



Drift Chamber Occupancy Studies Using Bhwide Bhabha Monte Carlo Generator: September 27, 2010



McGill

Darren Swersky,
McGill University

Major Changes to FastSim (V0.2.5):

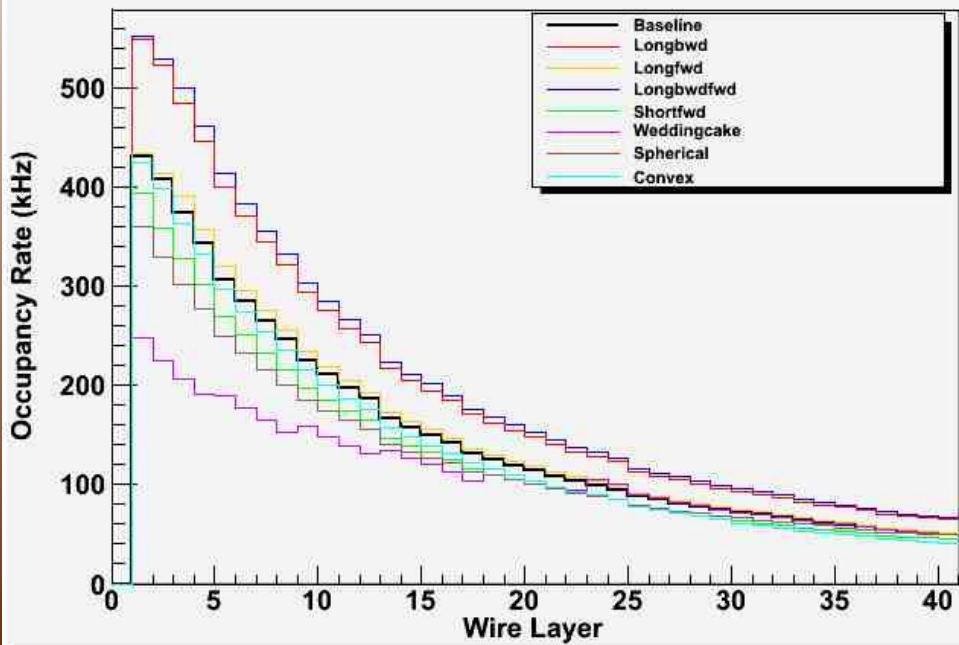
- New voxel system for track navigation (many bugs fixed)
- Fixes and modifications to the Dch geometries
- Added Parent Track ID info to PacQA ntuples (see `PacQA/trunk/src/PacSimTrackTest.cc`)
- Added and tested a preliminary FastSim beamshield (test results to follow below)
- Looking to improve capabilities of EDML parser to enable easier geometry creation in future

Important Notes:

- All simulations run with Bhwide Monte Carlo generator
- 30k Monte Carlo events for unshielded results (angles between 5° and 173°), 60k Monte Carlo events for shielded results (angles between 2° and 178°)
- Higher statistics now needed, especially for shielded results
- Wire radii may need to be re-evaluated to match new developments

Direct Comparisons of Results:

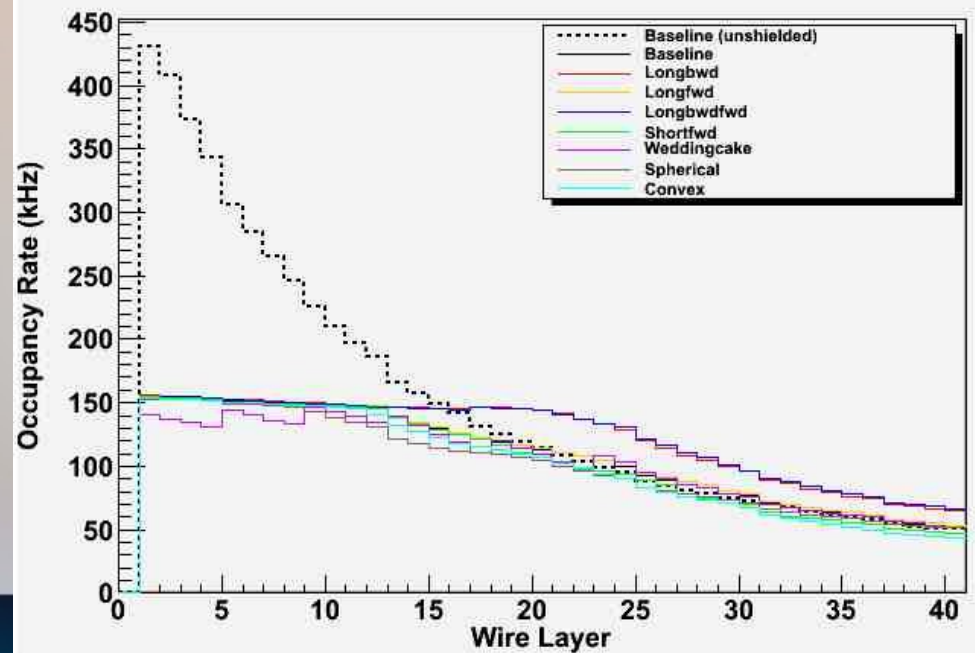
Occupancy Rate per Dch Wire Layer



Unshielded

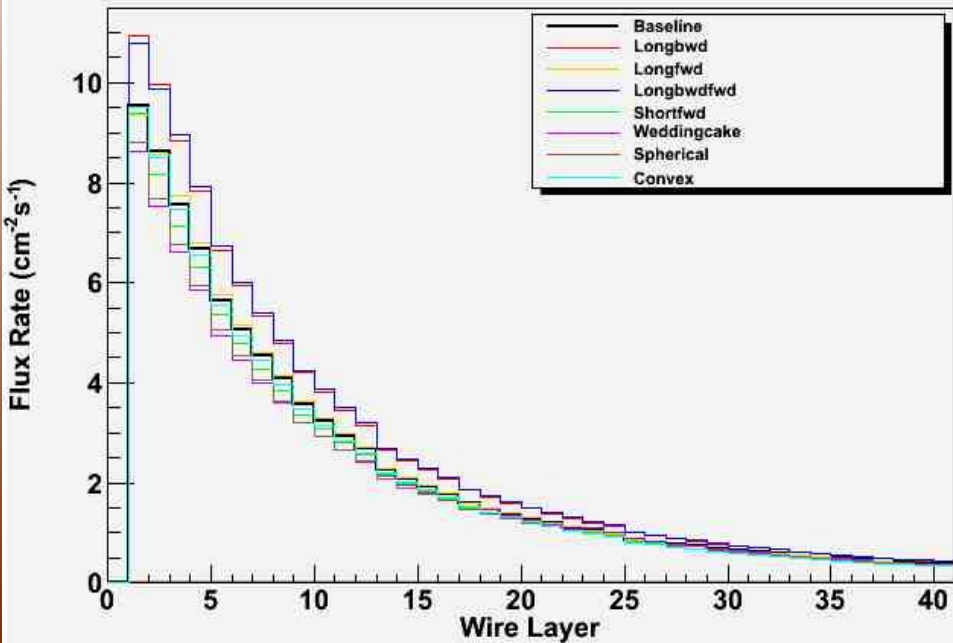
Shielded

Occupancy Rate per Dch Wire Layer



Direct Comparisons of Results:

