

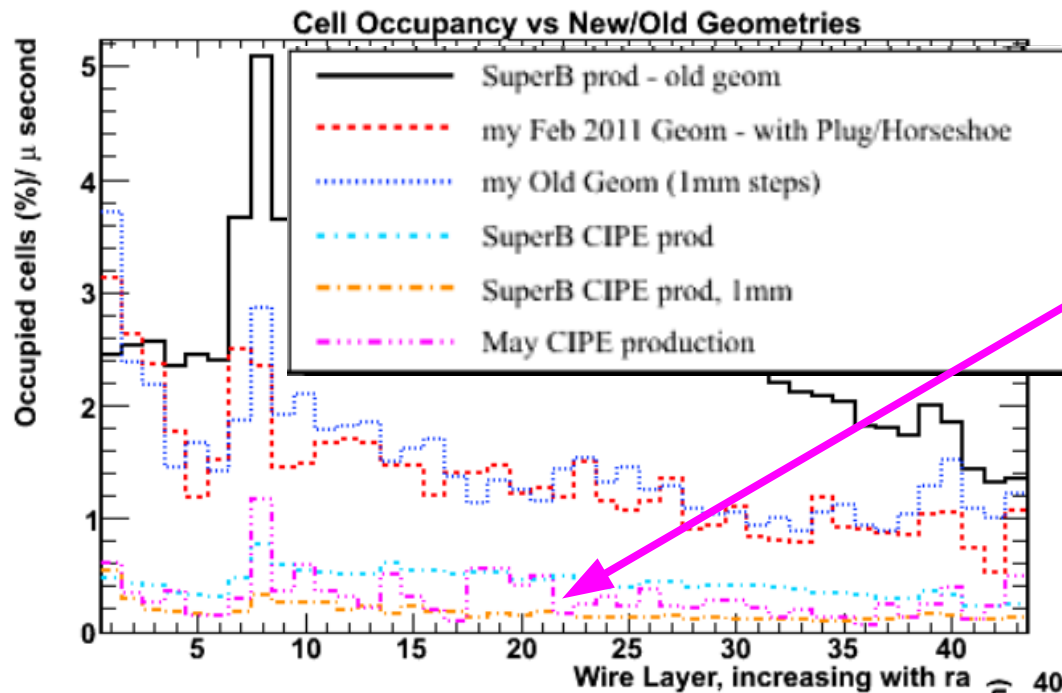
SuperB:

DCH background studies with FullSim

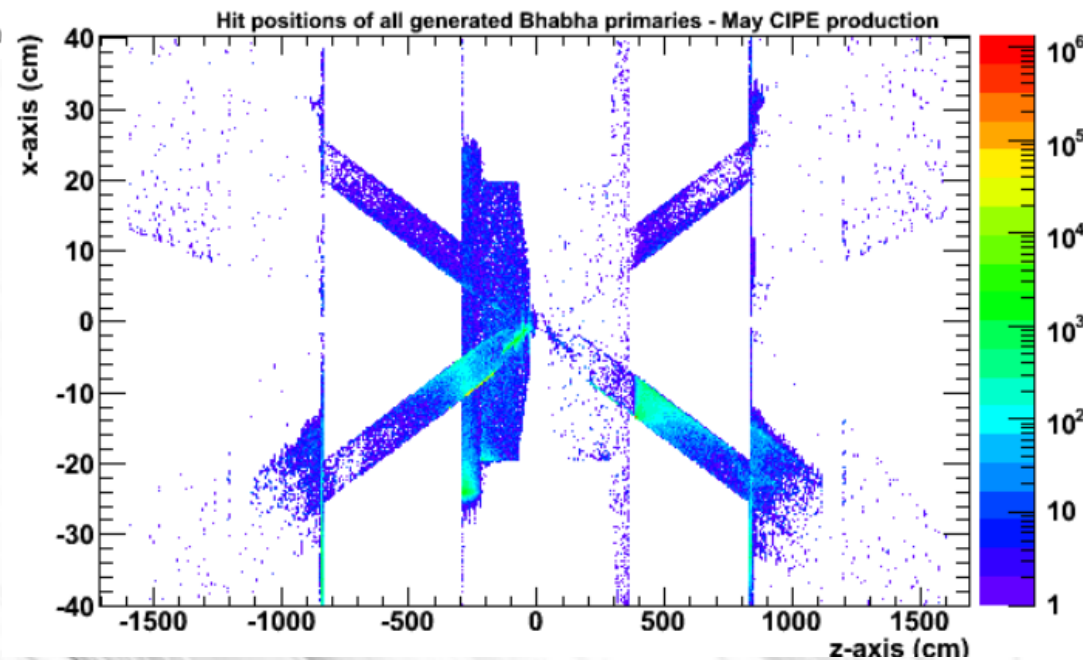
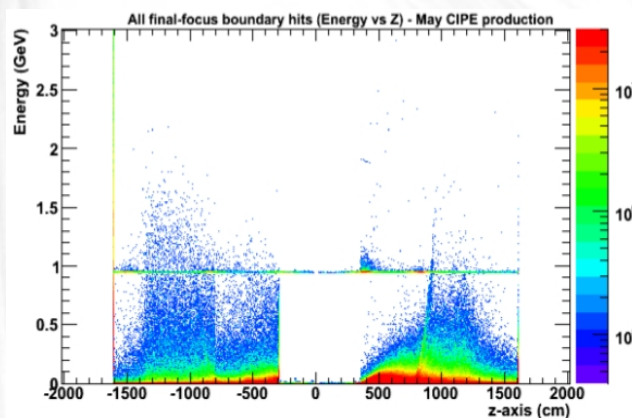


