working models for wedding cake, spherical endplates, more to come soon (i.e. beam shielding)
- Attempted to use PacDisplay module to display the new geometries, but haven't got it to work yet with V0.2.1

Baseline Geometry Recap





Geometric Specifications (Part 1)

Wire Layer	Radius (cm)	Wire Layer	Radius (cm)	Wire Layer	Radius (cm)
1	26.04	16	45.84	31	66.05
2	27.23	17	47.66	32	67.24
3	28.42	18	48.85	33	68.80
4	29.61	19	50.04	34	69.99
5	31.24	20	51.23	35	71.18
6	32.43	21	52.61	36	72.37
7	33.62	22	53.80	37	74.72
8	34.81	23	54.99	38	75.91
9	36.34	24	56.18	39	77.10
10	37.53	25	58.54	40	78.29
11	38.72	26	59.73	1SL*	21.00
12	39.91	27	60.92	2SL*	22.19
13	42.27	28	62.11	3SL*	23.38
14	43.46	29	63.67	4SL*	24.57
15	44.65	30	64.86		

* 1SL, 2SL, 3SL, 4SL included only in SL geometries

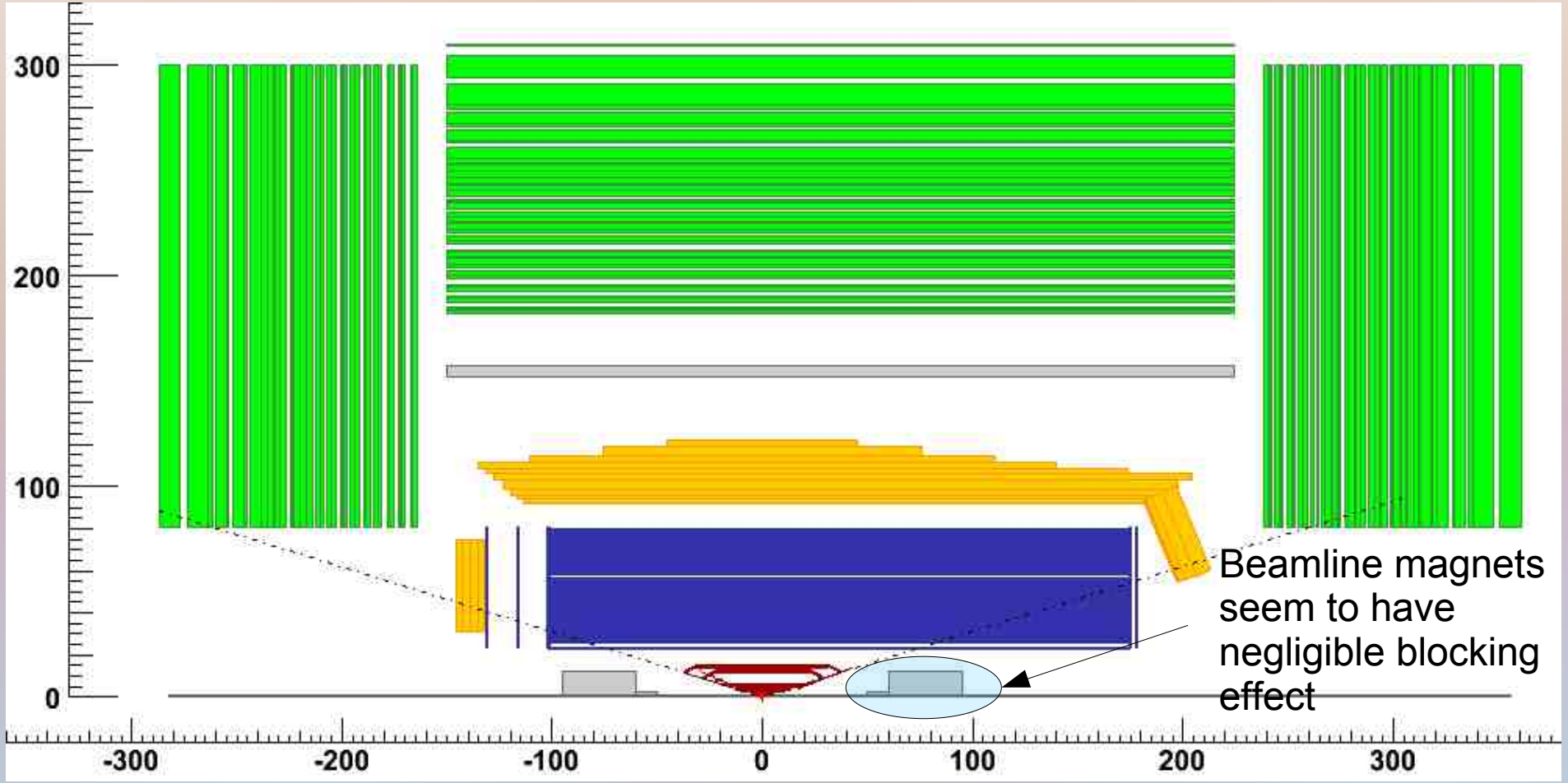
Geometric Specifications (Part 2)