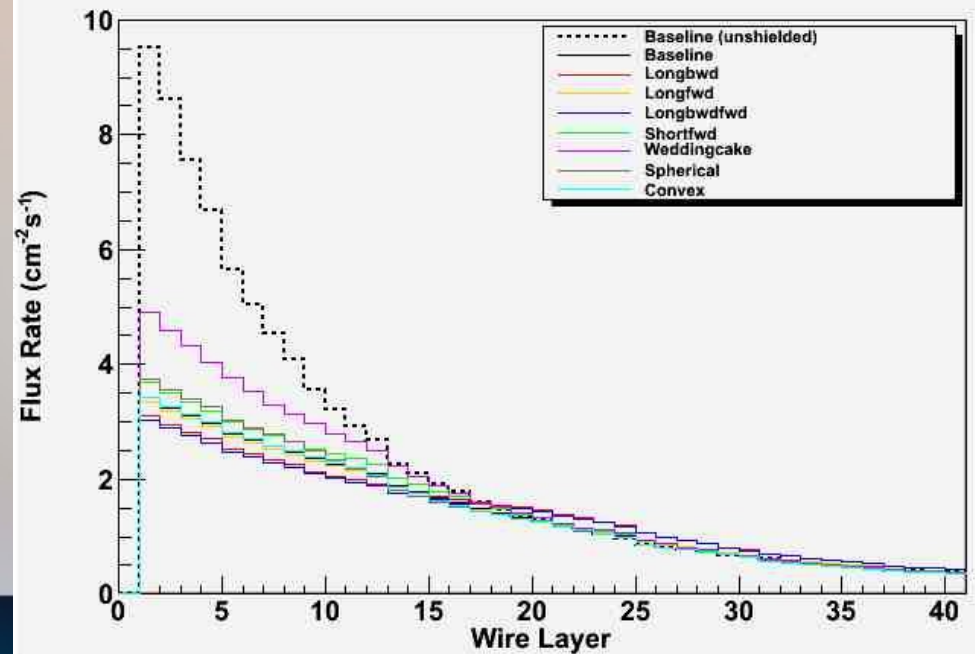
Flux Rate per Dch Wire Layer



Unshielded

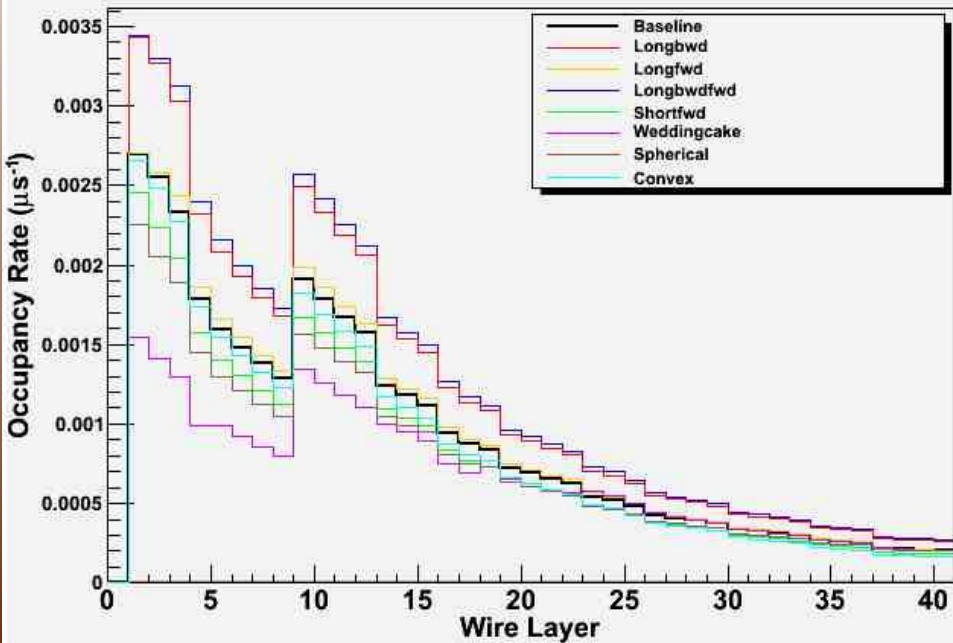
Shielded

Flux Rate per Dch Wire Layer



Direct Comparisons of Results:

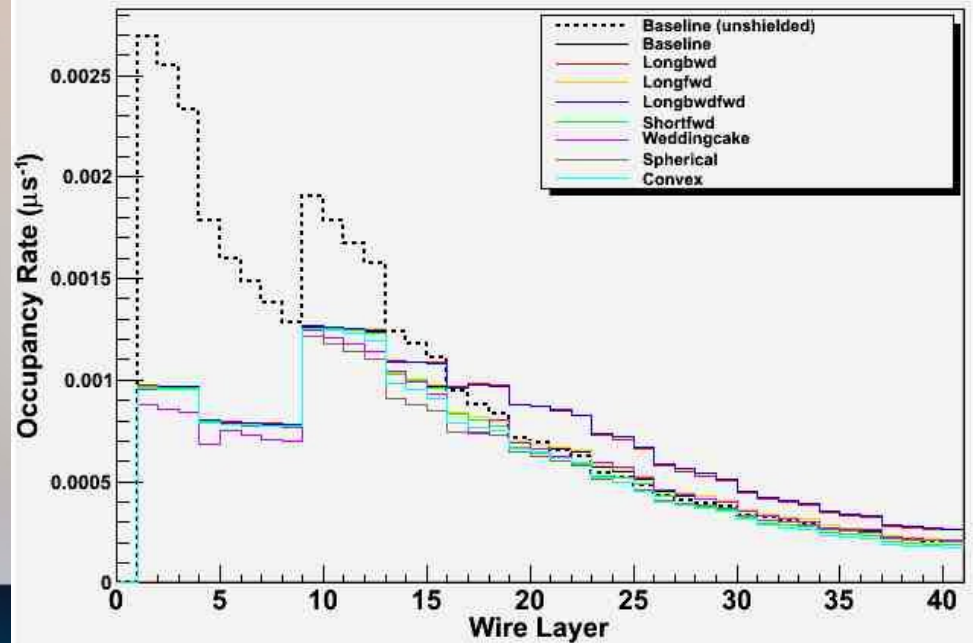
Occupancy Rate per Individual Dch Wire



Unshielded

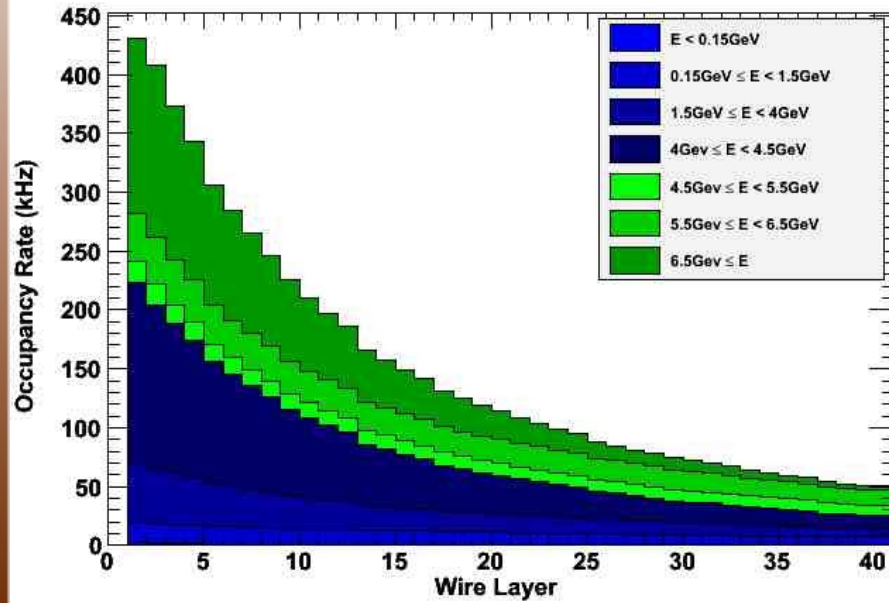
Shielded

Occupancy Rate per Individual Dch Wire

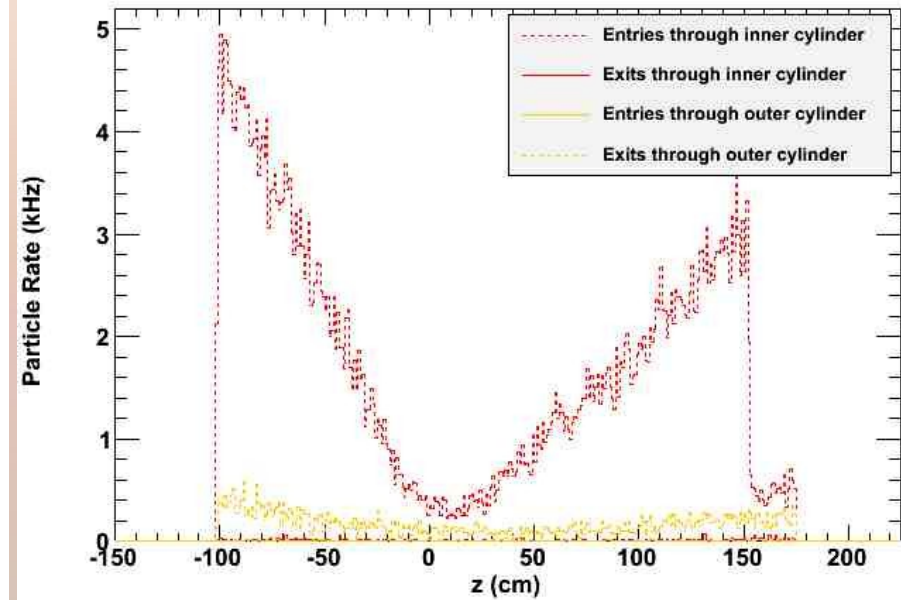


Baseline Geometry: Occupancy Rates

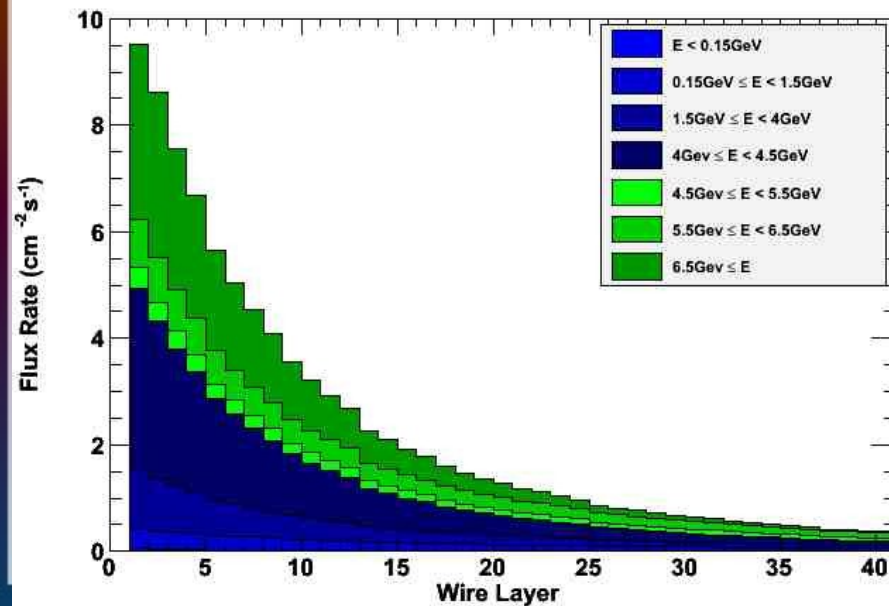
Occupancy Rate per Dch Wire Layer (baseline)



