



FastSim V0.2.7 Dch Occupancy Studies with Bhwide May 29, 2011



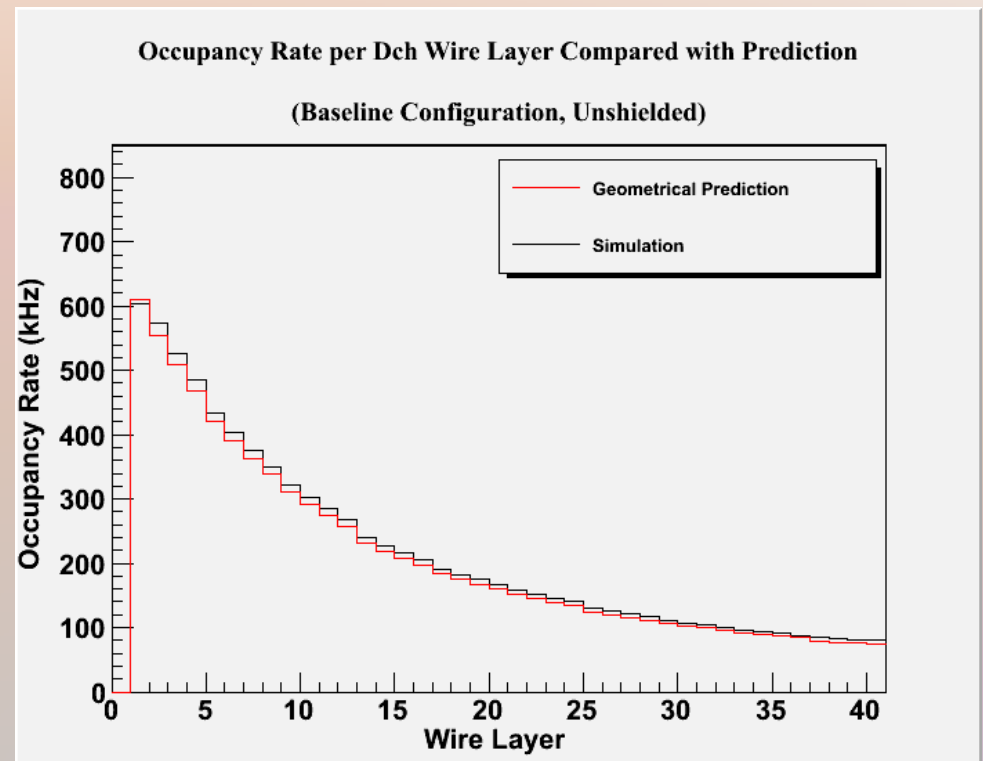
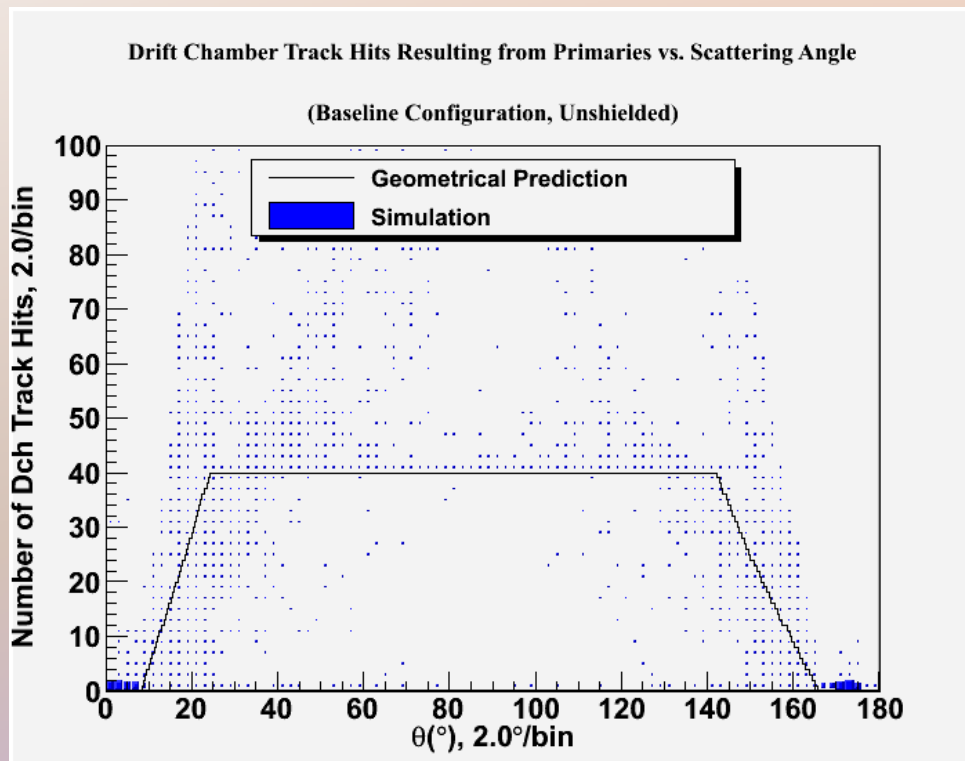
McGill