Dana Lindemann - McGill University
SuperB Backgrounds Meeting
May 30, 2011

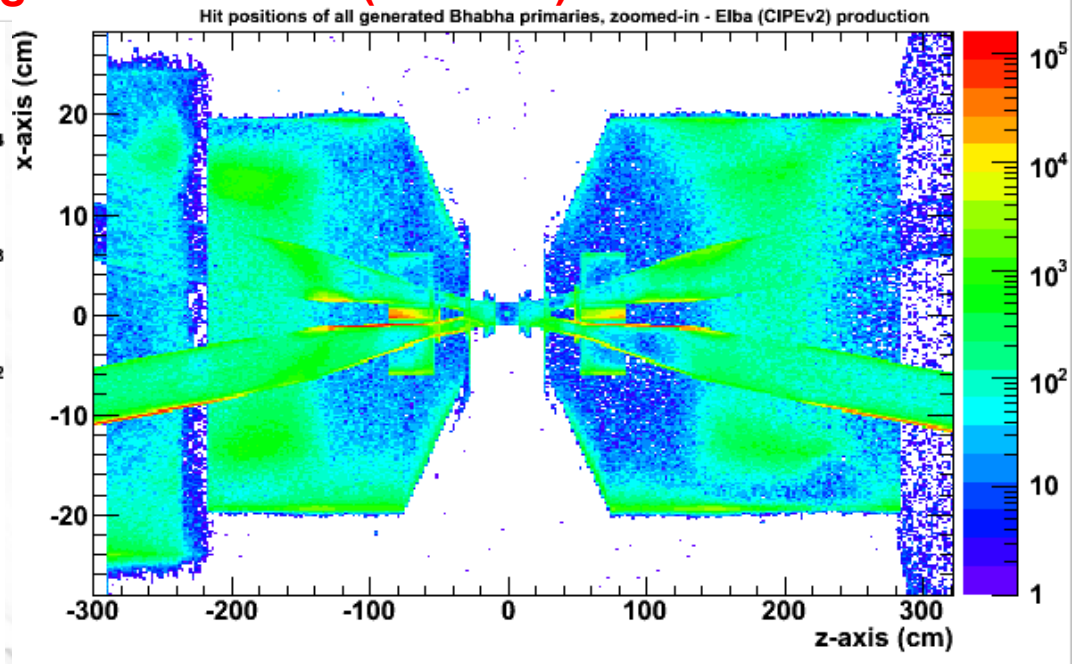
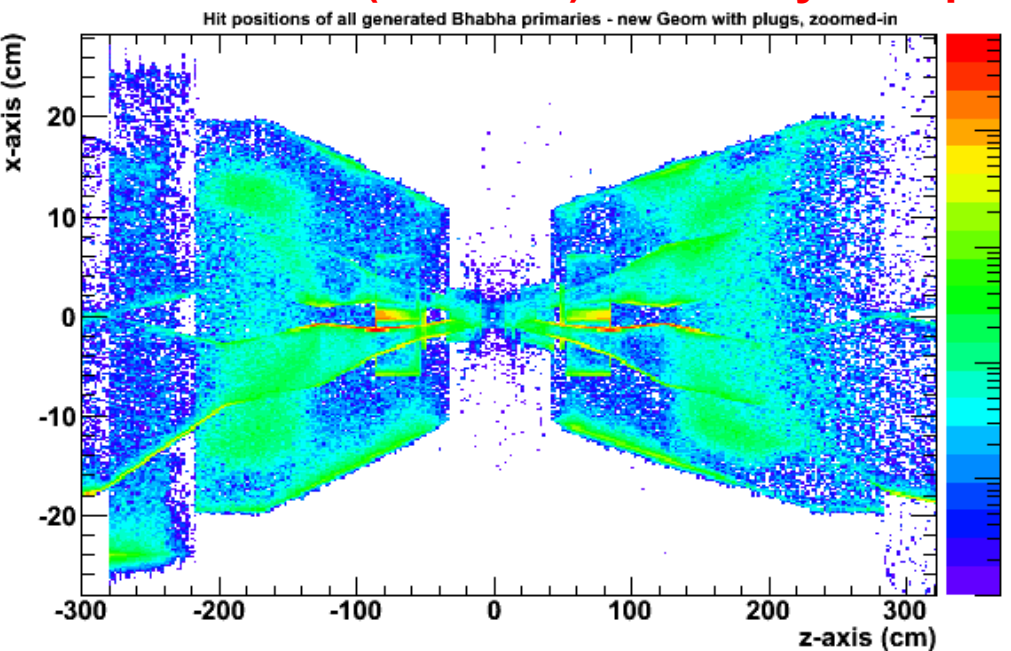
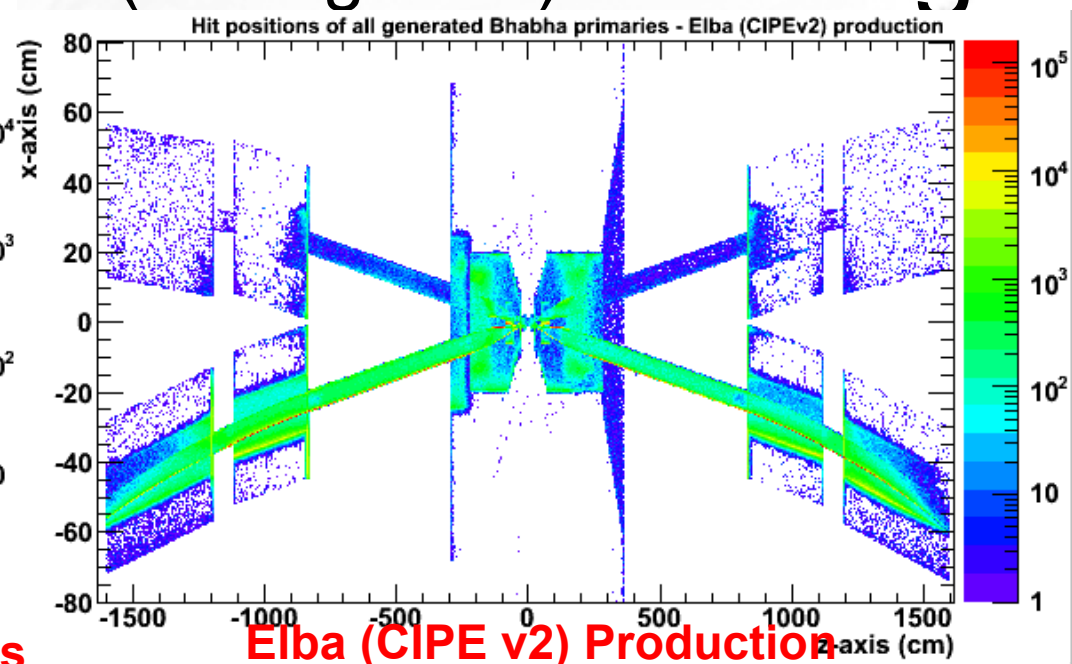
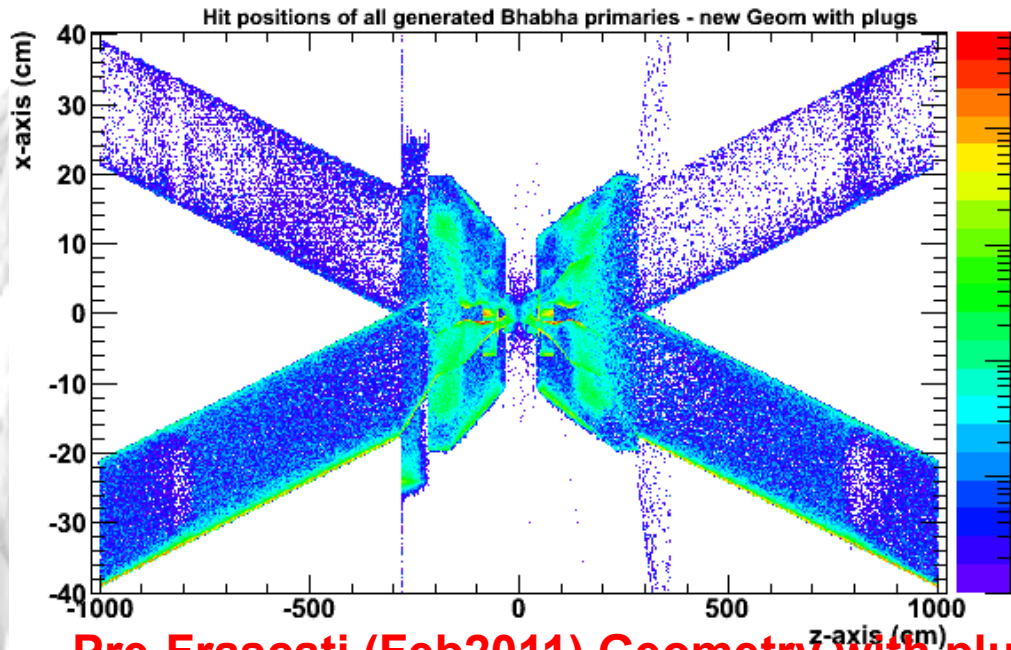
Bug in CIPE v1



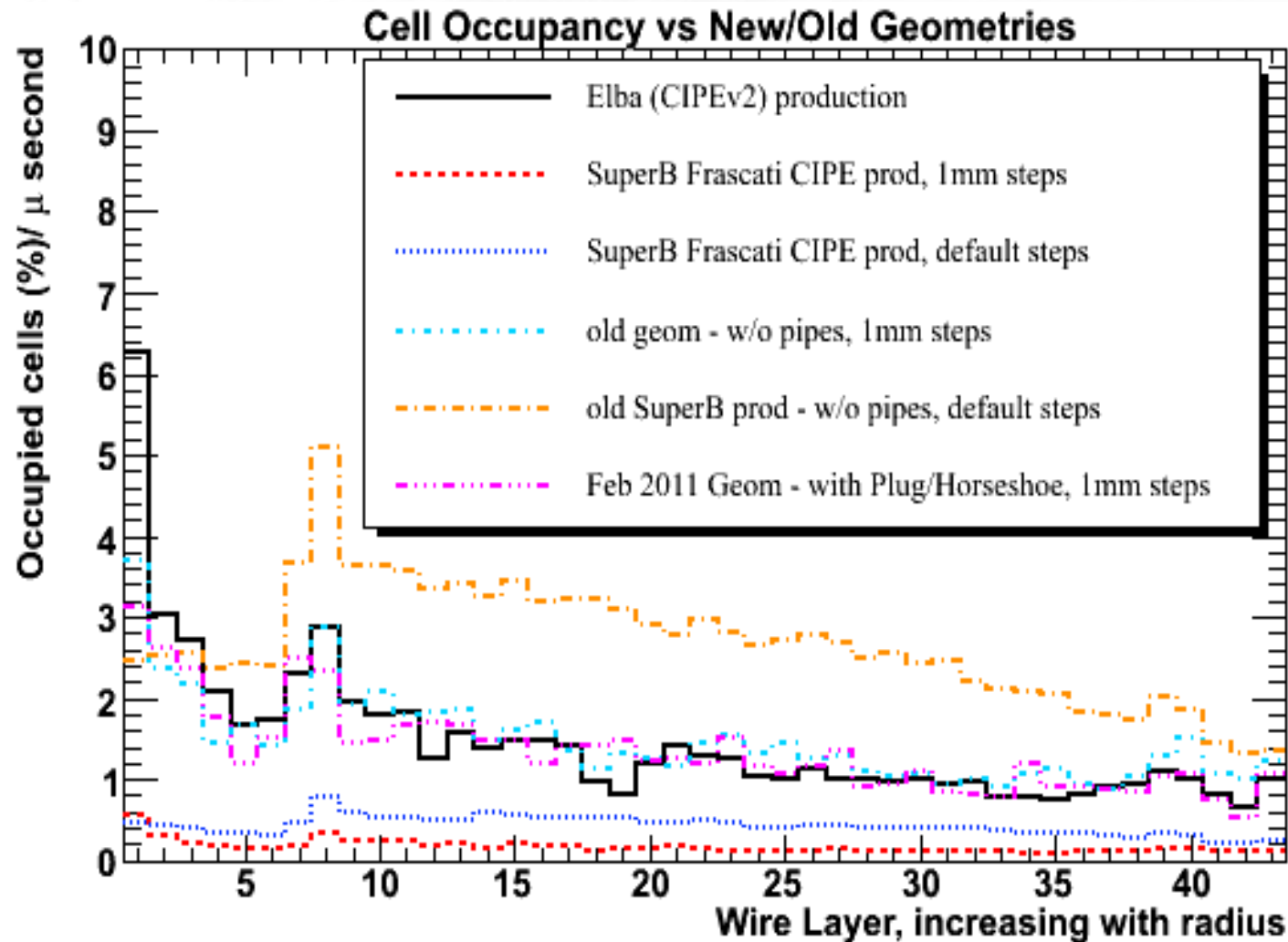
Production from earlier in May – CIPE v2 but before bug fix, and likely same bug as in Frascati...