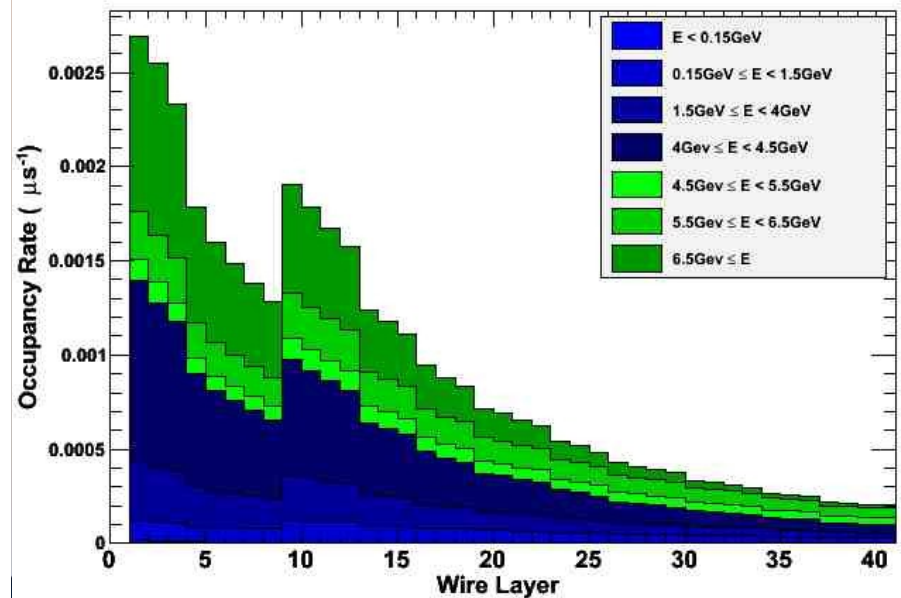
Rate of Particles Entering and Exiting Dch vs. z (baseline)



Flux Rate per Dch Wire Layer (baseline)

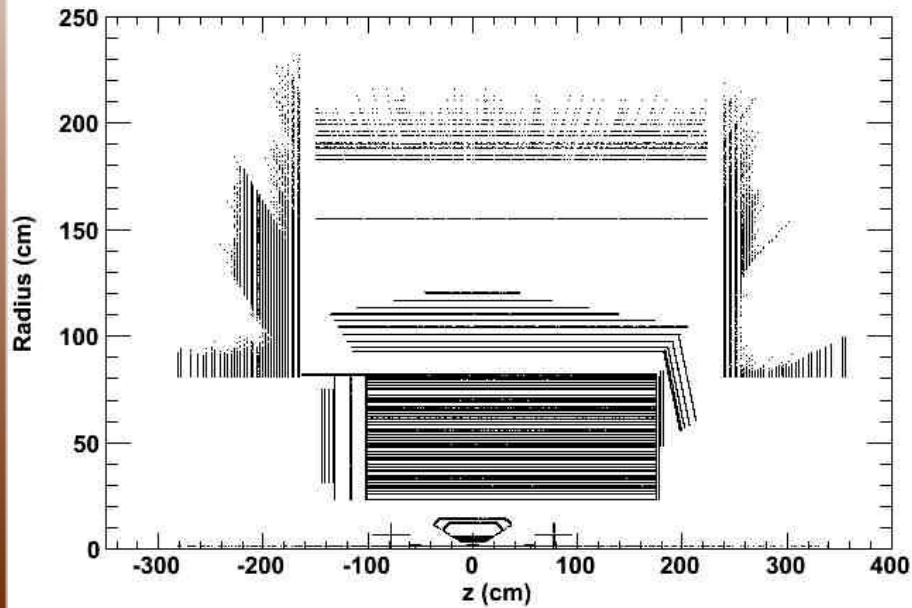


Occupancy Rate per Individual Dch Wire (baseline)

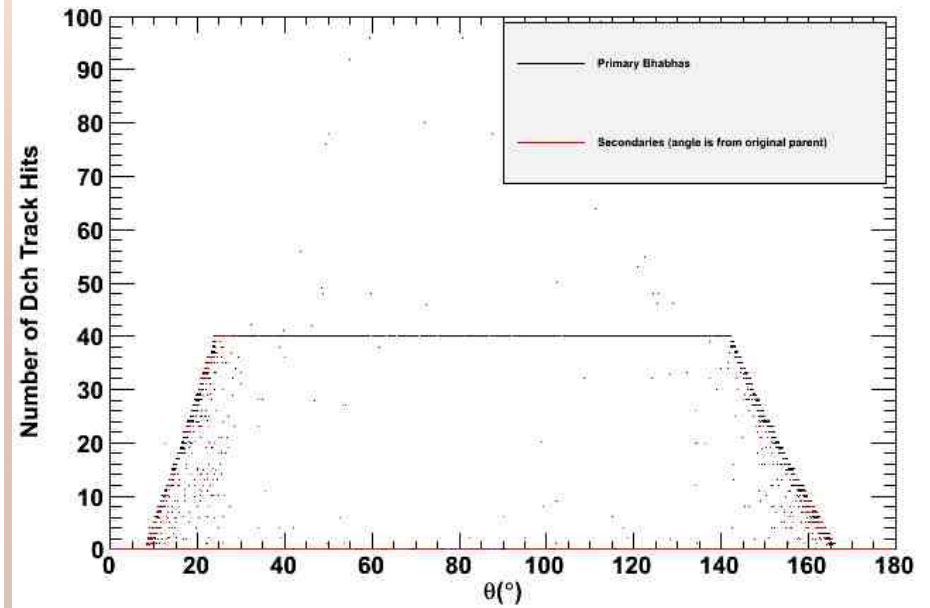


Baseline Geometry: SimHit Checks

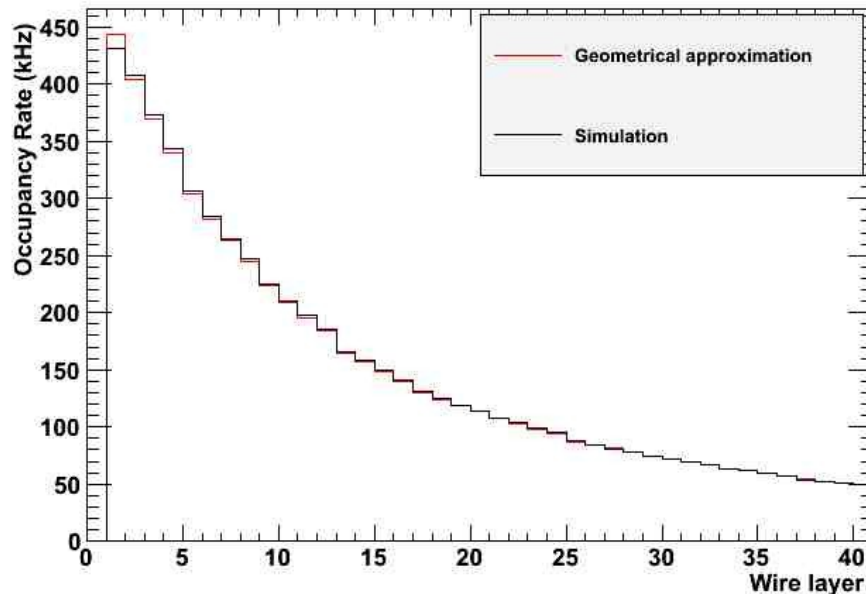
SimHits in Radial-z Plane (baseline)