Darren Swersky,
McGill University

Progress

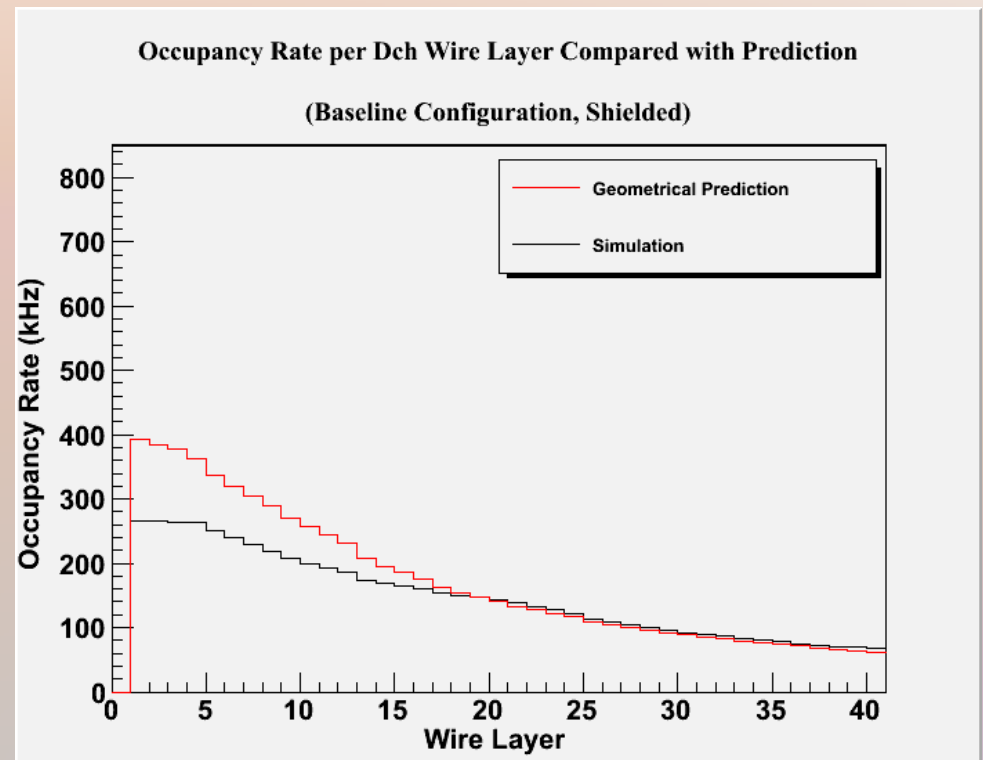
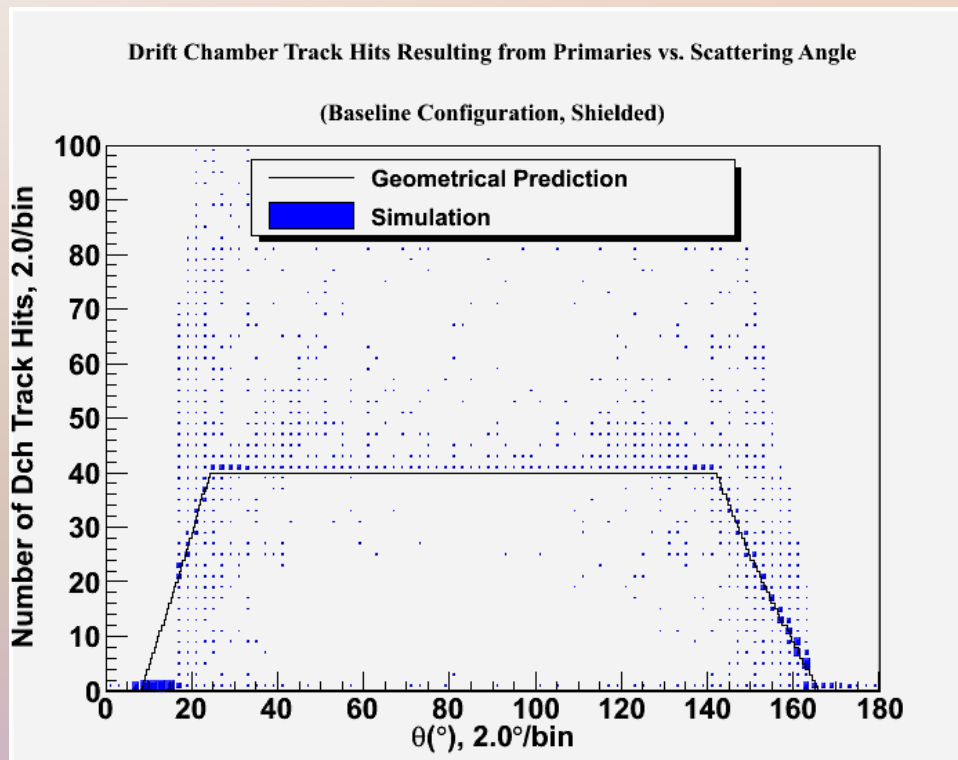
- Updated to FastSim V0.2.7
- Added new beam shield model based on new FullSim model
- Recalculated systematics for angular cuts (verification cross-checks are still in progress)
- Fixed bugs in Dch entry/exit identification code (code for wedding cake inner cylinder still behaving strangely)
- Verified that polar coordinate occupancy plots are consistent with other results, as requested by Chris Hearty

Geometric Consistency Checks



- Left hand plot: code was improved, now displays tracks caused by primaries, with secondary tracks attributed to their mother primaries
- New scheme simulations still match well with first-order geometric approximations in unshielded case

Geometric Consistency Checks

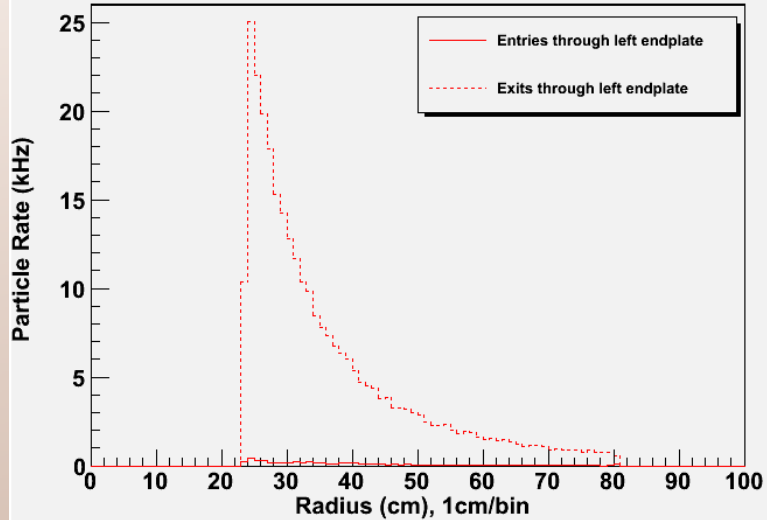


- Right-hand plot: geometrical prediction doesn't diverge for inner layers because angular optimization scheme shows that low-angle Bhabha scattering has minimal effect on results in shielded case
 - Thus for shielded case, scattering angles are restricted to 16° w.r.t. Incoming direction. Geometrical prediction uses MC generator angles to perform necessary calculations.

Dch Entry/Exit Tracking Code

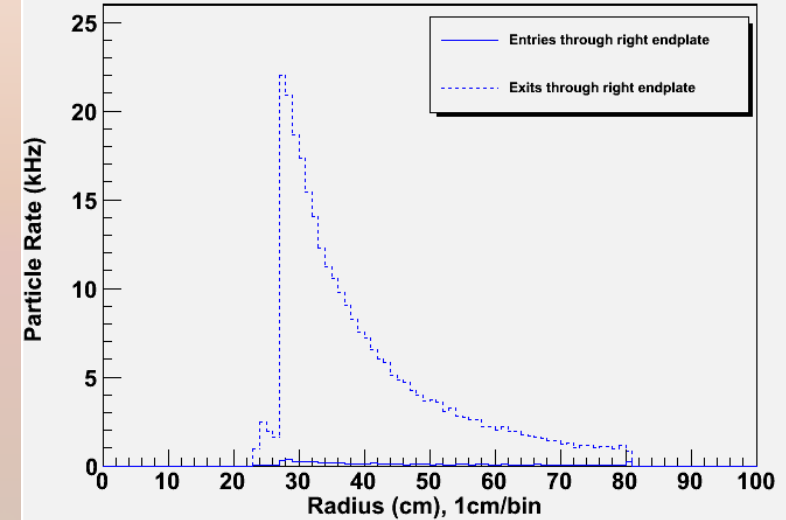
Rate of Particles Entering and Exiting Left Dch Endplate vs. Radius

(Baseline Configuration, Unshielded)