Geometry	Z_{max} (cm)	Z_{min} (cm)
Baseline	174.9	-101.5
Longbwd	174.9	-131.5
Longfwd	181.0	-101.5
Longbwdfwd	181.0	-131.5
Shortfwd	154.9	-101.5

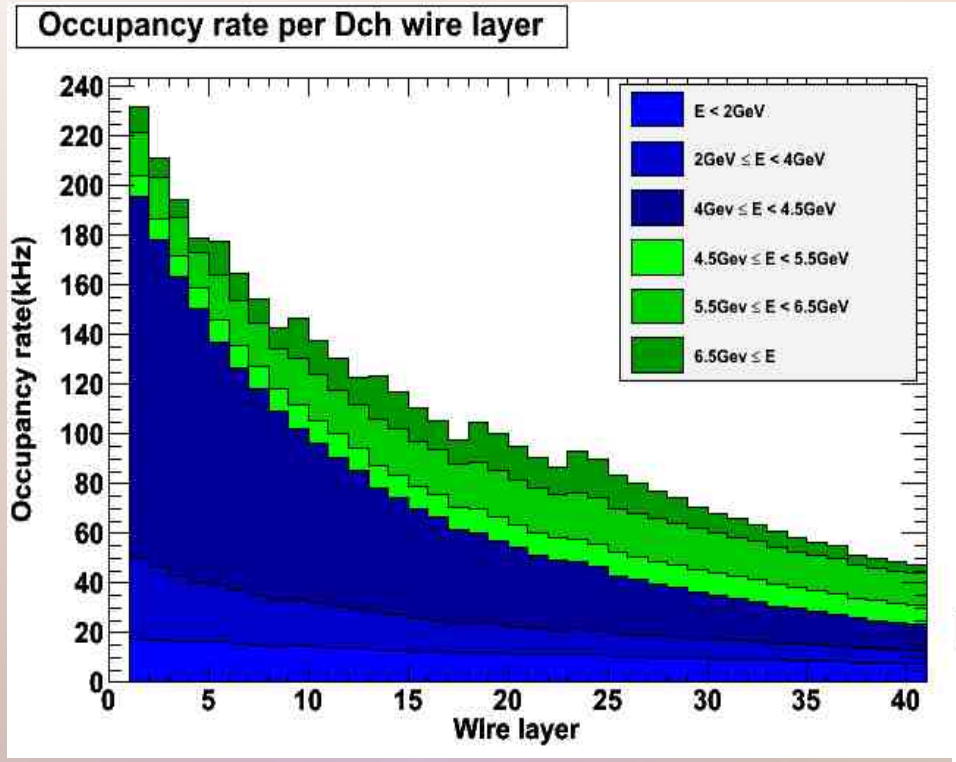
- +10IP in geometry filenames means they are shifted by z+=-10cm
- Only the Dch geometry was changed between runs

