

# SuperB: Filesize vs. Bruno Truth

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# Sample Description

- Copied 2010\_Full\_Winter set-up
- All system hits have been turned back on
- G4ver = 9.3
- SuperB\_Wolf\_v12\_sf10.Prod.gdml
- QGSP\_BERT\_HP
- MinDeltaE 0.3 (see backup slide for 0.7)
- 100 events (2010\_Full\_Winter has 500 events)
- Default Mcconfig.mac:
  - Boundry info for all systems
  - Truth info for DCH only
- Seed # 100026

# Table of Filesize/CPUtime

Official SuperB production: 278M, 18.12h : My Production w/ 500 events: 320M, 20.56h

(Seed 100026)	Default step-size	1mm step-size	10mm steps
Default Truth Info (size, CPUtime)	66M, 5.37h	250M (66+184), 4.15h	83M, 4.22h
FF Truth Info	272M (66+206), 4.31h	451M (66+206+179), 4.22h	
FF+SVT Truth Info	272M, 4.23h		
FF, Electrons only	176M (66+108), 4.27h	357M (66+184+107), 3.87h	
FF, Positrons only	75M (66+9), 4.21h		
FF, Photons only	155M (66+89), 4.22h		
FF, neutrons only	66M (66+0), 5.38h		
FF, electrons E> 5MeV	74M (66+8), 4.18h		
FF, electrons E> 0.1GeV	67M (66+1), 4.26h		
FF, electrons E>4GeV	66M, 4.22h		
FF, photons E> 5MeV	83M (66+17), 4.29h		
FF, photons E> 0.1GeV	69M (66+3),, 4.25h		
FF, photons E>4GeV	66M , 4.25h		
MinDeltaE 0.7 (see back-up slides)	32M, 1.87h (+ other values 2 weeks ago)		