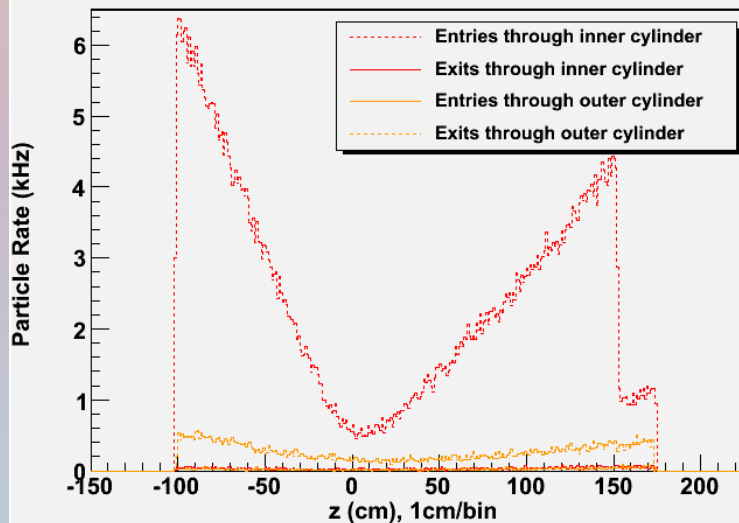
Rate of Particles Entering and Exiting Right Dch Endplate vs. Radius

(Baseline Configuration, Unshielded)



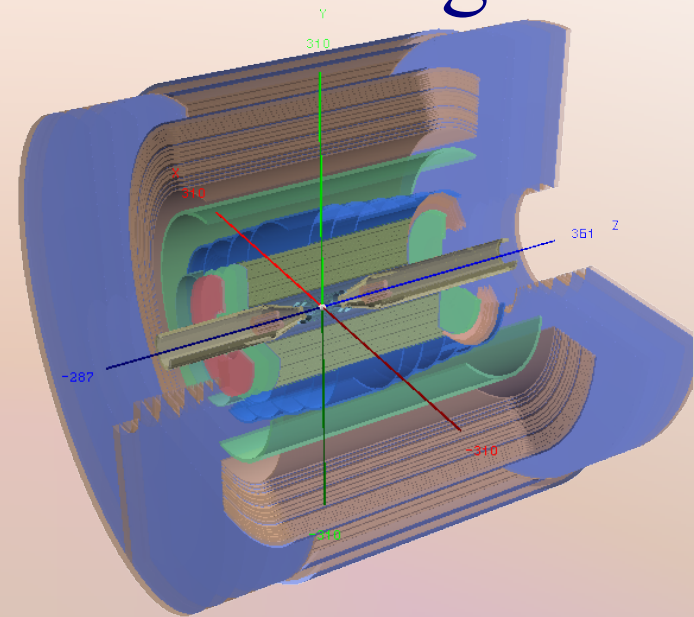
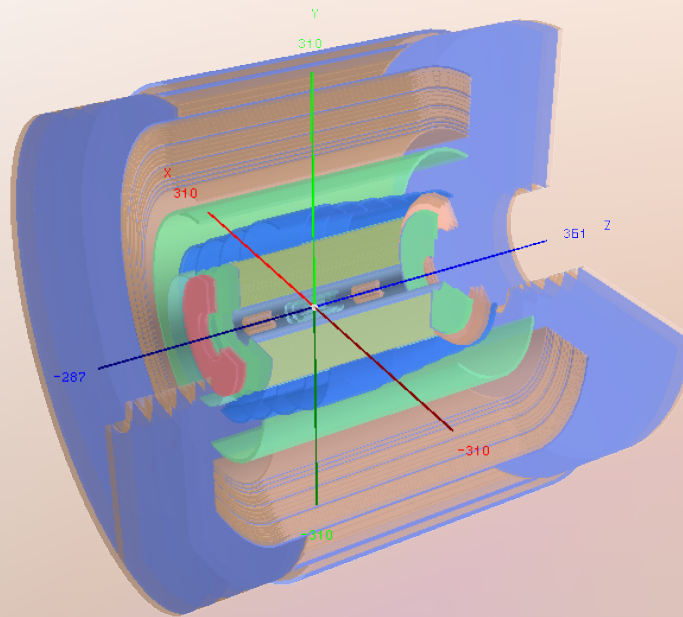
Rate of Particles Entering and Exiting Dch Support Cylinders vs. z

(Baseline Configuration, Unshielded)

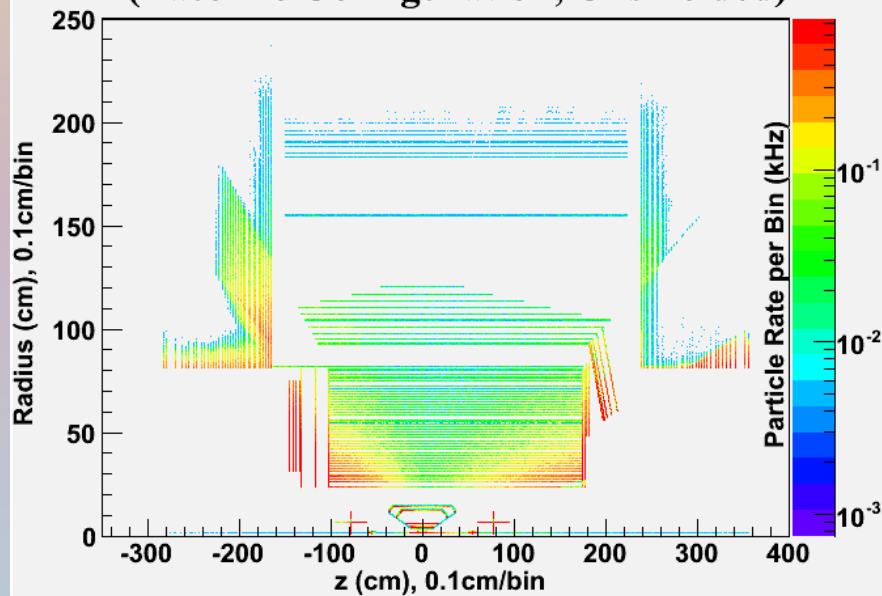


- Fix for wedding cake inner cylinder pending
- Integrated rates for baseline:
 - Inner cylinder entries = 683.3kHz
 - Outer cylinder exits = 74.1kHz
 - Left endplate exits = 294.8kHz
 - Right endplate exits = 294.4kHz

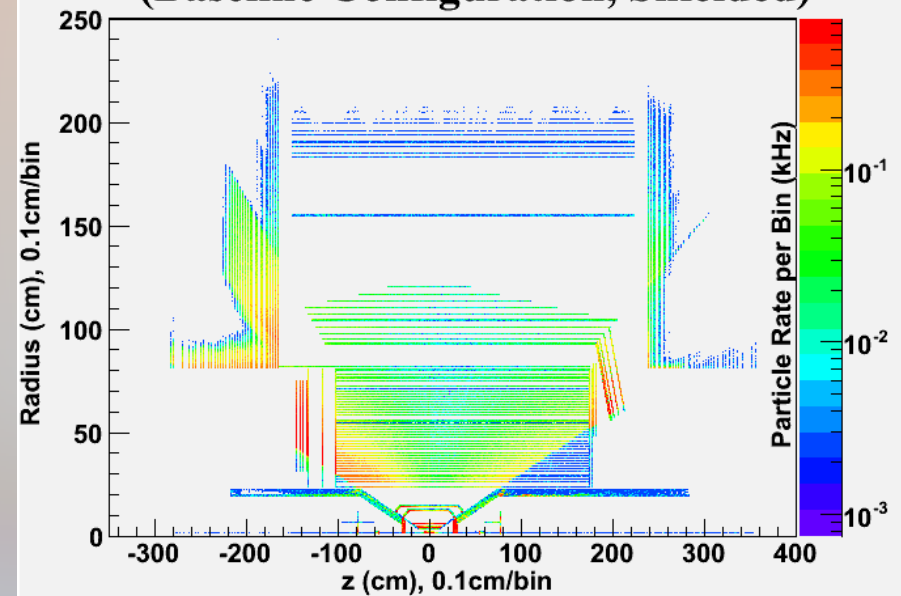
The New Beam Shield (Baseline Configuration)