Elba vs. Pre-Frascati (“new geom”) w/ Plugs

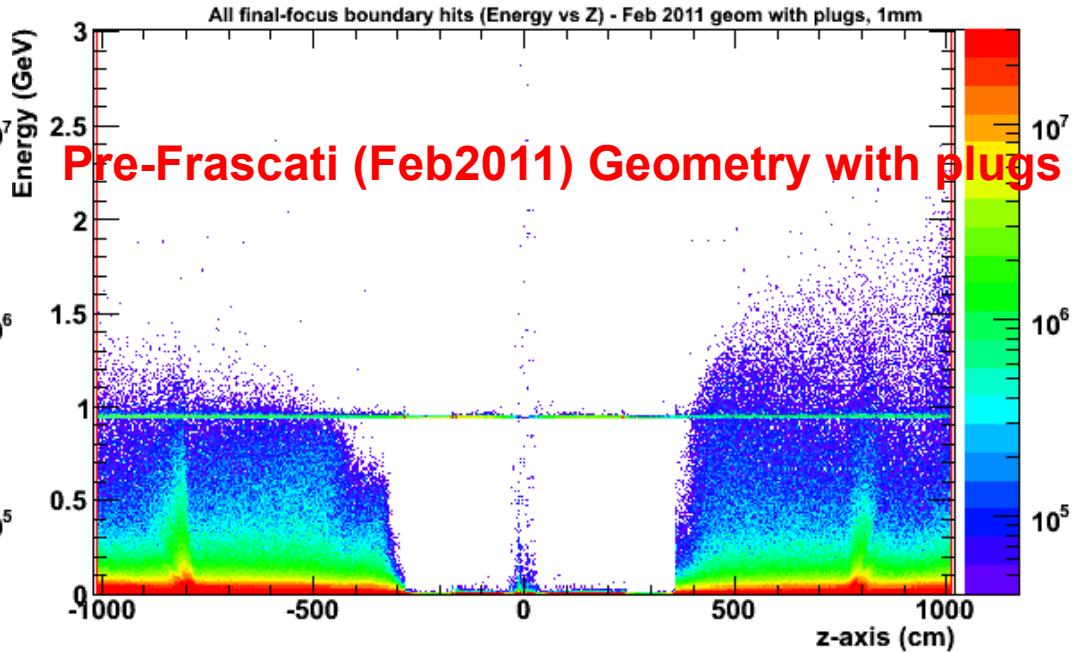
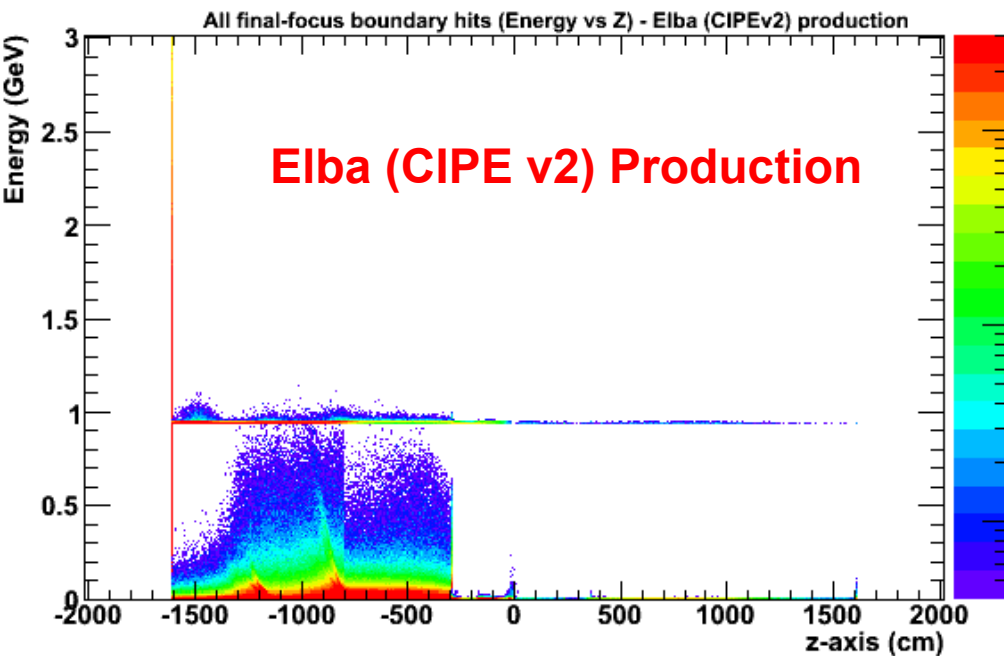
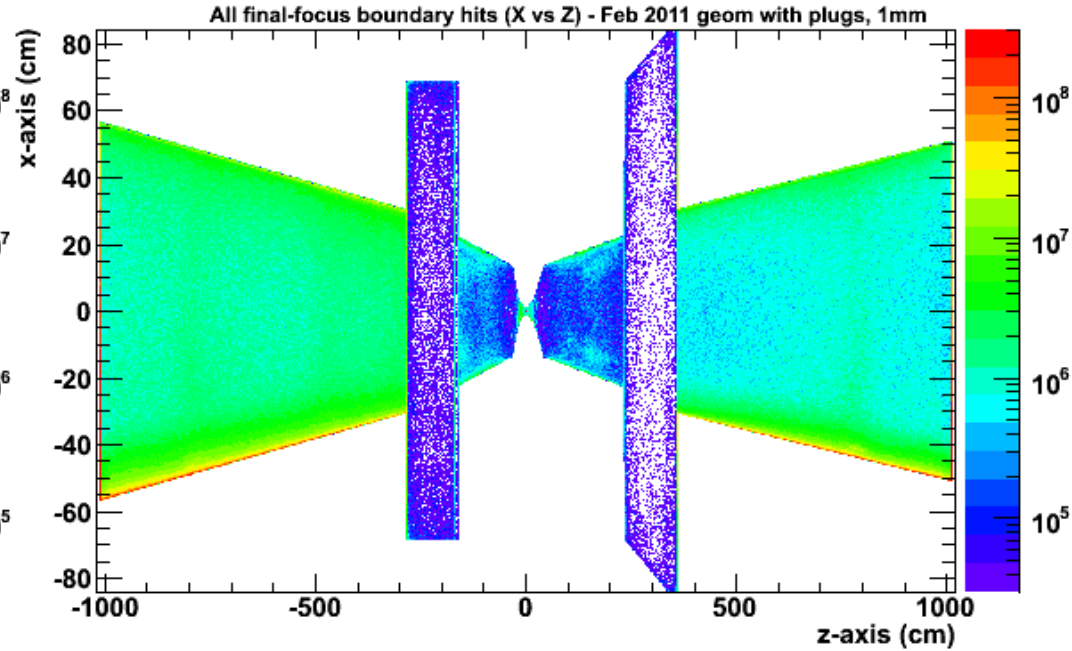
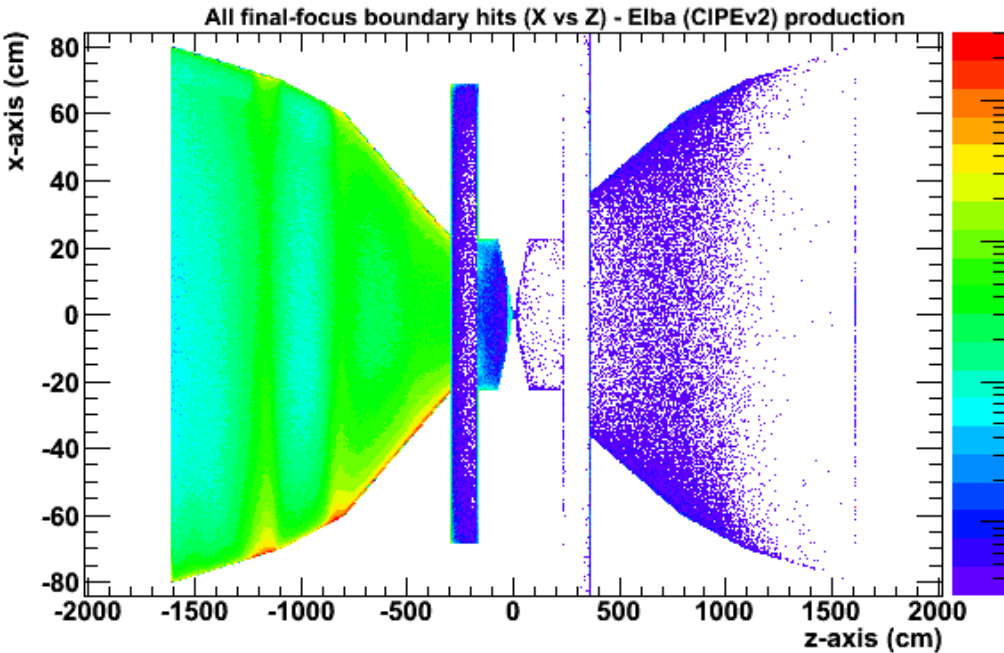