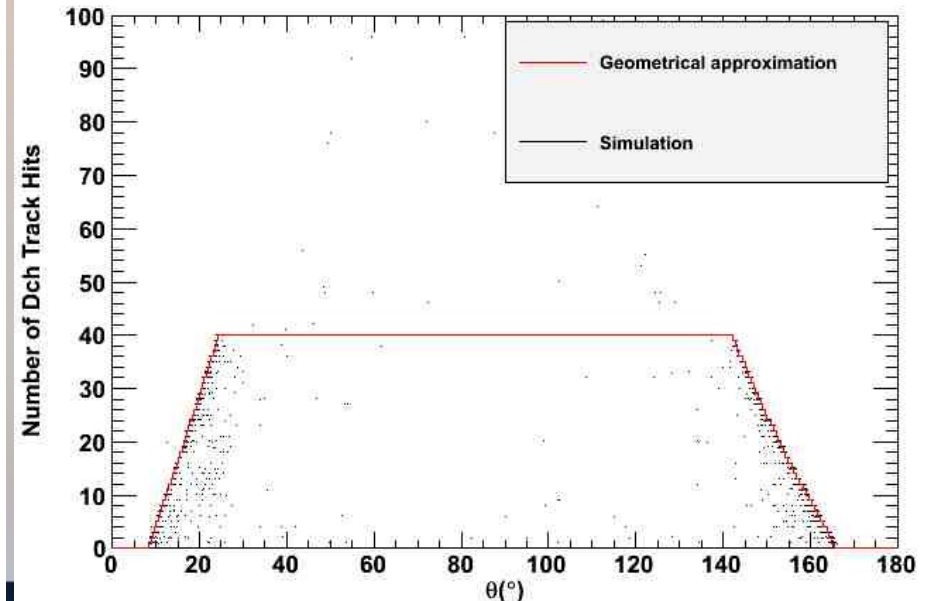
Number of Dch Track Hits vs. θ (baseline)



Predicted Occupancy Rate per Wire Layer

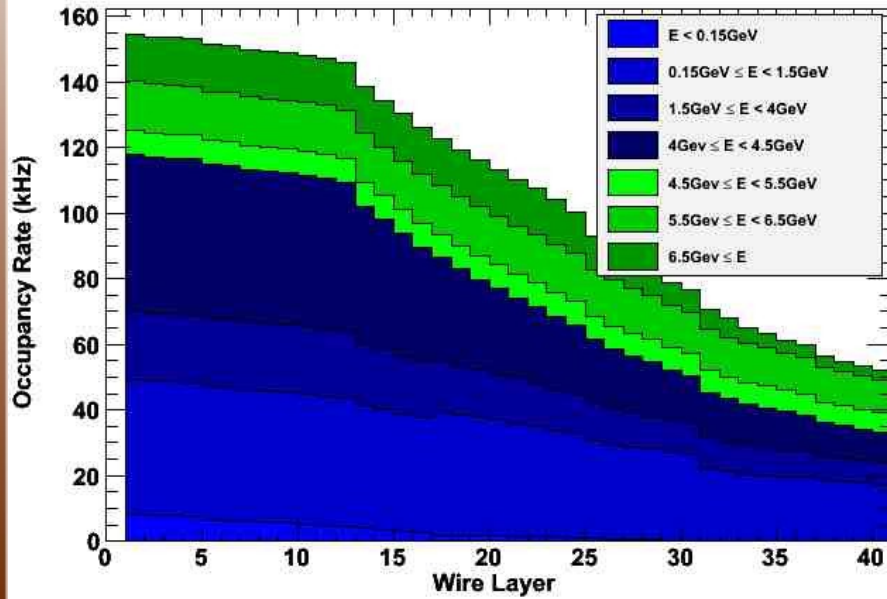


Number of Dch Track Hits vs. θ (baseline)