**SimHits in the Radial-z Plane
(Baseline Configuration, Unshielded)**

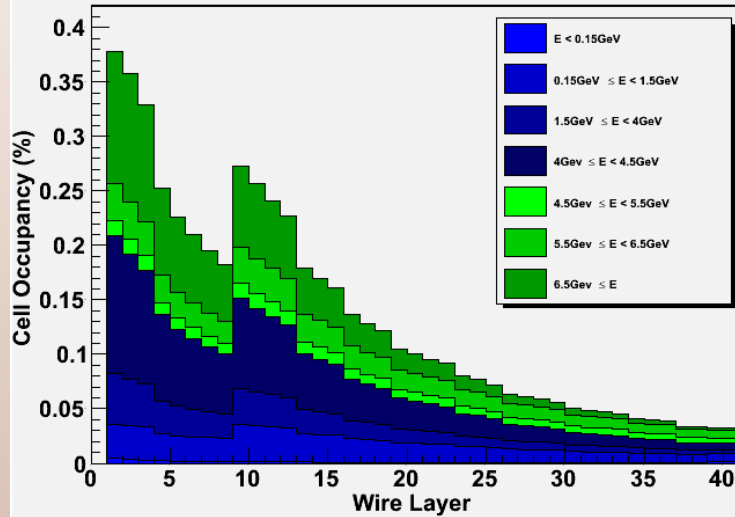


**SimHits in the Radial-z Plane
(Baseline Configuration, Shielded)**

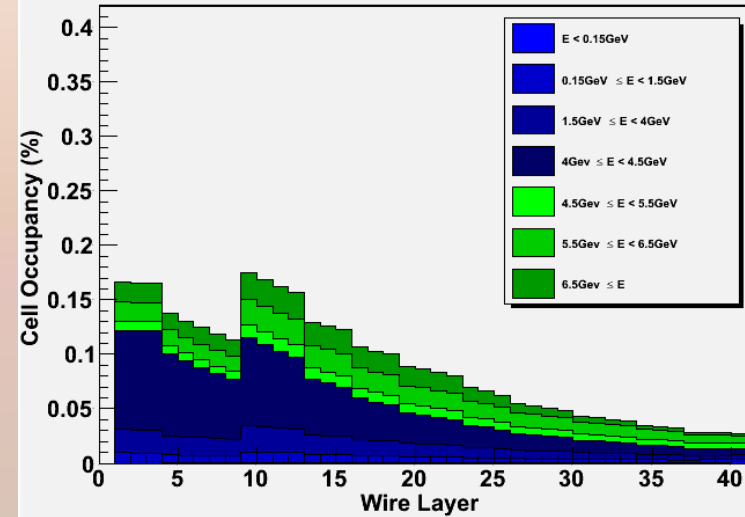


The New Beam Shield (Baseline Configuration)

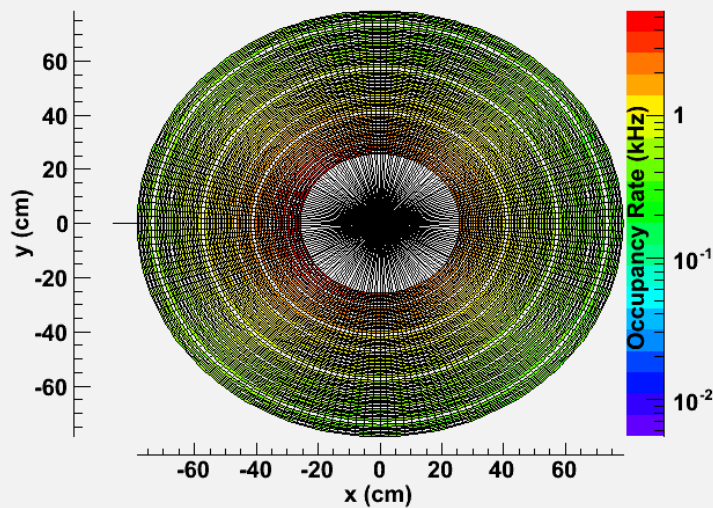
Cell Occupancy Percentage per Dch Wire Layer
(Baseline Configuration, Unshielded)



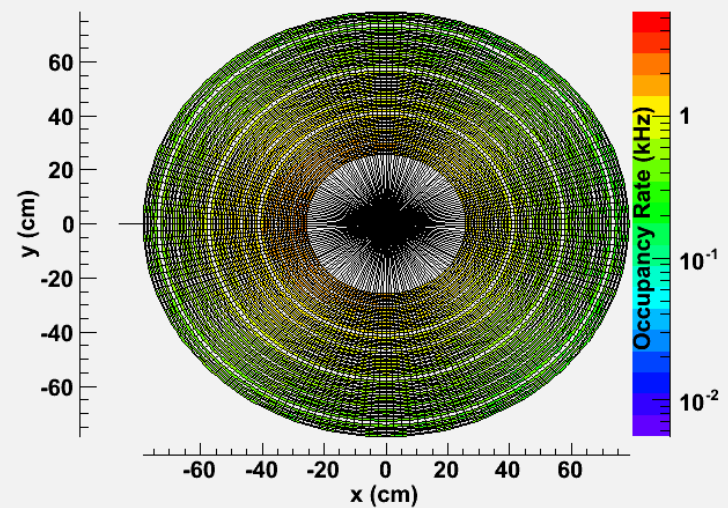
Cell Occupancy Percentage per Dch Wire Layer
(Baseline Configuration, Shielded)



Occupancy Rates in Cylindrical Polar Coordinates
(Baseline Configuration, Unshielded)