Comparison of Samples

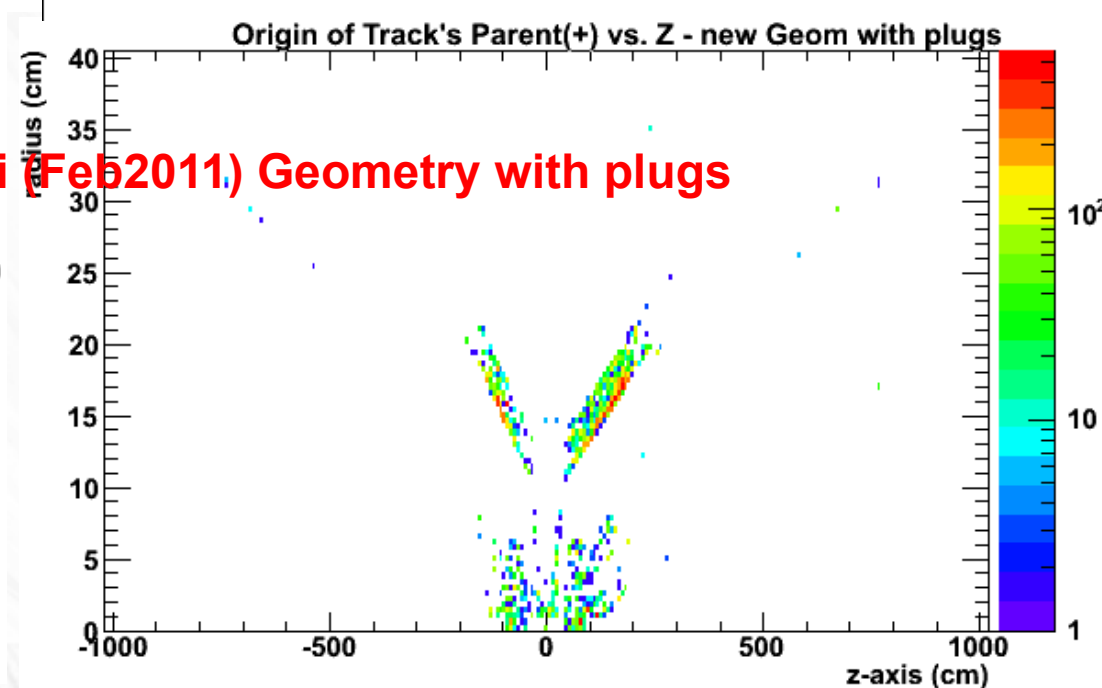
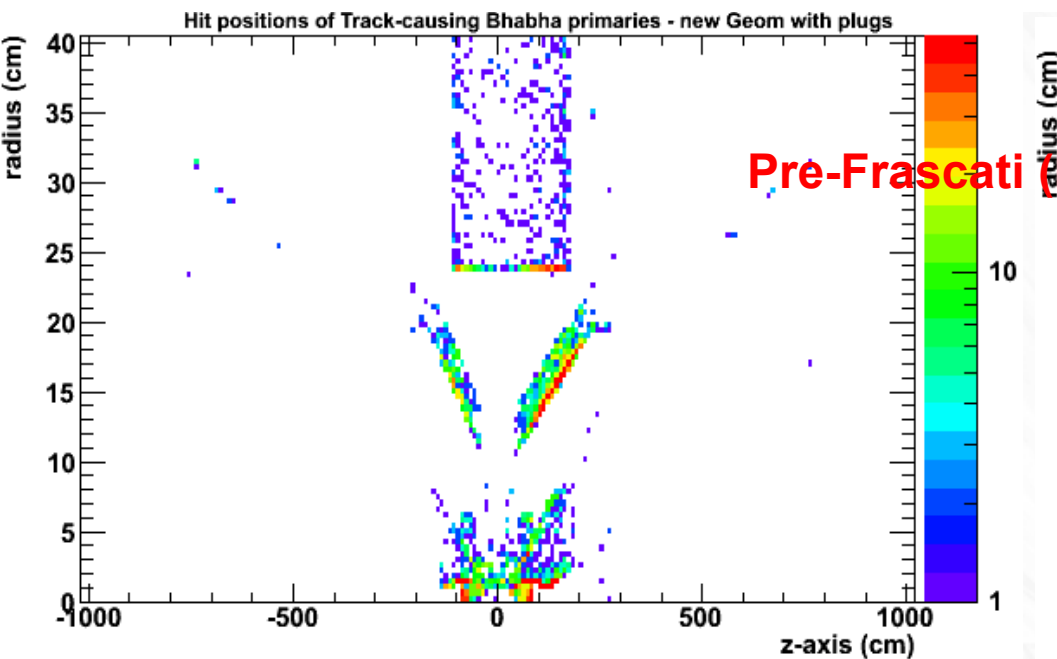
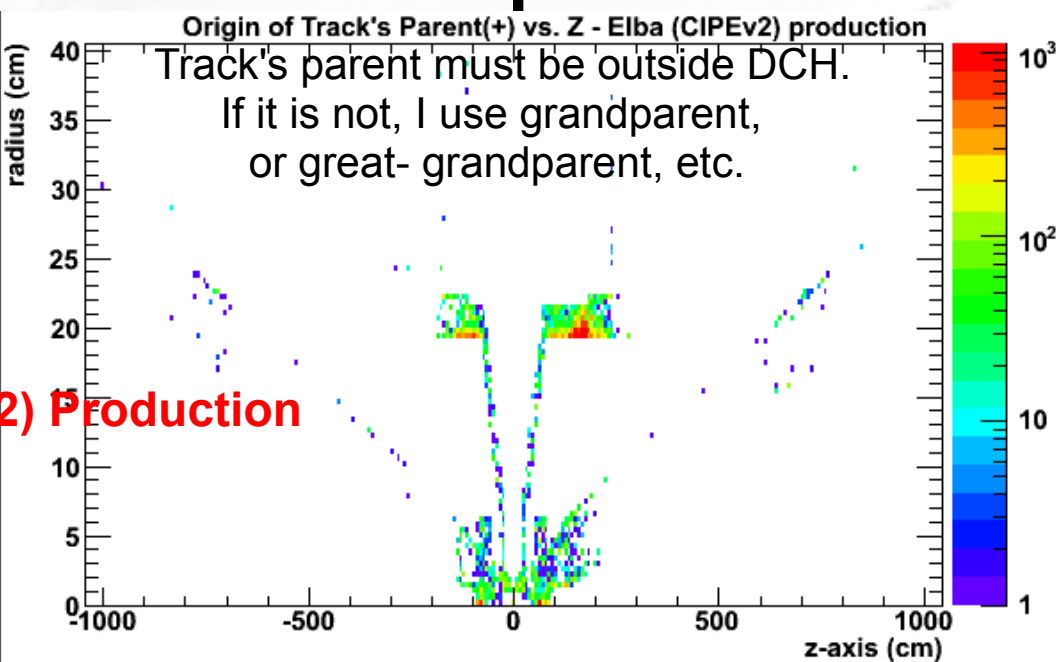
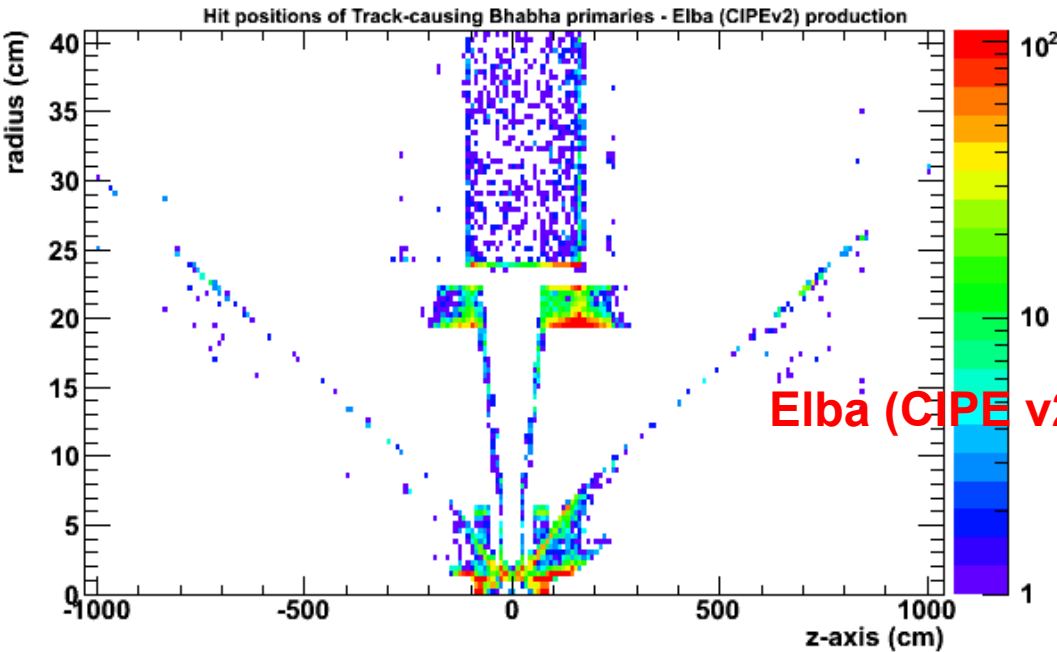


Rise in occupancy likely due to a fix of the bug that caused tracks to get stuck in the final-focus