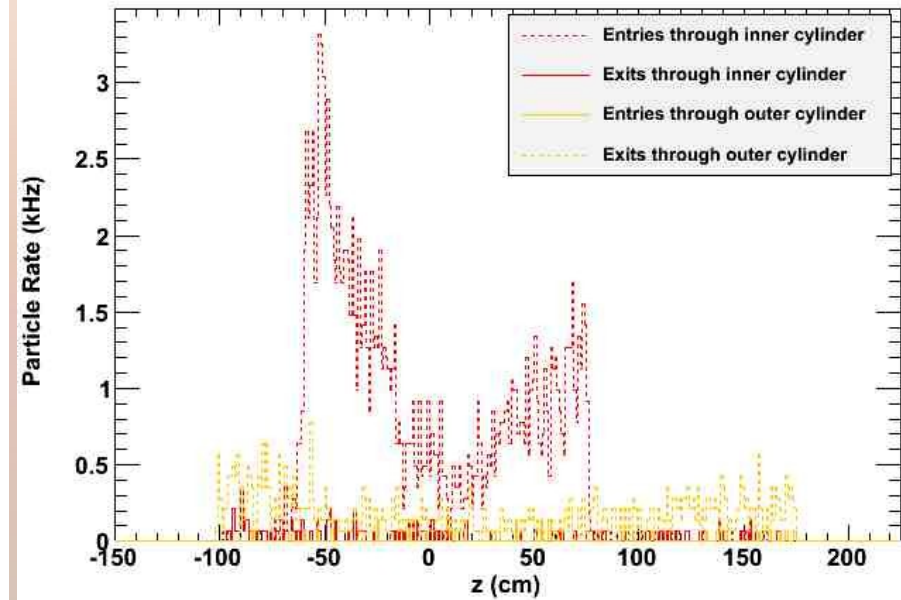


Baseline Geometry (shielded): Occupancy Rates

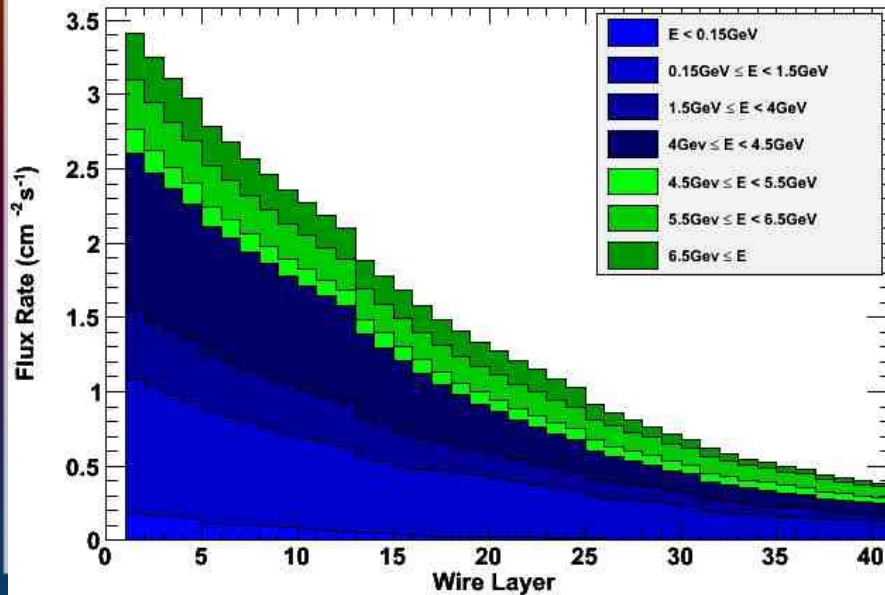
Occupancy Rate per Dch Wire Layer (baseline_shielded)



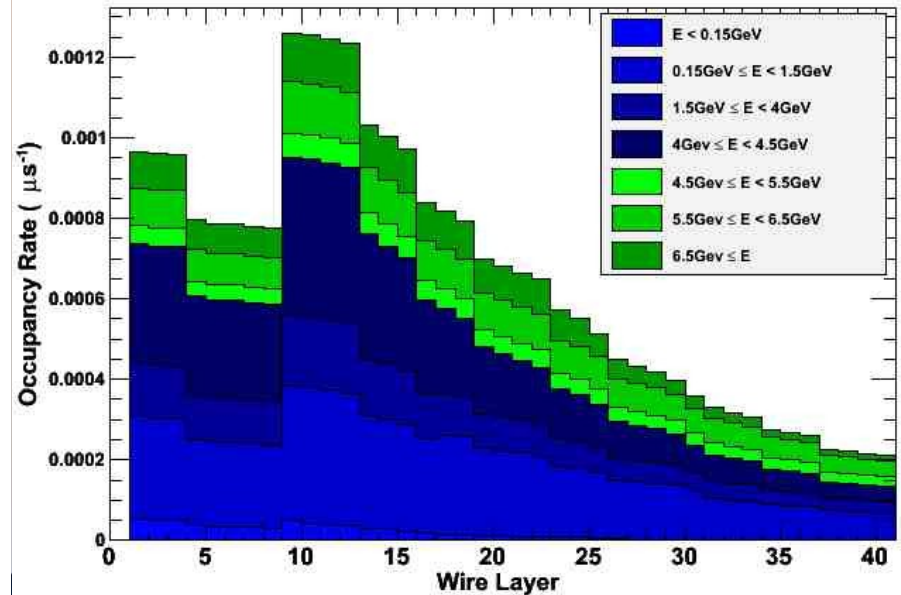
Rate of Particles Entering and Exiting Dch vs. z (baseline_shielded)



Flux Rate per Dch Wire Layer (baseline_shielded)

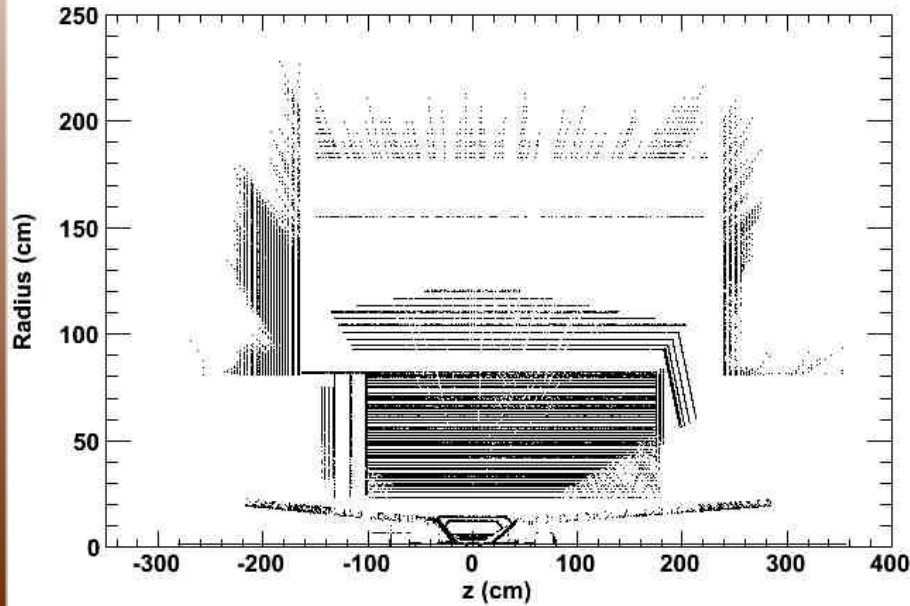


Occupancy Rate per Individual Dch Wire (baseline_shielded)