# Filesize/Runtime Conclusions

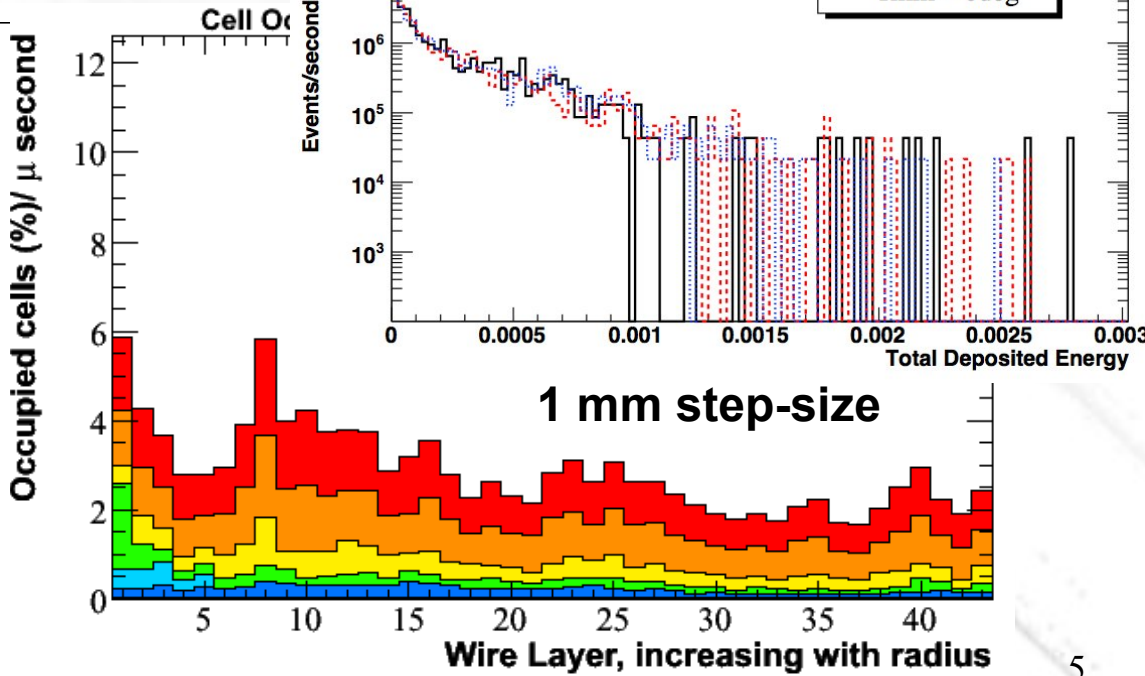
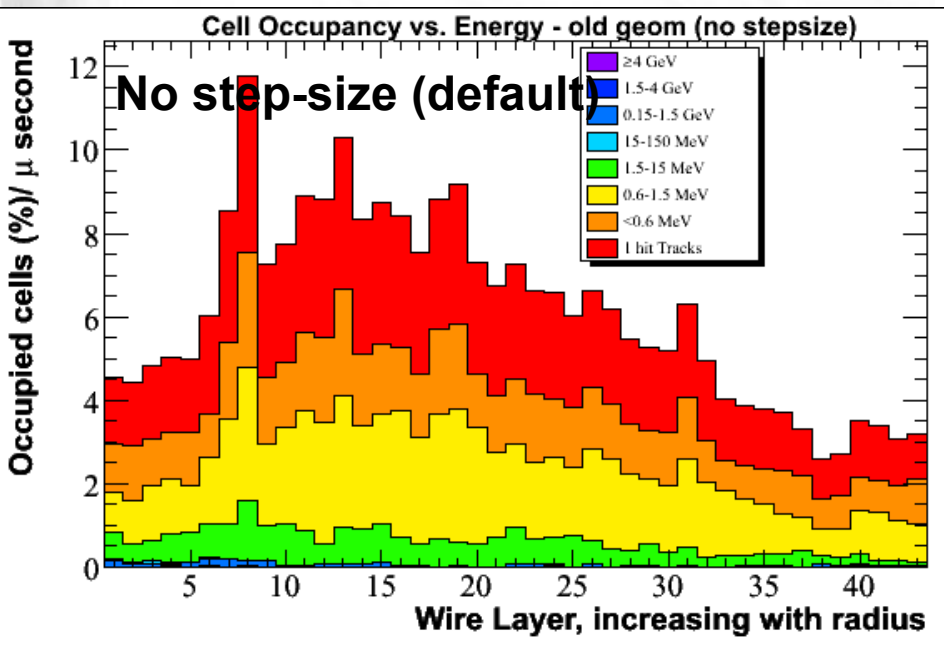
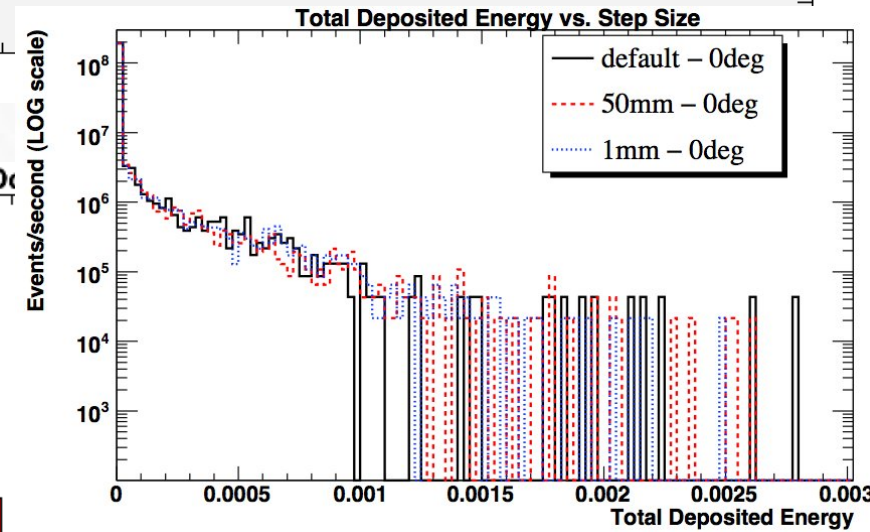
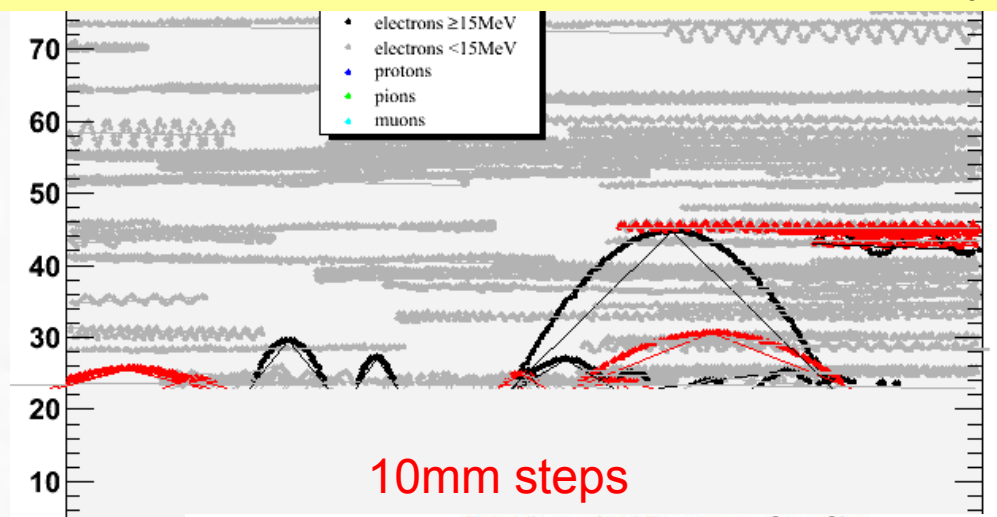
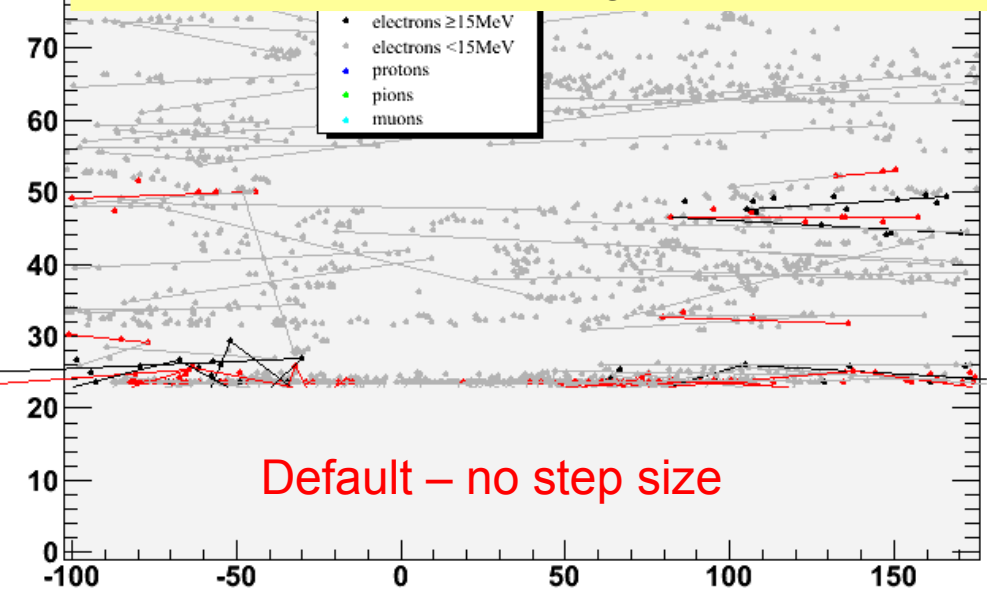
- I'm still not sure why the SuperB prod size is different
  - Only difference is Error in gdml. Log of official production shows:

```
G4GDML: Reading module 'inner_detector_Bosi.gdml' done!  
G4GDML: Reading module 'final_focus_V12_SF10.gdml'...  
G4GDML: VALIDATION ERROR! attribute 'startphi' is not declared for element 'zplane' at line: 291  
G4GDML: VALIDATION ERROR! attribute 'startphi' is not declared for element 'zplane' at line: 292  
G4GDML: VALIDATION ERROR! attribute 'startphi' is not declared for element 'zplane' at line: 294  
G4GDML: VALIDATION ERROR! attribute 'startphi' is not declared for element 'zplane' at line: 295  
G4GDML: VALIDATION ERROR! attribute 'startphi' is not declared for element 'zplane' at line: 296  
G4GDML: VALIDATION ERROR! attribute 'startphi' is not declared for element 'zplane' at line: 297  
G4GDML: Reading definitions...
```