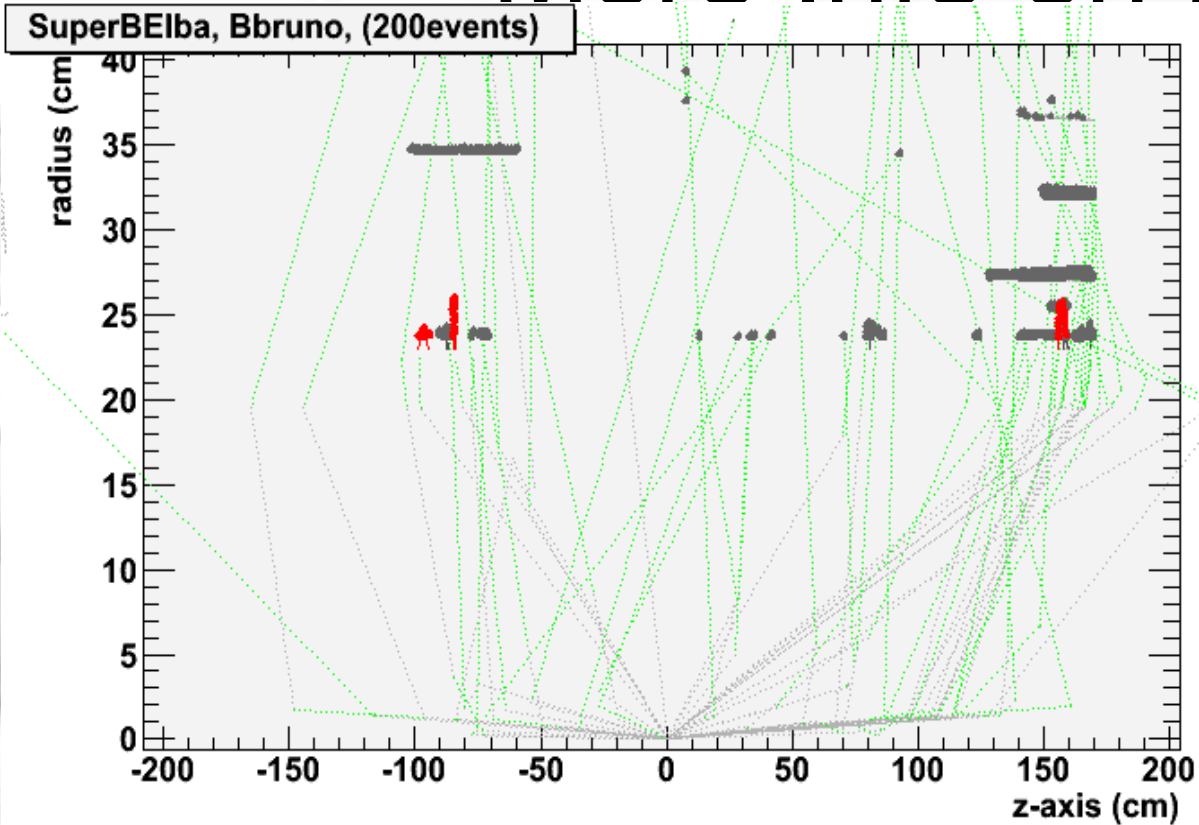
ALL final-focus boundary hits



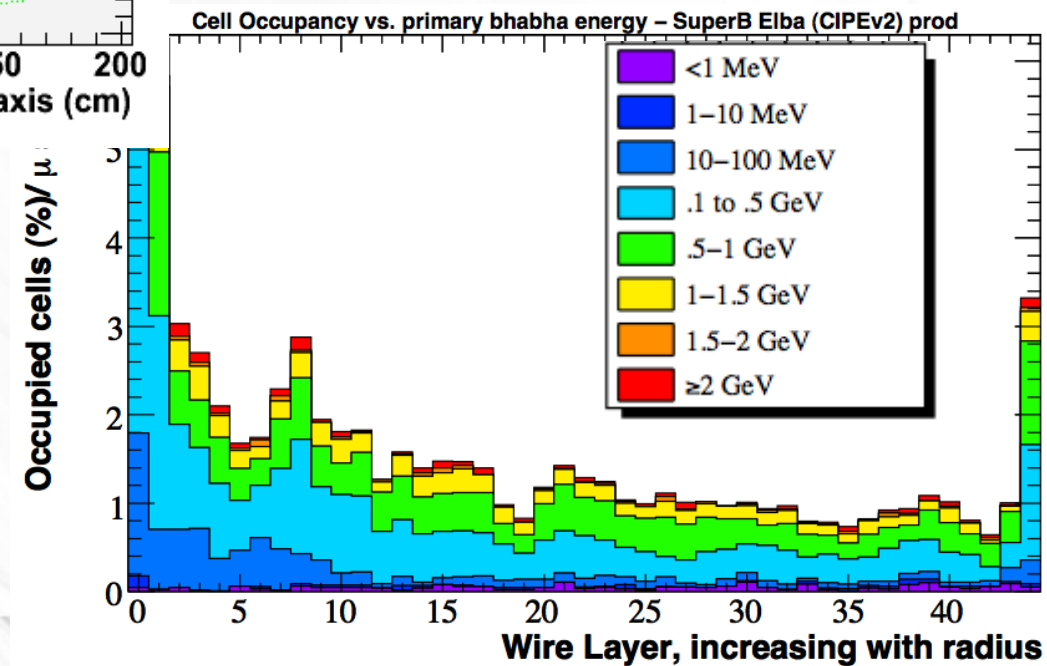
Track-producing Bhabhas/parents



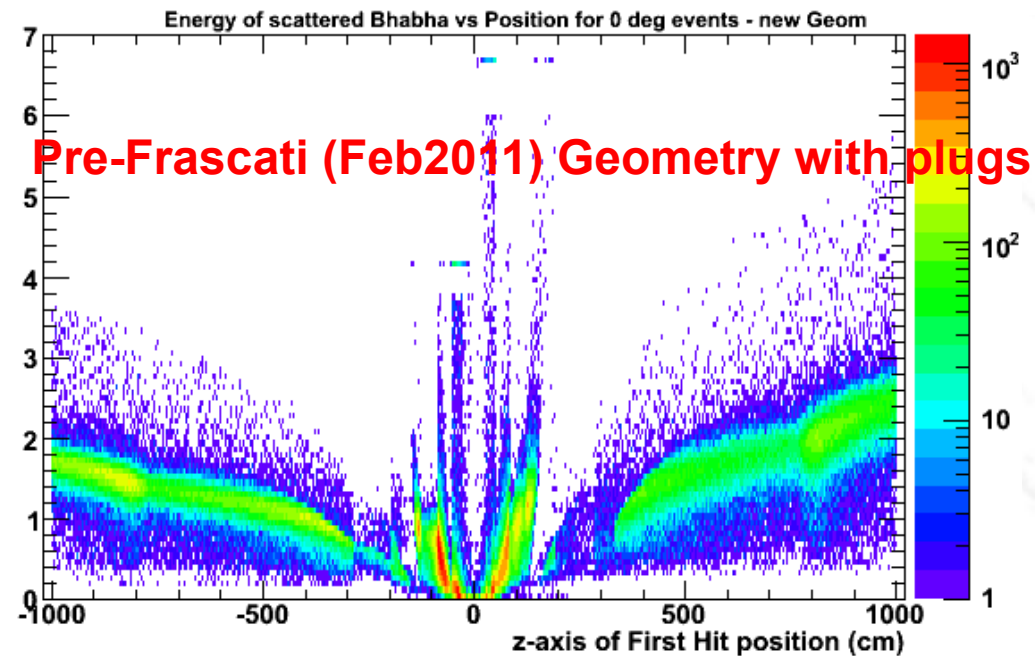
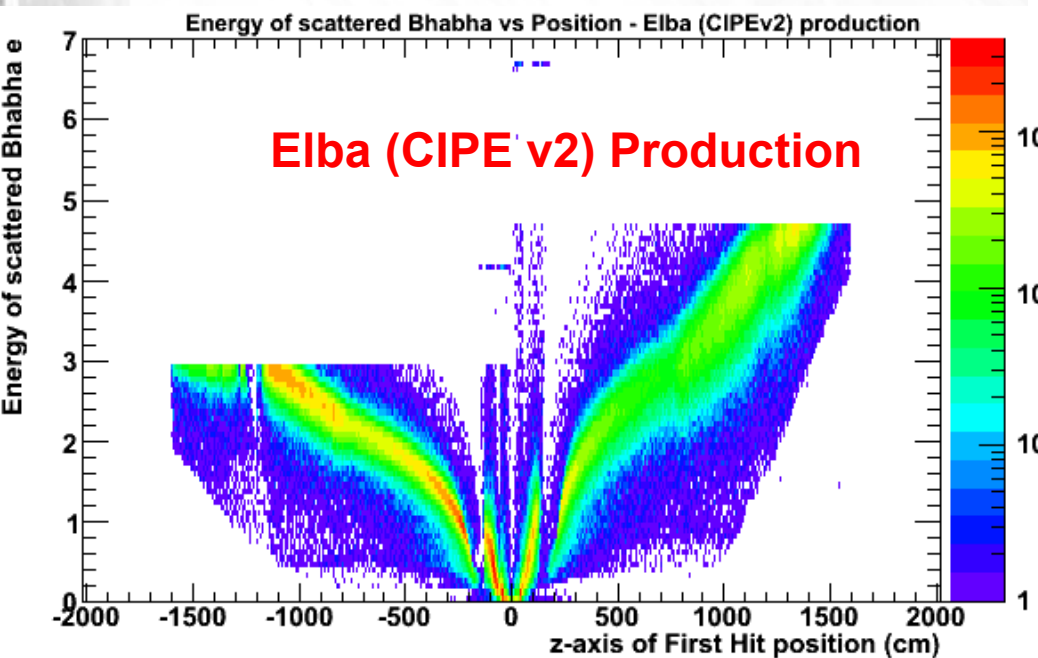
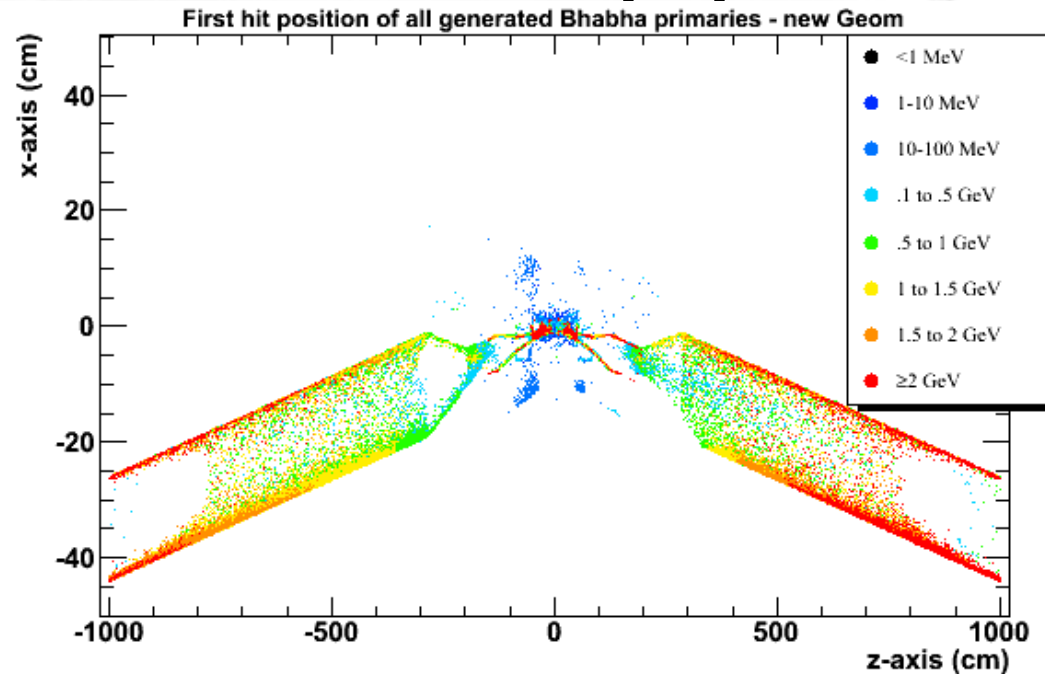
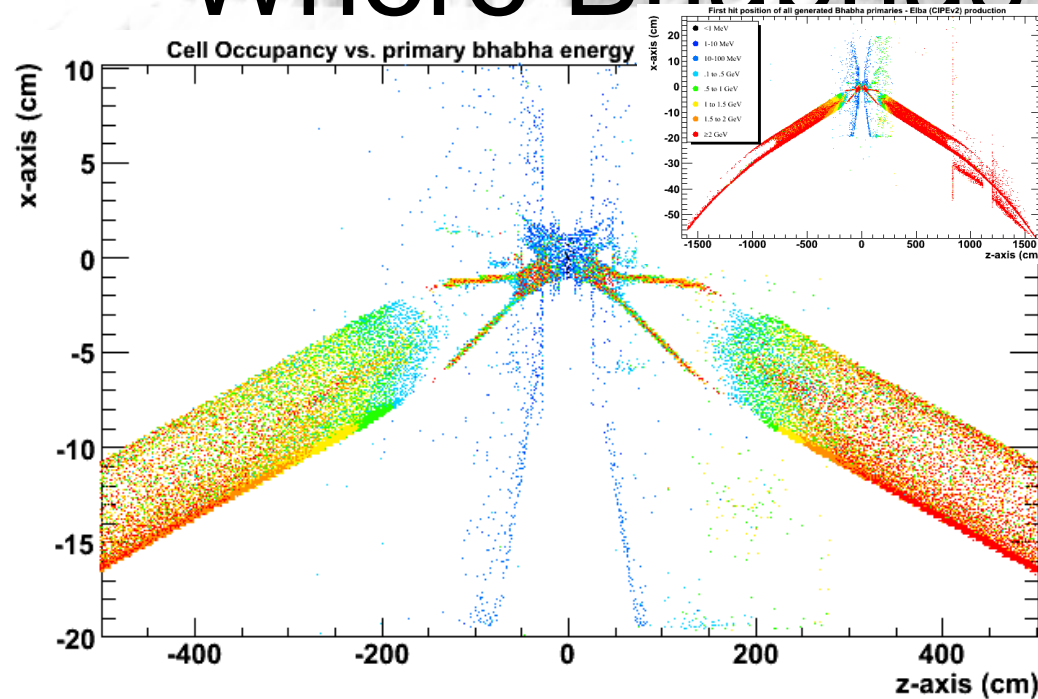
More Info on Hotspot



<-- Shows history of the tracks.