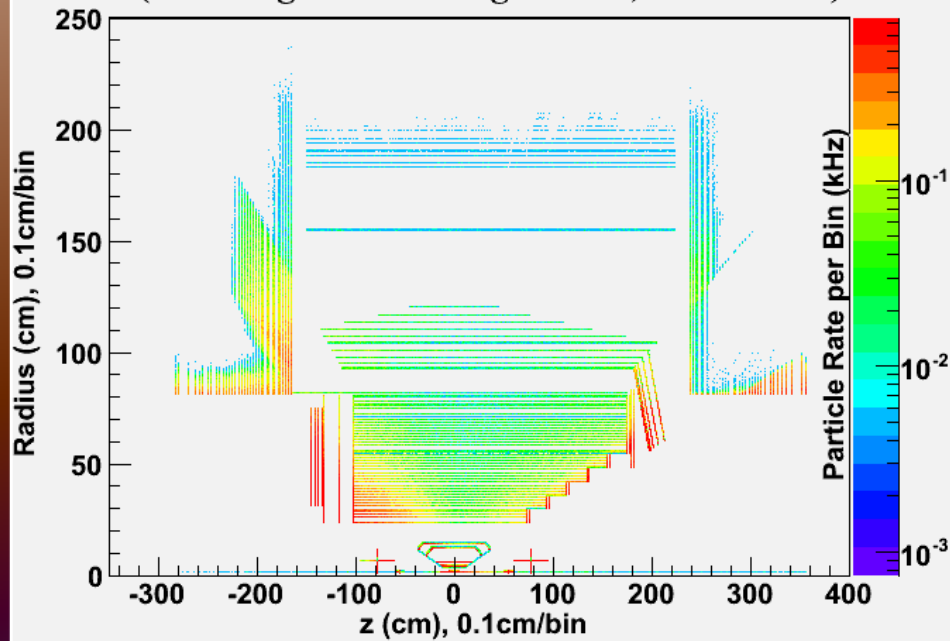
Occupancy Rates in Cylindrical Polar Coordinates
(Baseline Configuration, Shielded)



Further Results (Wedding Cake Configuration)

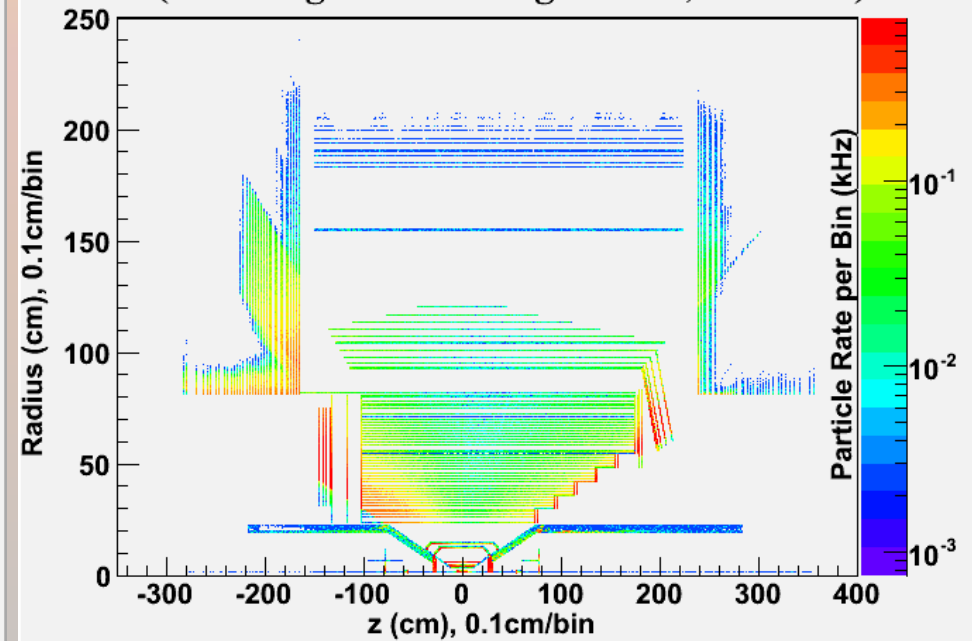
SimHits in the Radial-z Plane

(Wedding Cake Configuration, Unshielded)



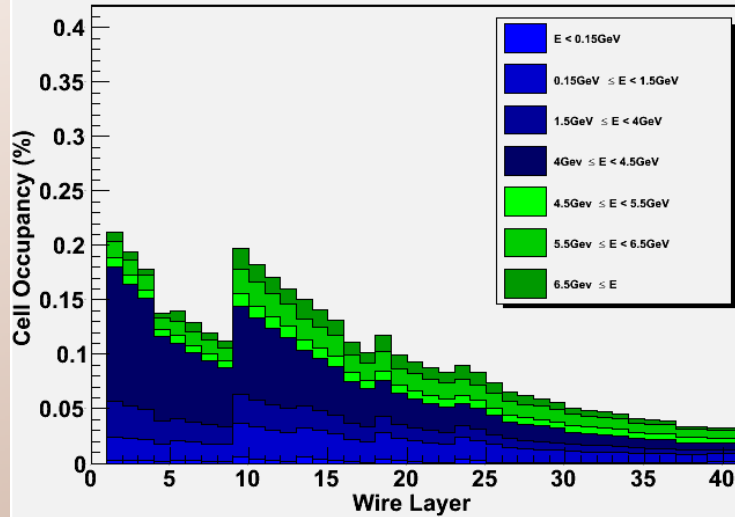
SimHits in the Radial-z Plane

(Wedding Cake Configuration, Shielded)

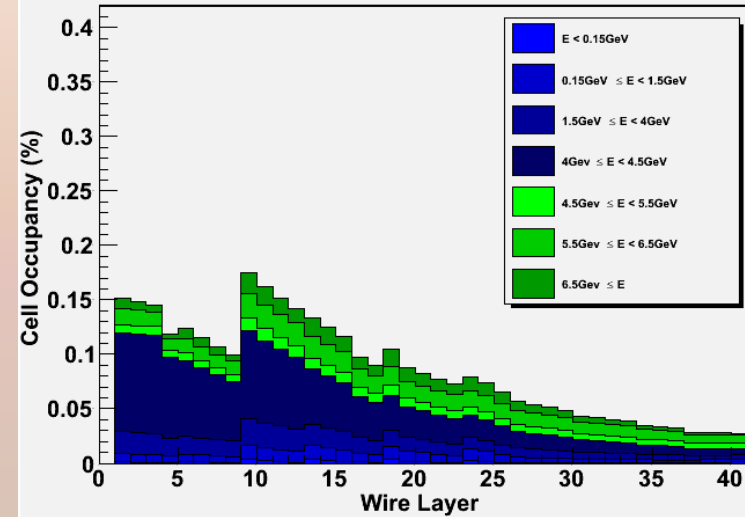


Further Results (Wedding Cake Configuration)

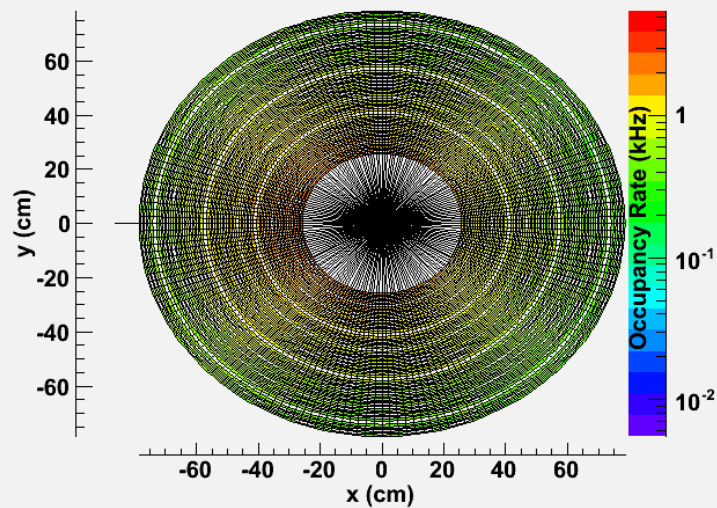
Cell Occupancy Percentage per Dch Wire Layer
(Wedding Cake Configuration, Unshielded)