- Adding additional info does not change CPU/running time
- Adding FF Truth (+SVT, etc) info increases size by **4.2 - 5.7x**
- Adding 1mm step-size increases size by **3.7 - 6.2x** (10mm is only **1.2x** larger)
- Most of the FF Truth size comes from electrons < 5MeV

# Why Include Step Size Info?

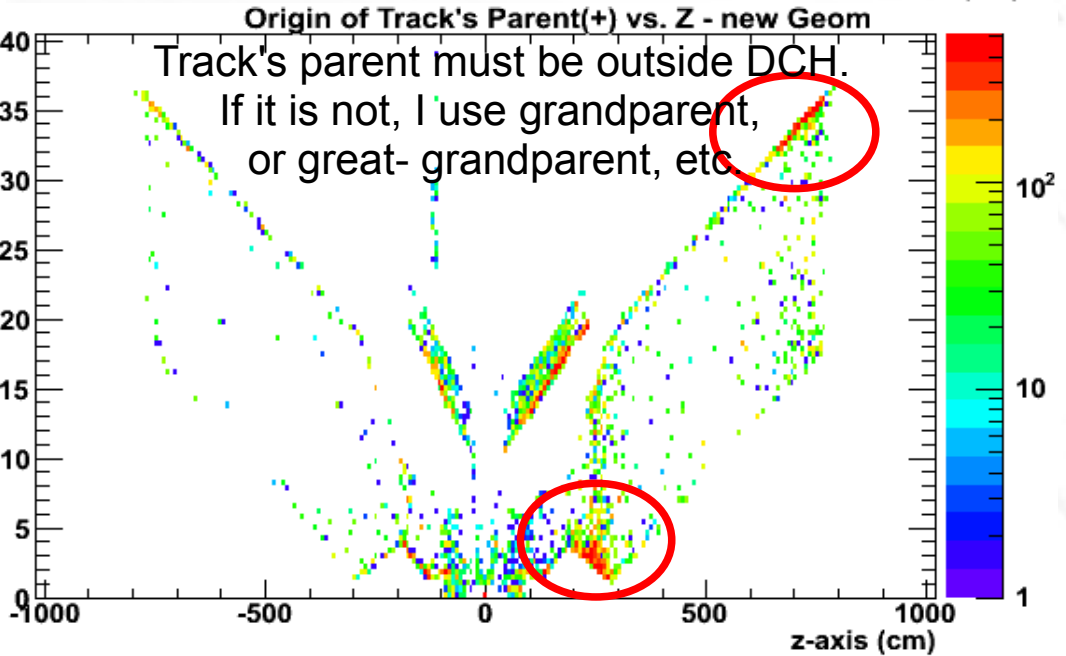
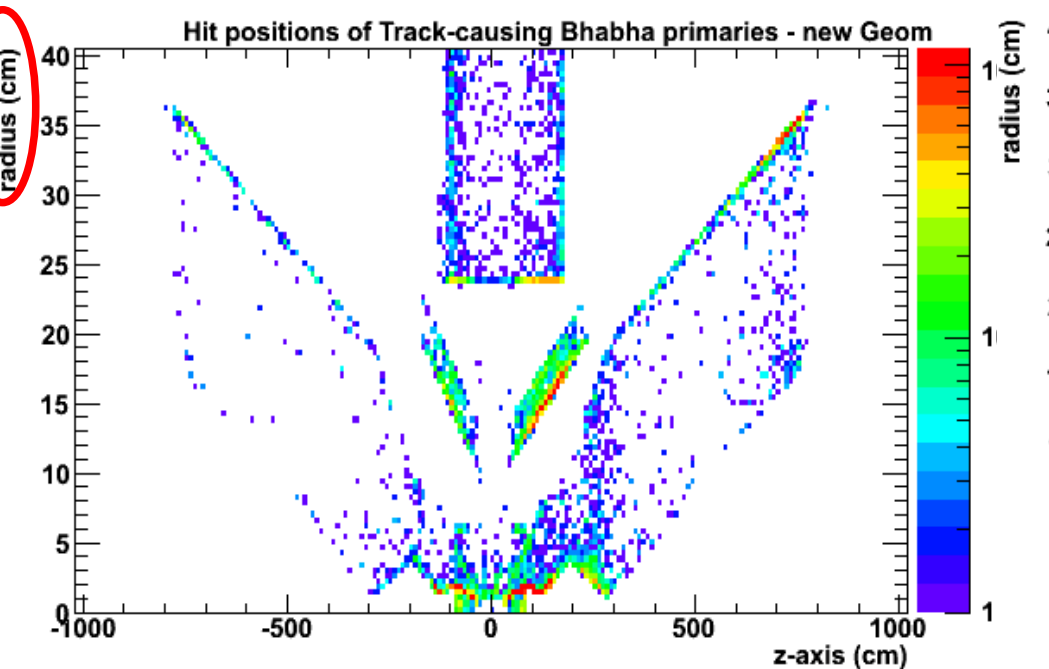
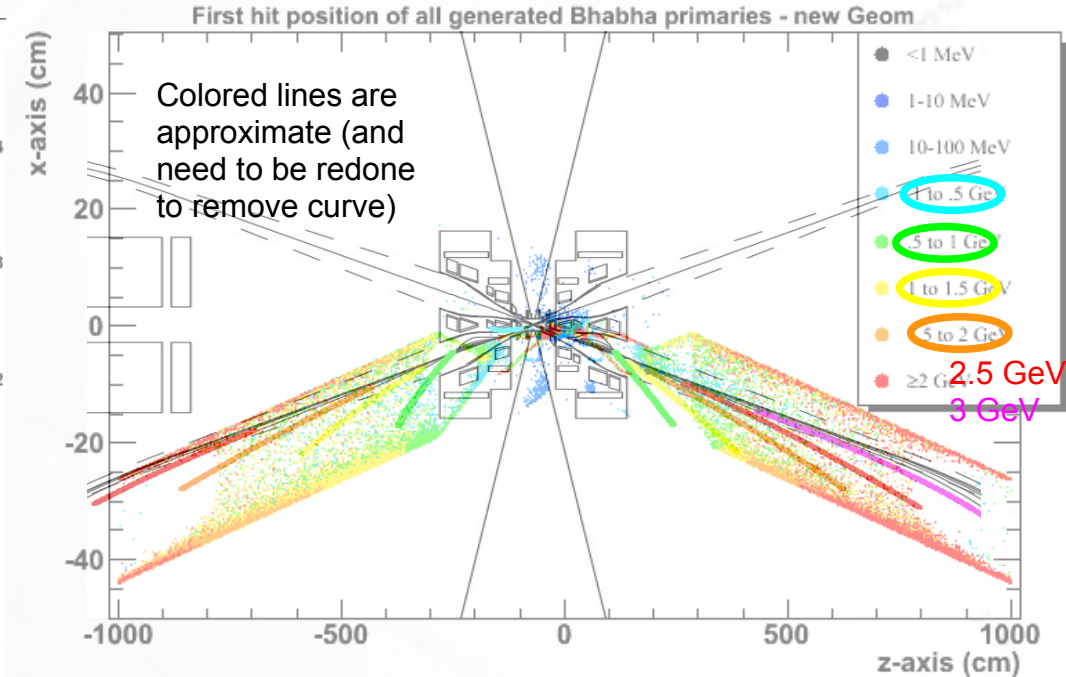
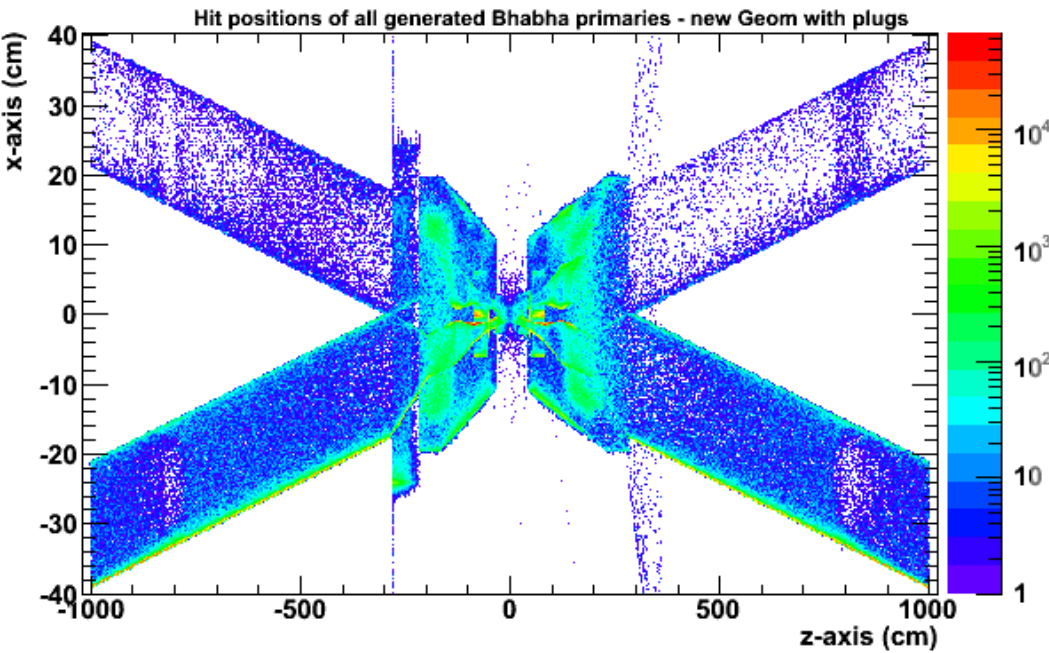
Same 200 events ( $>5\text{deg}$ ) with tracks  $1.5\text{MeV} < E < 150\text{MeV}$ , hits with deposited  $E > 0$  only