Green is photons, grey is other.
Assumes straight lines...



Where Bhabhas First hit the pipe

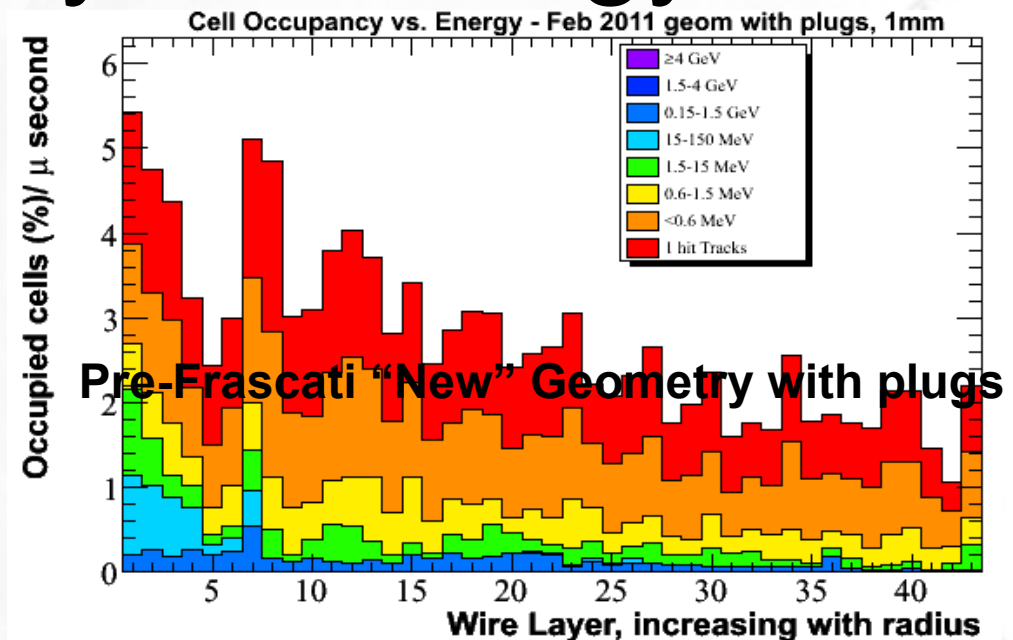
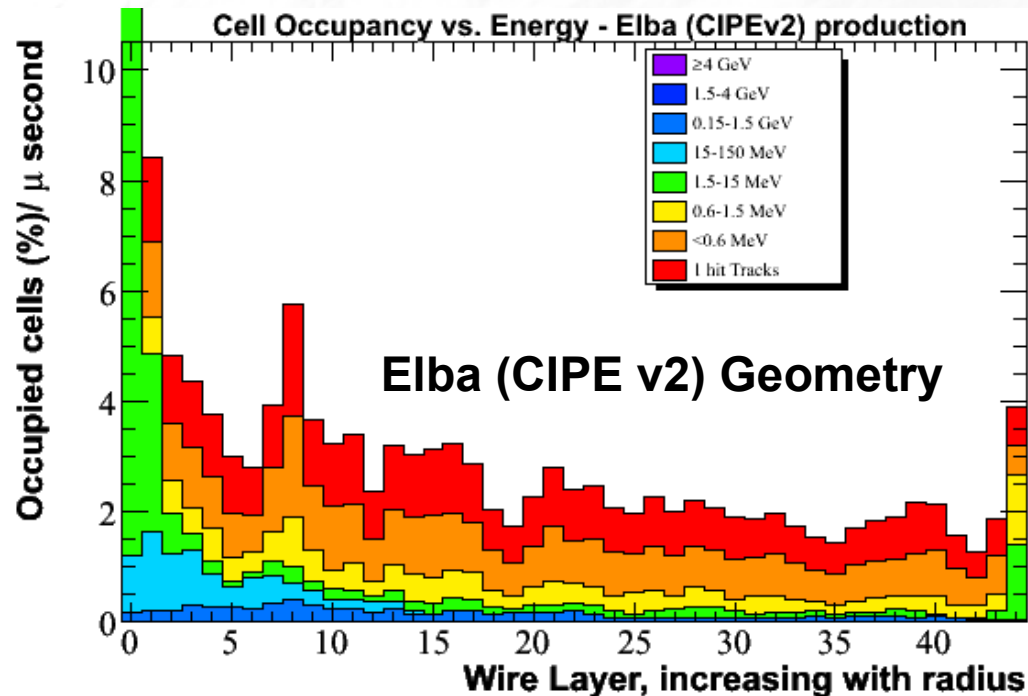


Conclusions

- New Final Focus design shows increase in occupancy back to levels pre-Frascati.
 - But never had Truth info for Frascati samples so best guess is that there was a bug in the production...