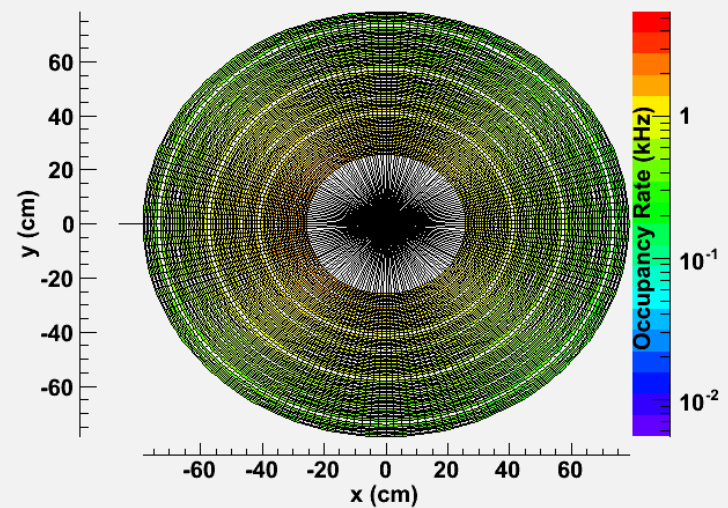
Cell Occupancy Percentage per Dch Wire Layer
(Wedding Cake Configuration, Shielded)



Occupancy Rates in Cylindrical Polar Coordinates
(Wedding Cake Configuration, Unshielded)

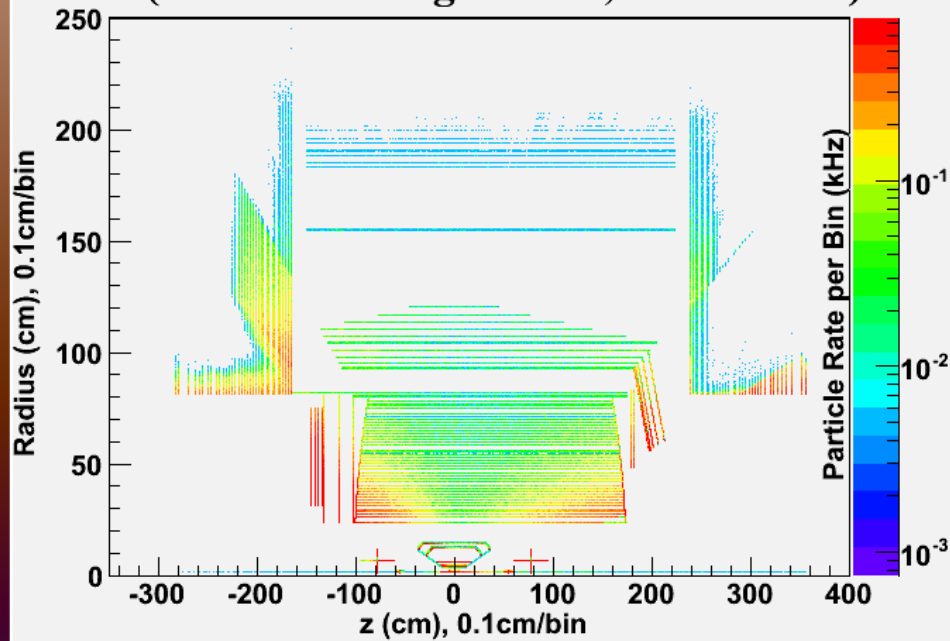


Occupancy Rates in Cylindrical Polar Coordinates
(Wedding Cake Configuration, Shielded)

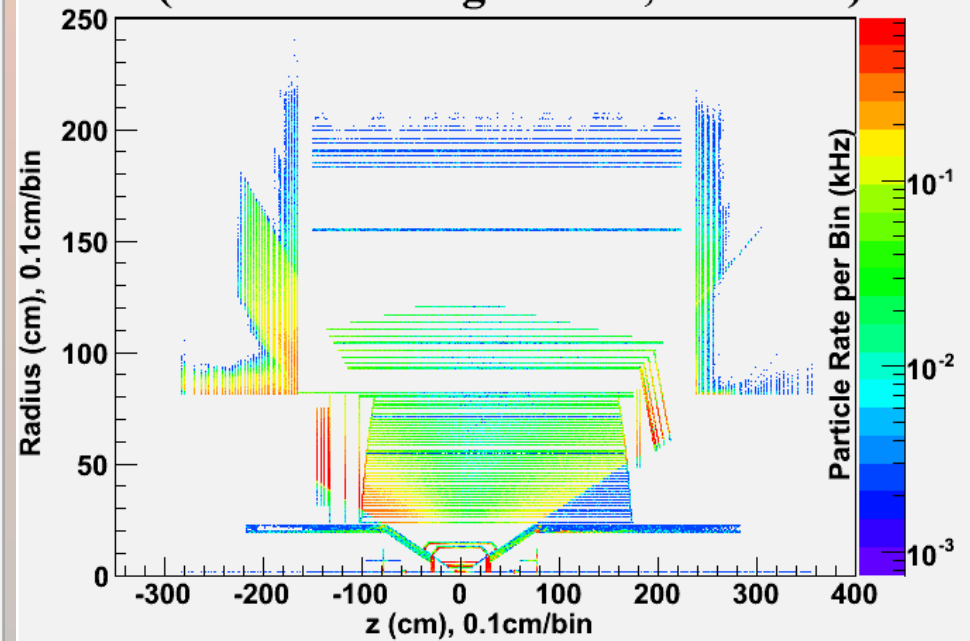


Further Results (Convex Configuration)