# Recording only $>5\text{MeV}$ particles ?

- Reasons to record truth:
  - (1) To know from which  $e^+e^-$  bhabha it originates (to know the bhabha angle, photon radiation energy, etc)
  - (2) to know the origin locations of all the parent/grandparent particles and the complete decay process involved
- Removing the truth info for particles  $> 5\text{MeV}$  (but including the DCH and FF boundary truth info – already standard):
  - Can still identify initial  $e^+e^-$ (gamma) bhabha for 100% of DCH tracks using position within truth array.
- Complete truth history of 100% of tracks can be reconstructed if all the FF truth info is included (and the SVT & SVT\_L0 truth info – negligible size difference). Only 2.6% of tracks have fully reconstructable truth decays if only  $>5\text{MeV}$  particles are recorded.
- When including all the FF truth info, only 75% of neutrons and 67% of photons can be fully traced back. With only  $>5\text{MeV}$  particles recorded, 13.6% and 0%, respectively, can be fully traced.

# Why Include FF Truth Info?



# Back-up Slides



# Table of Filesize/Runtime - minDeltaE = 0.7

(Seed 100023) (Seed 100026)	Default Truth Info (size, runtime, CPUtime)	FF Truth Info	FF+SVT Truth Info
Official SuperB prod	520K 278M <-- more typical!		
Default step-size	32M, 1:50, 1.79h CPU 32M, 1:51, 1.82h CPU	183M, 1:48, 1.85h 183M, 1:51, 1.83h	183M, 1:53, 1.87h 183M, 1:54, 1.79h
1mm step-size	194M, 1:48, 1.79h CPU 204M, 1:47, 1.82h CPU	337M, 1:55, 1.85h 353M, 1:51, 1.82h	
10 mm step-size		193M, 1:52, 1.84h 207M, 1:58, 1.93h	

- SuperB prod size is different – wrong minDeltaE, 500 events not 100
- Adding additional info does not change running time
- Adding FF Truth (+SVT, etc) info increases size by **5.7x**
- Adding 1mm step-size increases size by **6.2x**
- Adding both FF truth and step-size increases by **10.8x**
- Adding 10mm step-size: smaller size difference?? (10 events shows 1.5x increase)