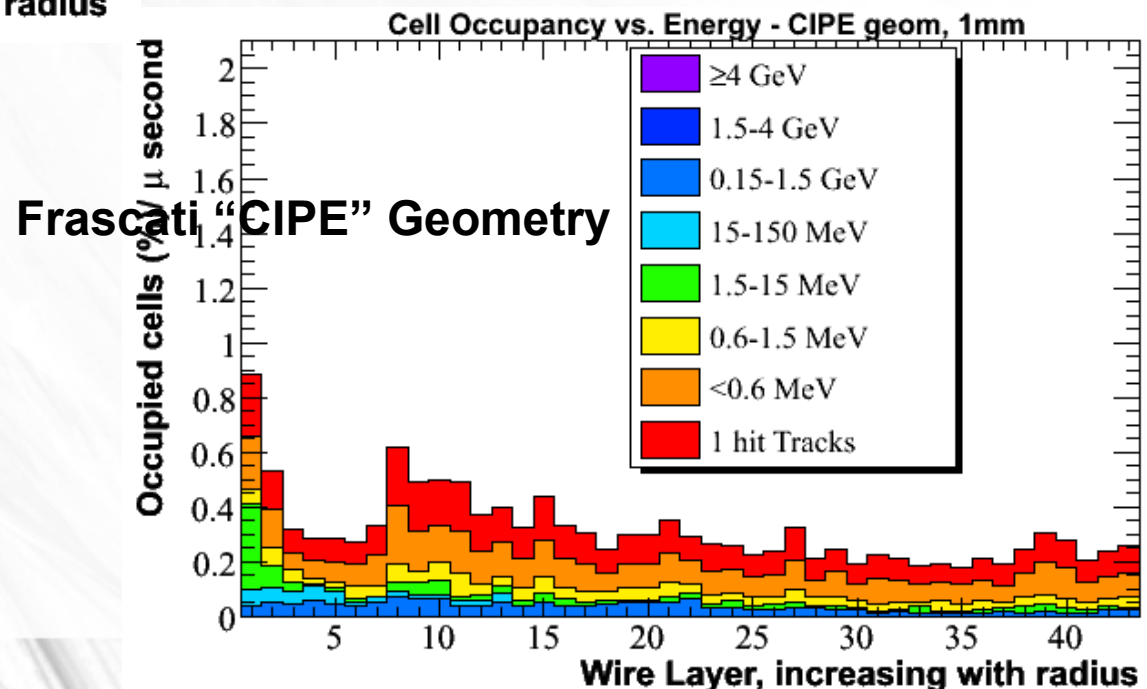
Back-up Slides

“Elba” Geometry vs. Energy

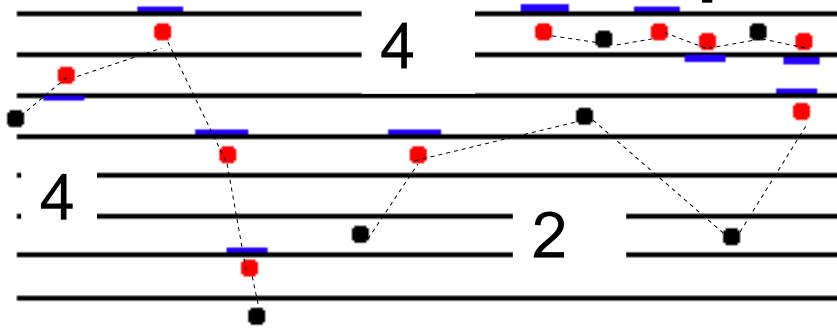


Note: By splitting plots into stacked colored “bins”, falsely higher occupancies are shown.

Wire layer 0 and 44 are actually the DCH boundaries, not wires.



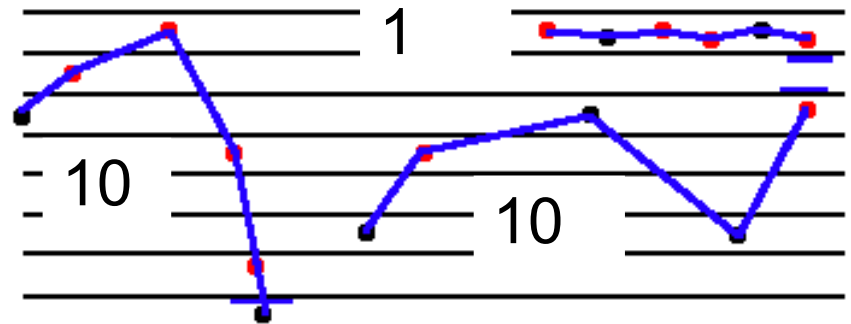
Occupancy Algorithm



Deposited Energy w/o double-counting:

- 1 wire-hit for each hit with deposited $E > 0$
- Uses whichever wire is closest to hit (accounting for phi arrangement)
- Allows only 1 wire-hit per wire per event.
- Does NOT account for stereo wires
- Current “bug”: if hit is closer to boundary than first or last wires, does not count in occupancy
- Doesn't work as well for larger step sizes

- My Bruno occupancies are normalized to ~215 Mhz
- Wire layout is same as Riccardo uses: First superlayer has smaller cell radii



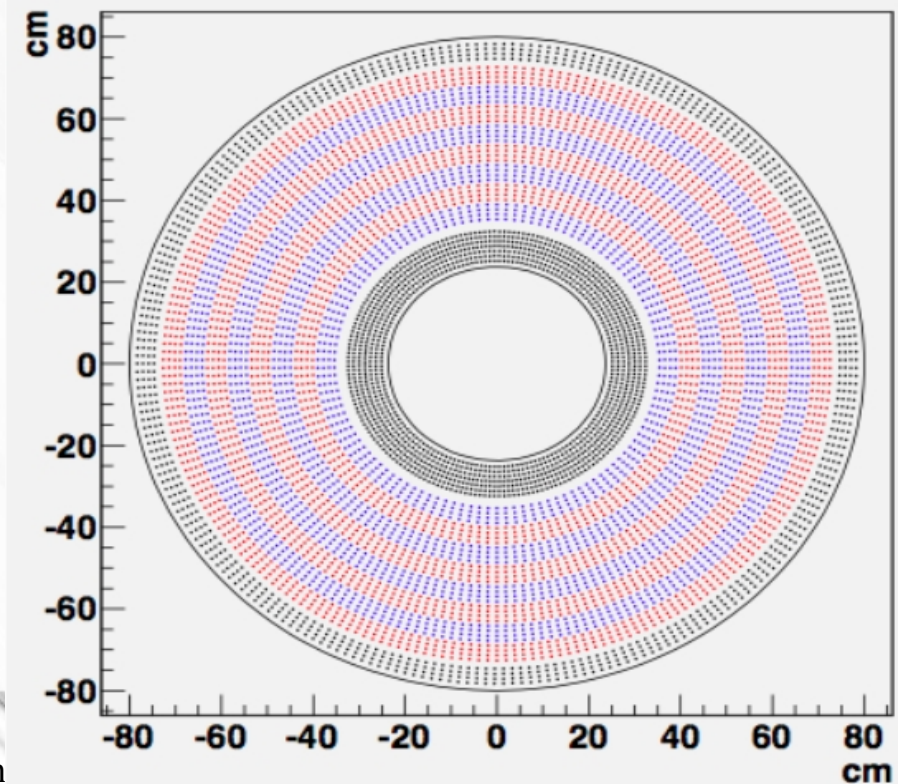
Hit-by-Hit w/o d-c : old method, not used anymore!