**SimHits in the Radial-z Plane
(Convex Configuration, Unshielded)**

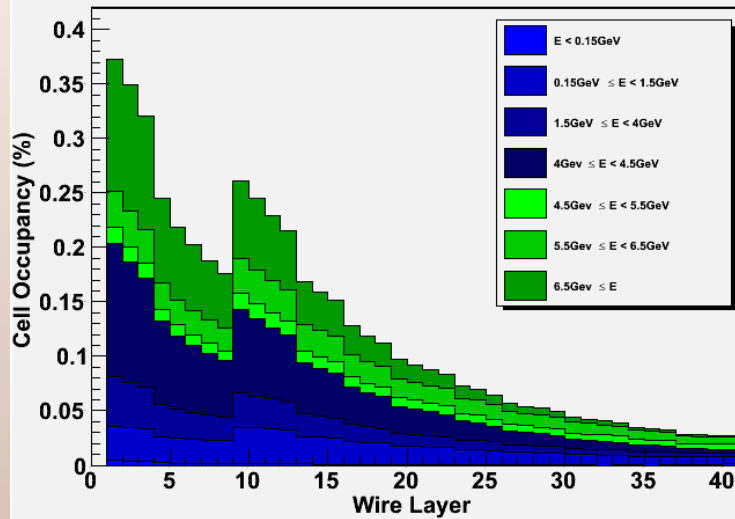


**SimHits in the Radial-z Plane
(Convex Configuration, Shielded)**

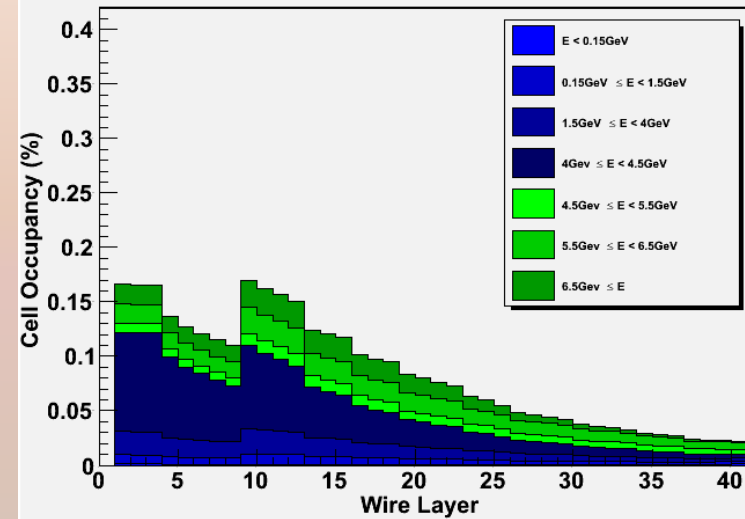


Further Results (Convex Configuration)

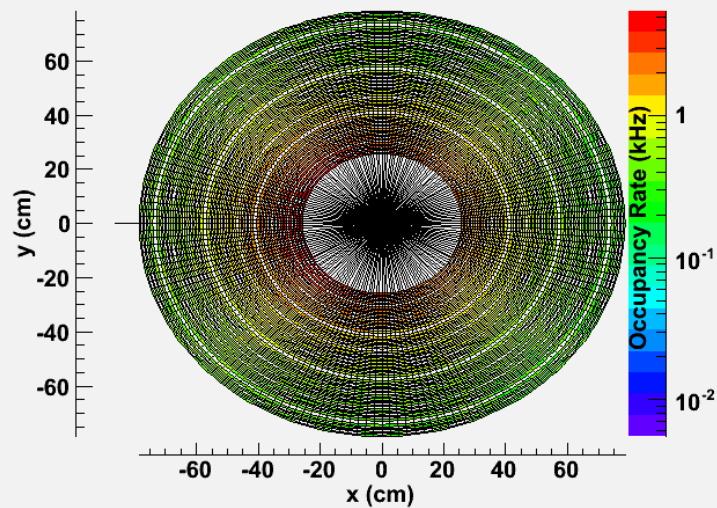
Cell Occupancy Percentage per Dch Wire Layer
(Convex Configuration, Unshielded)



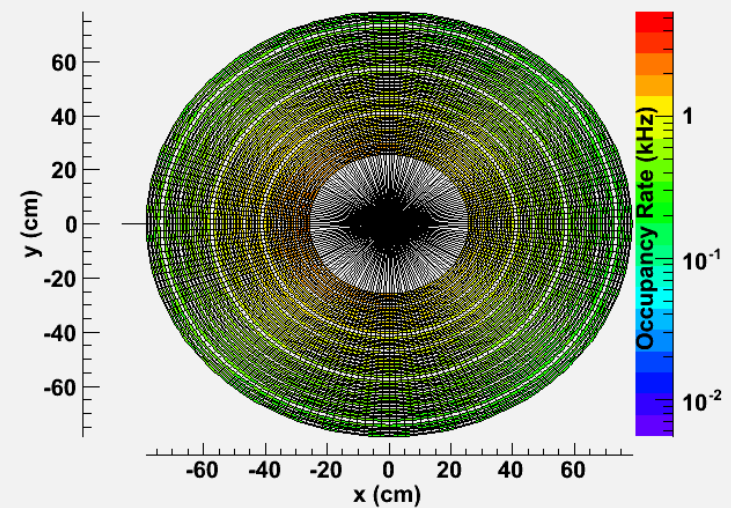
Cell Occupancy Percentage per Dch Wire Layer
(Convex Configuration, Shielded)



Occupancy Rates in Cylindrical Polar Coordinates
(Convex Configuration, Unshielded)

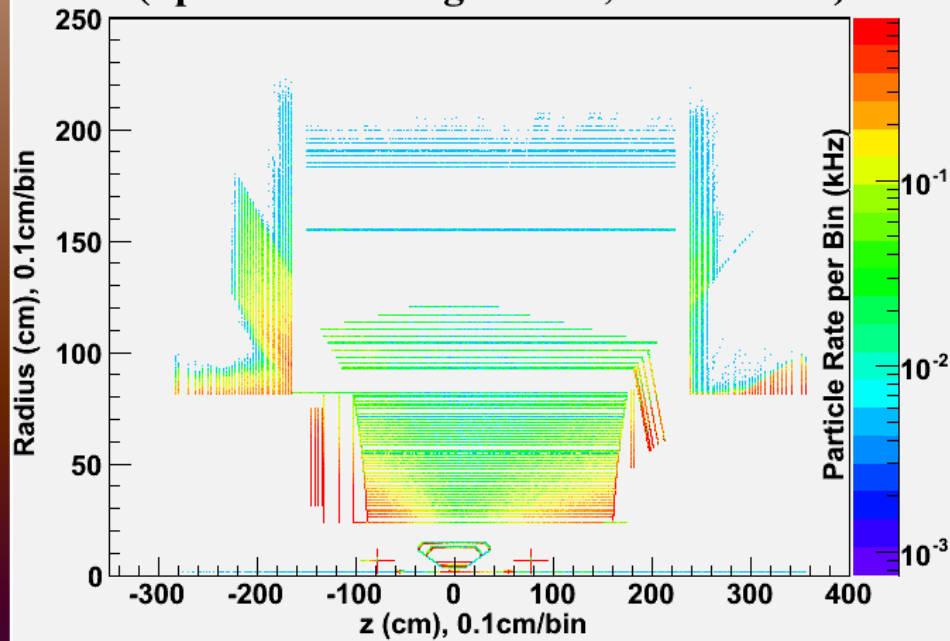


Occupancy Rates in Cylindrical Polar Coordinates
(Convex Configuration, Shielded)