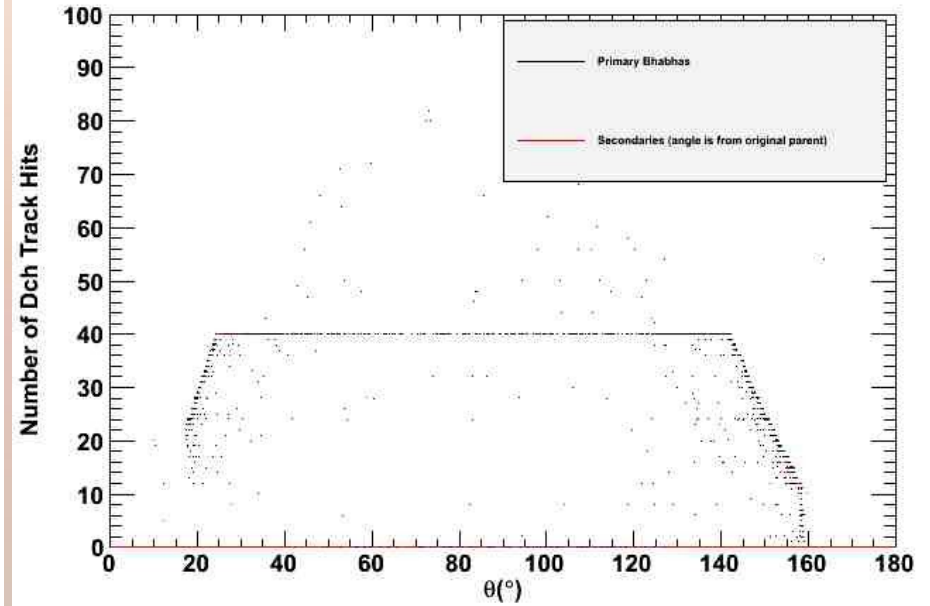


Baseline Geometry (shielded): SimHit Checks

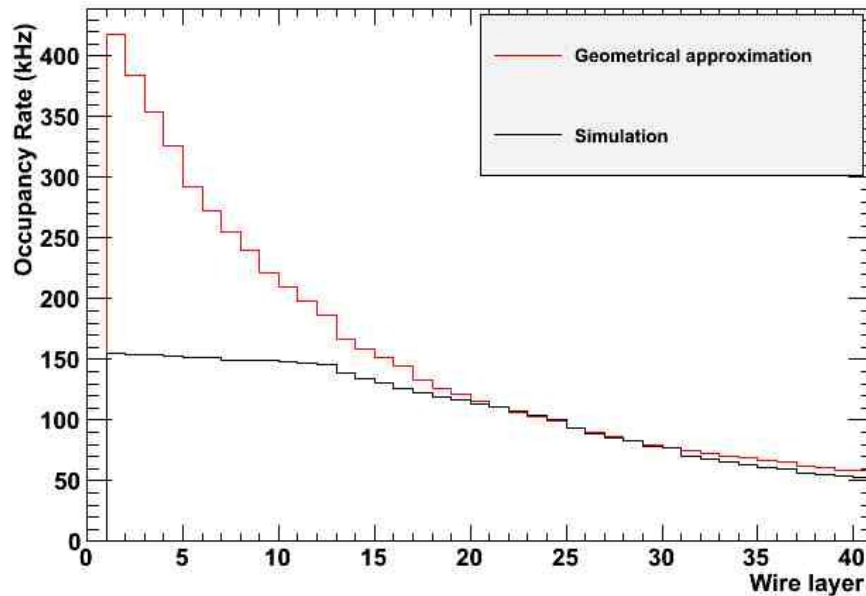
SimHits in Radial-z Plane (baseline_shielded)



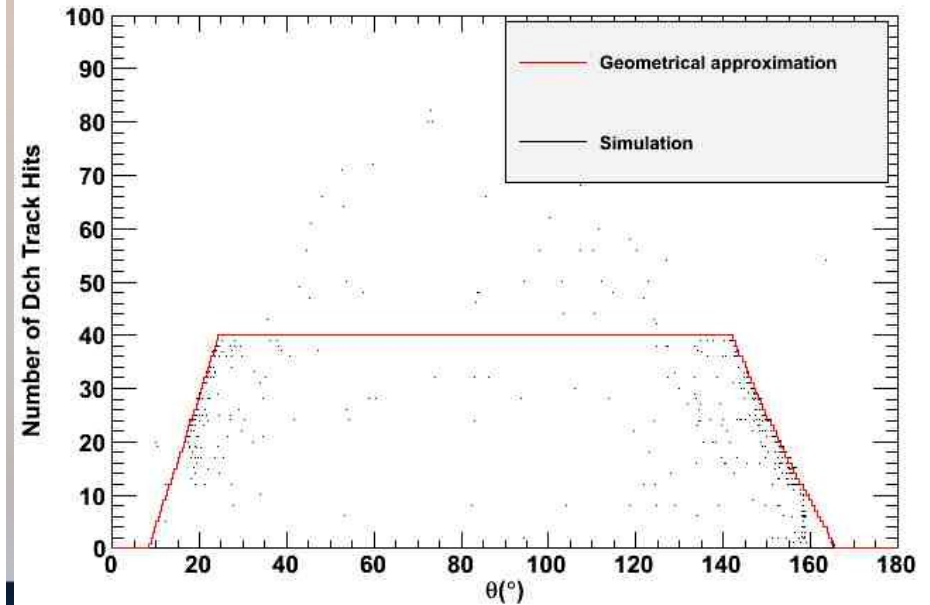
Number of Dch Track Hits vs. θ (baseline_shielded)



Predicted Occupancy Rate per Wire Layer

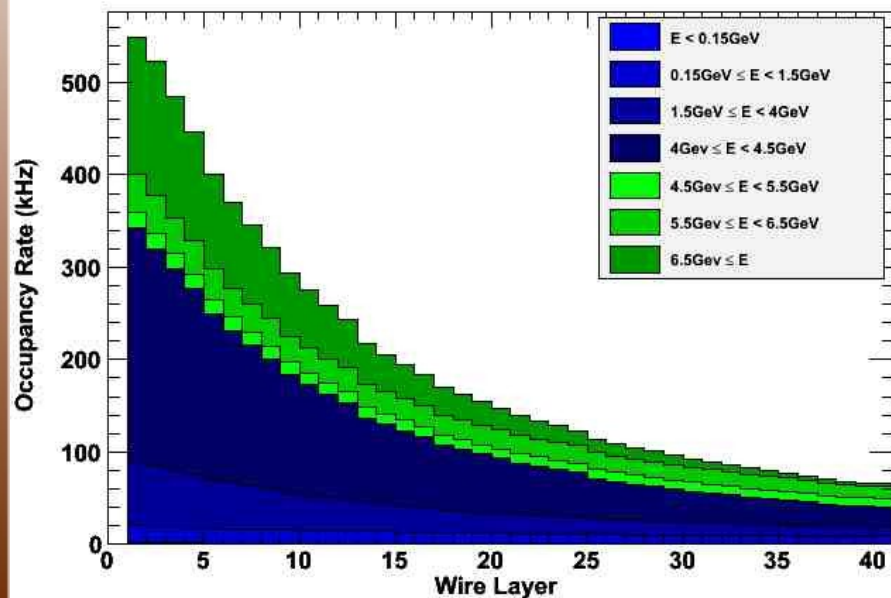


Number of Dch Track Hits vs. θ (baseline_shielded)