Straight lines between ALL hits

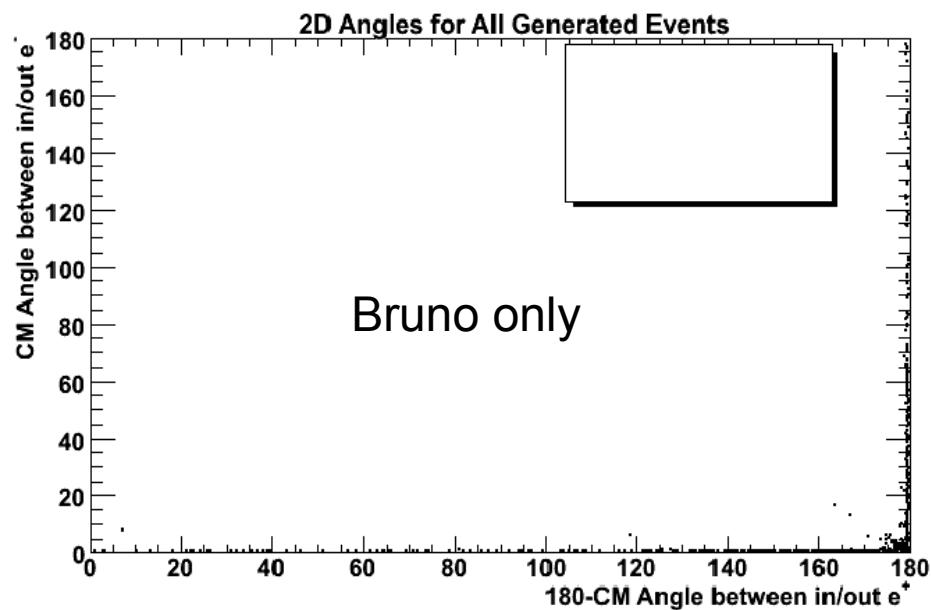
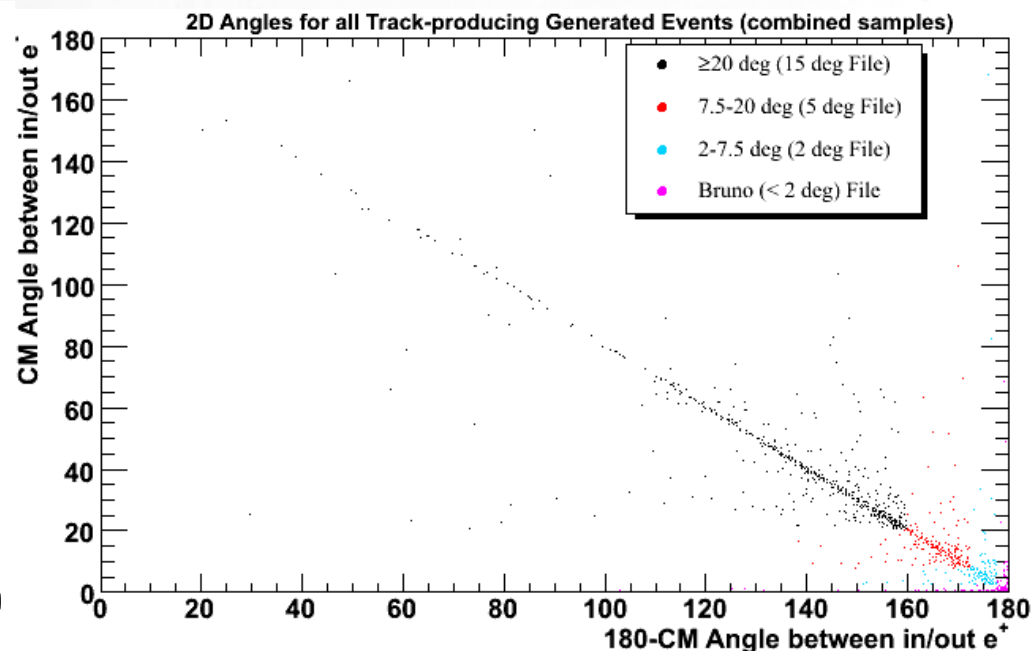
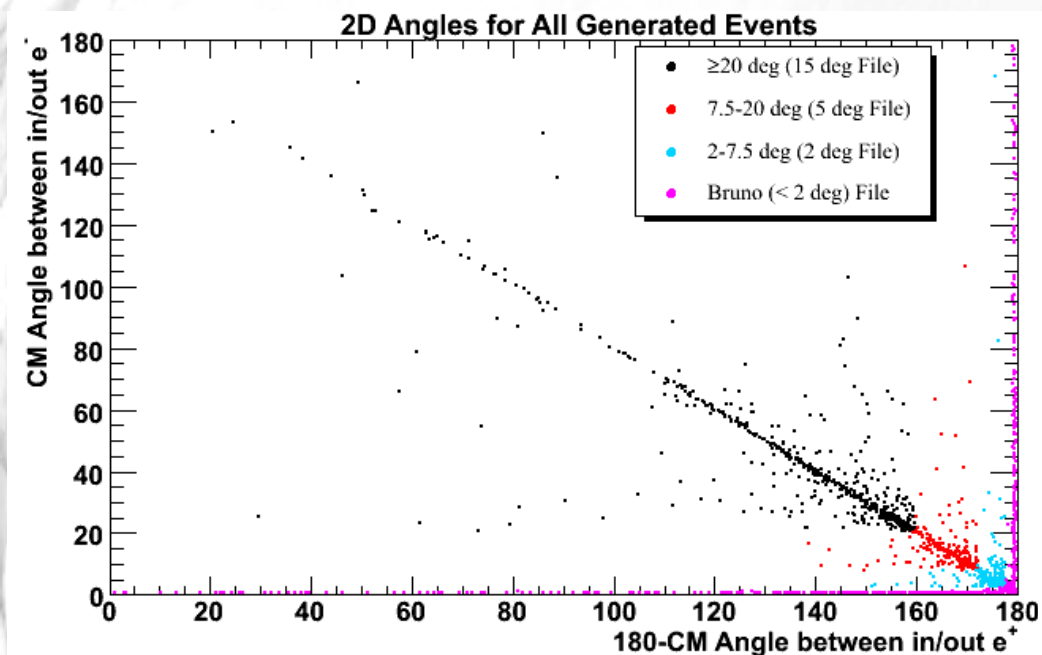
1 wire-hit per crossed wire

If no crossed wires, wire closest to first hit.

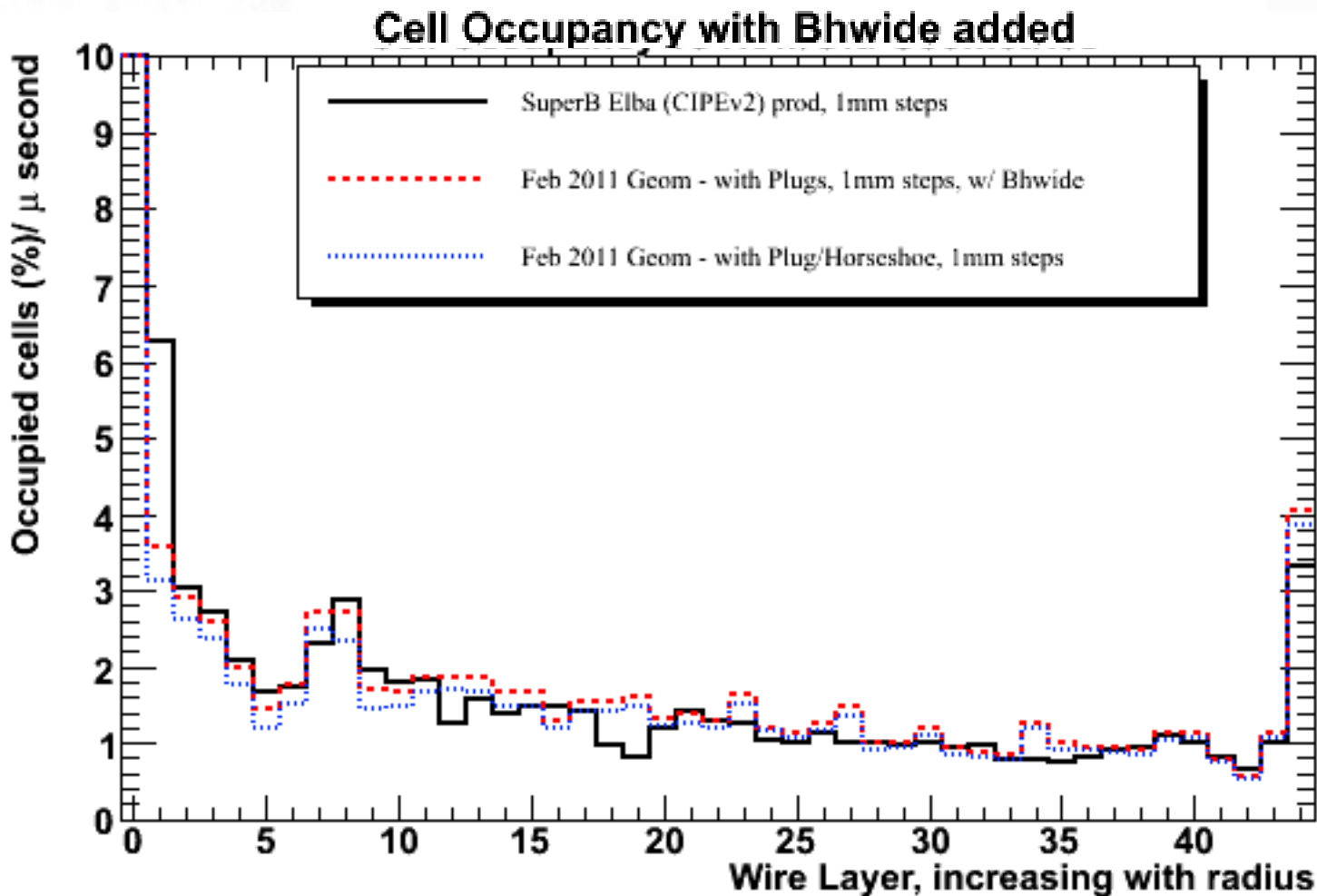
Allows only 1 wire-hit per wire per event.



Combining Bruno + Bhwide



Adding in Bhwide



- I couldn't get the CIPEv2 geometry to run, so used next-best geometry...
- Wire 0 (44) represent hits closer to inner (outer) boundary than first (last) wire. (Wire 0 values are 25.0, 22.4, and 21.3% respectively).
Hopefully guard wires will prevent these events from reaching wires?

Parent's Z origin vs. Occupancy