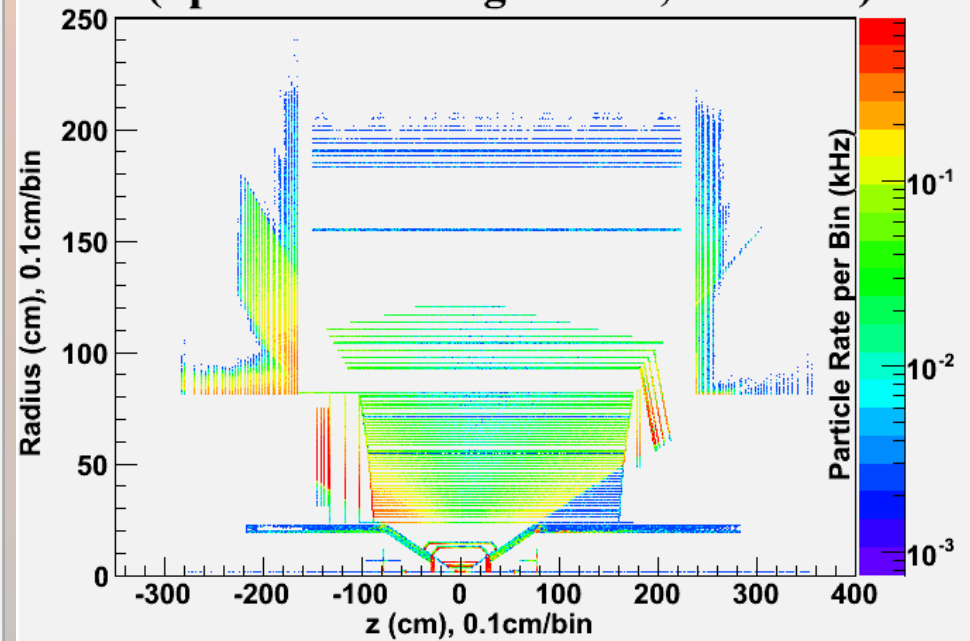


Further Results (Spherical Configuration)

**SimHits in the Radial-z Plane
(Spherical Configuration, Unshielded)**

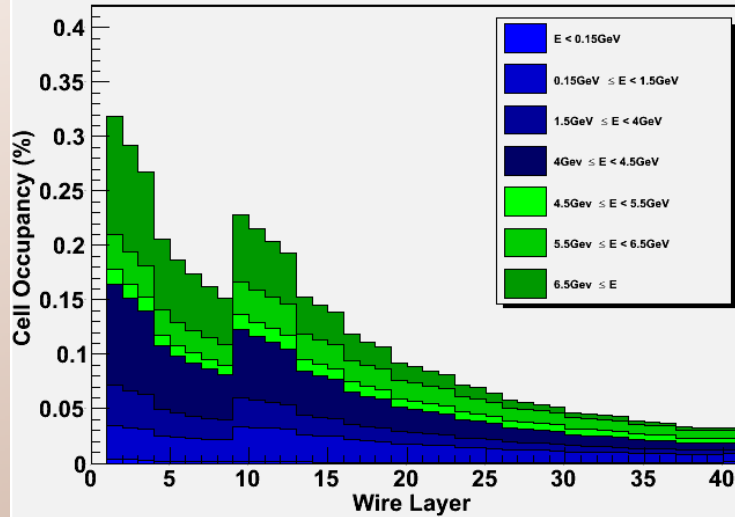


**SimHits in the Radial-z Plane
(Spherical Configuration, Shielded)**

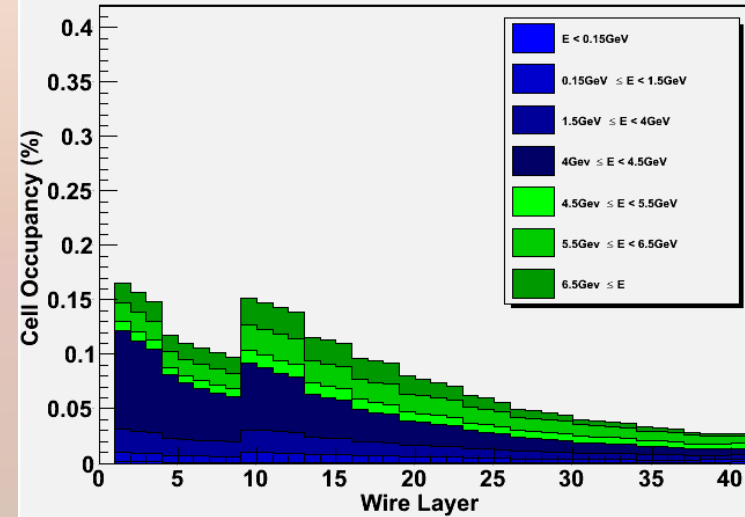


Further Results (Spherical Configuration)

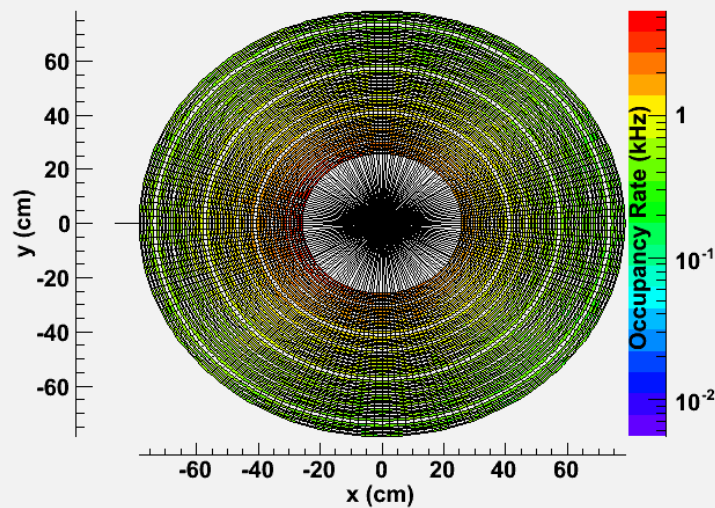
Cell Occupancy Percentage per Dch Wire Layer
(Spherical Configuration, Unshielded)



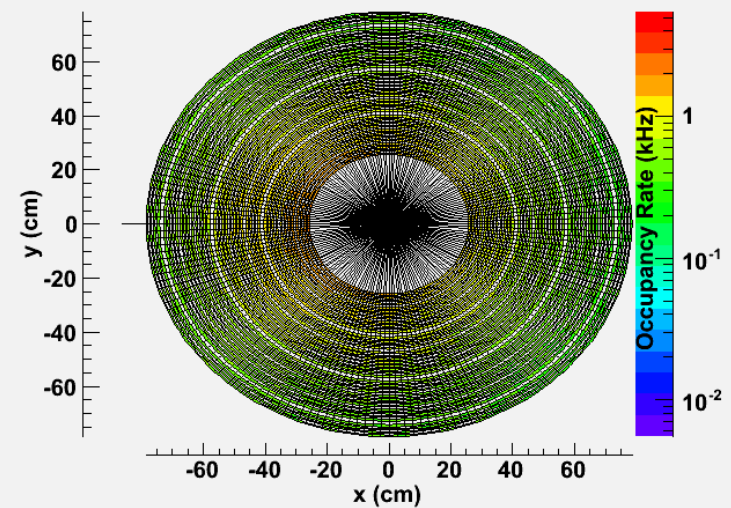
Cell Occupancy Percentage per Dch Wire Layer
(Spherical Configuration, Shielded)



Occupancy Rates in Cylindrical Polar Coordinates
(Spherical Configuration, Unshielded)



Occupancy Rates in Cylindrical Polar Coordinates
(Spherical Configuration, Shielded)



Conclusions

- New beam shield model appears to be working well, but more testing still required
- Systematics checks for angular cuts and MC generator cross-checks are still in progress – some discrepancies with expected results when generator angles are allowed to approach the beamline
- More results will be available soon at http://www.physics.mcgill.ca/~swerskyd/swersky_BAD_2.pdf
(Current document is slightly outdated)