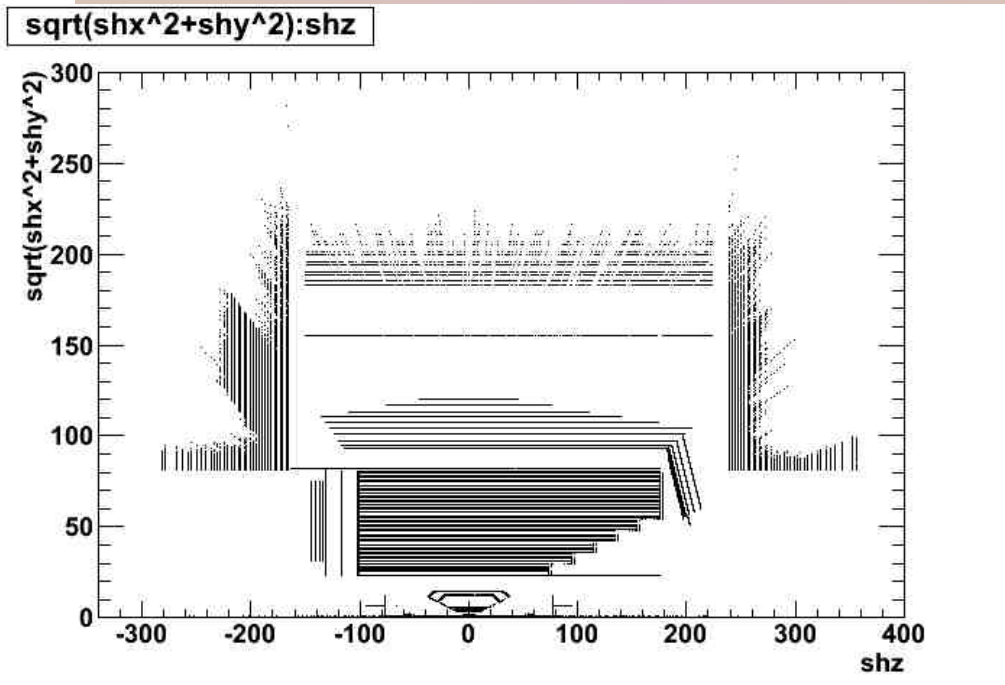
Baseline Geometry Recap

- Original Visualization Code Supplied by Matteo Rama

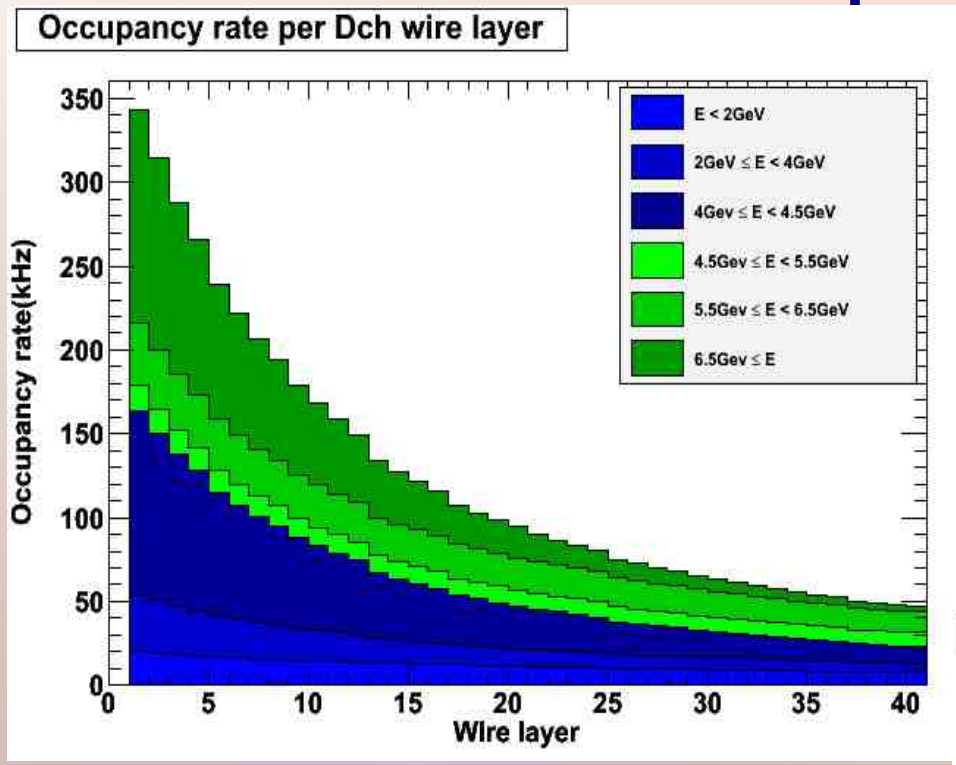


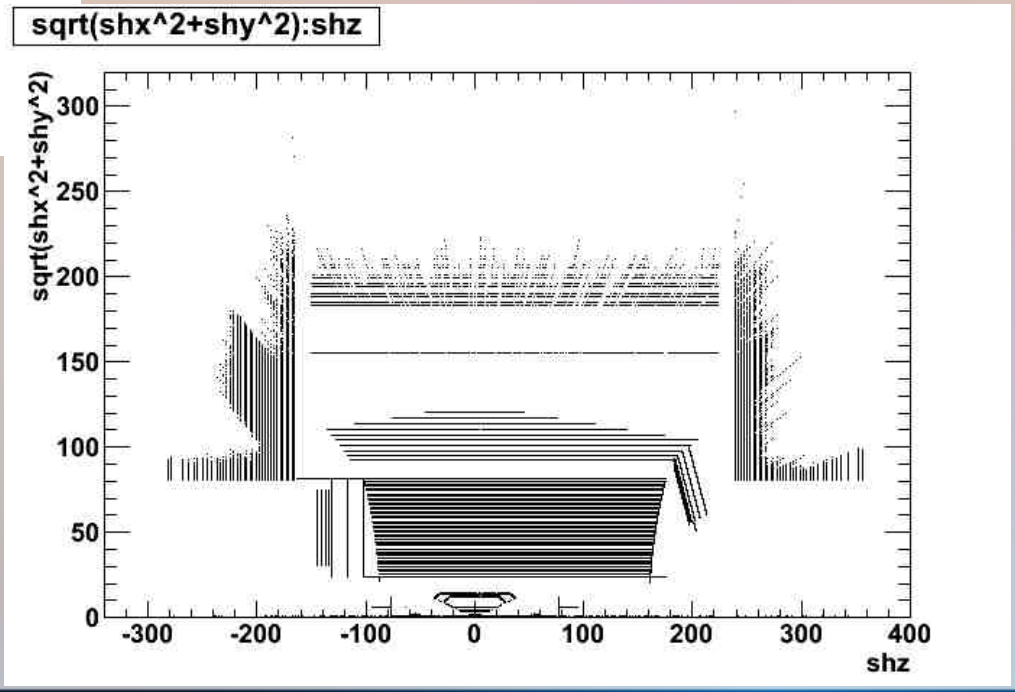
Wedding Cake





Spherical


Occupancy rate per Dch wire layer
E < 2GeV
2GeV ≤ E < 4GeV
4Gev ≤ E < 4.5GeV
4.5Gev ≤ E < 5.5GeV
5.5Gev ≤ E < 6.5GeV
6.5Gev ≤ E
Occupancy rate(kHz)
Wire layer
0
50
100
150
200
250
300
350
0
5
10
15
20
25
30
35
40


sqrt(shx^2+shy^2):shz
sqrt(shx^2+shy^2)
shz
0
50
100
150
200
250
300
-300
-200
-100
0
100
200
300
400

Final Remarks

- Wire radii are same as in baseline geometry, spherical and wedding cake dimensions fit to models provided by Giuseppe Finocchiaro from FullSim
  - Endplates are treated as carbon fiber with 0.80cm thickness
- FastSim V0.2.1 only allows for 2 dimensional surfaces, treats their thickness as a parameter
  - Can make cylinders, rings, and conical sections, thus 15 conical segments are used to approximate each of the spherical endplates
- V0.2.3 offers more powerful methods for writing geometries, simplifies the work- intend to use these capabilities ASAP
- Have been encountering many bugs lately, much more info to come once they're fixed