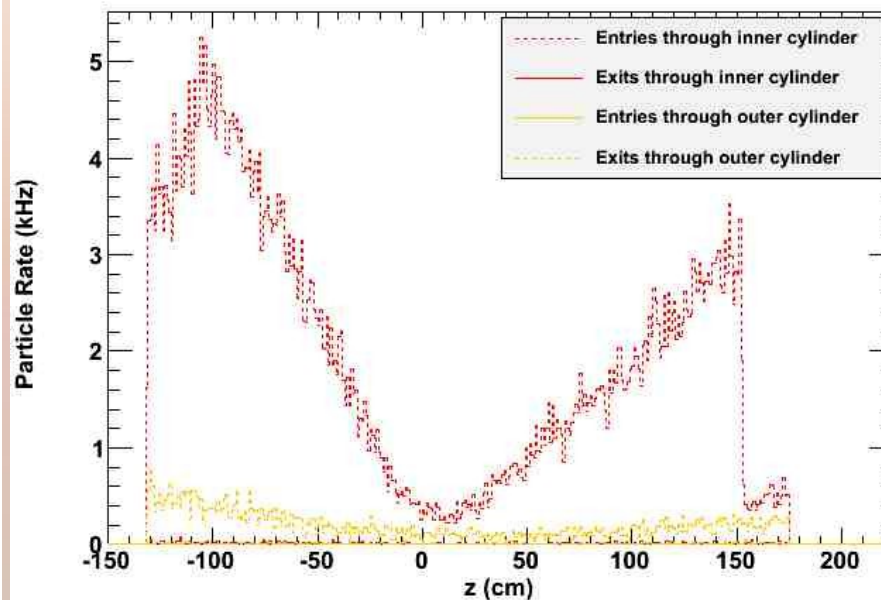


Longbwd Geometry: Occupancy Rates

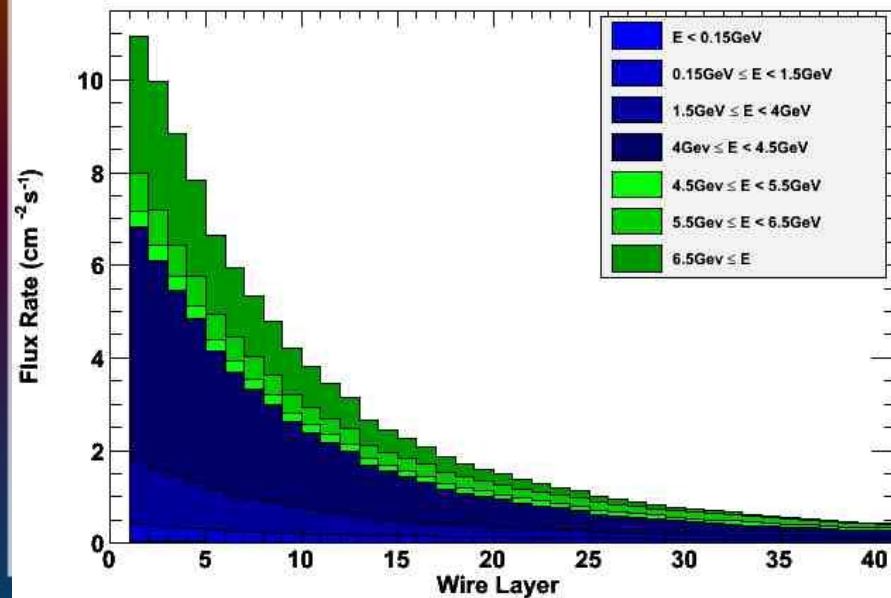
Occupancy Rate per Dch Wire Layer (longbwd)



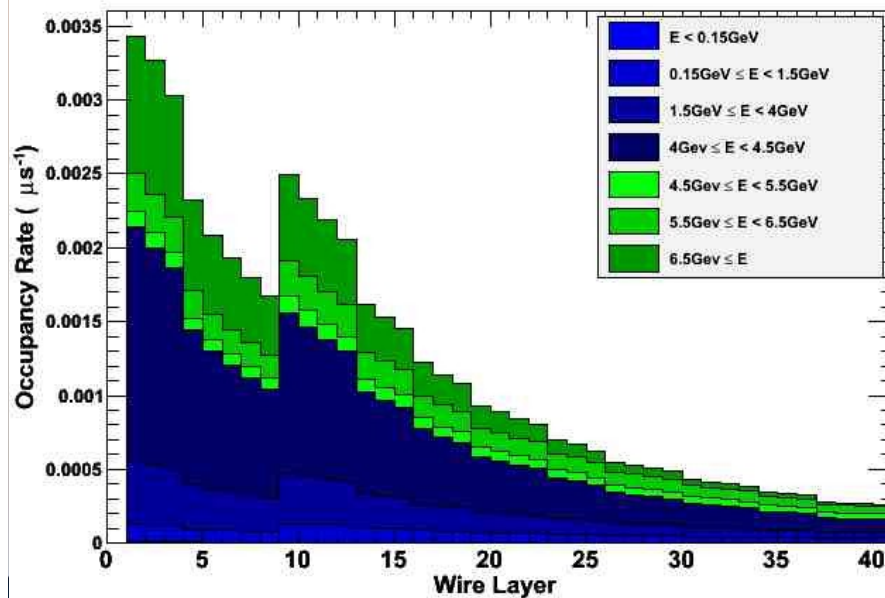
Rate of Particles Entering and Exiting Dch vs. z (longbwd)



Flux Rate per Dch Wire Layer (longbwd)

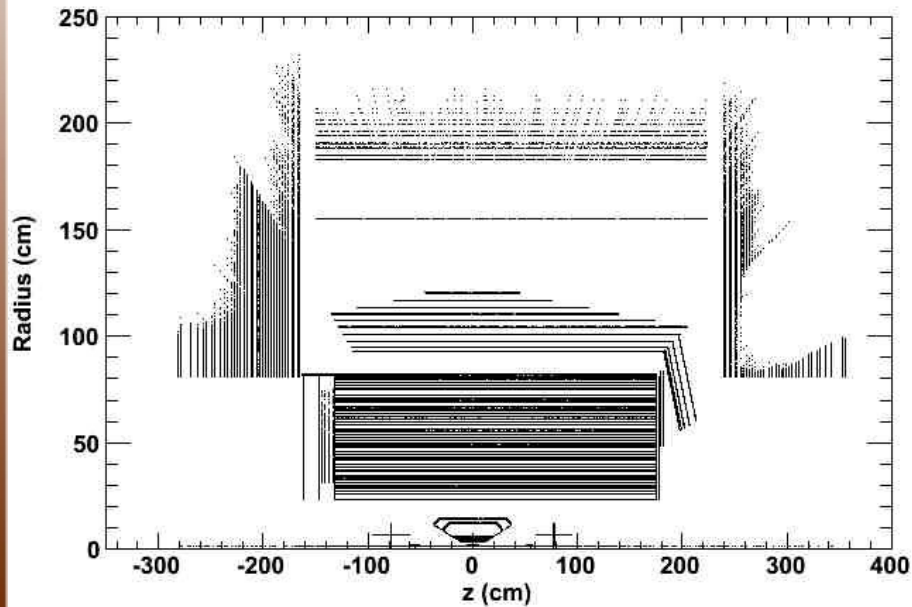


Occupancy Rate per Individual Dch Wire (longbwd)

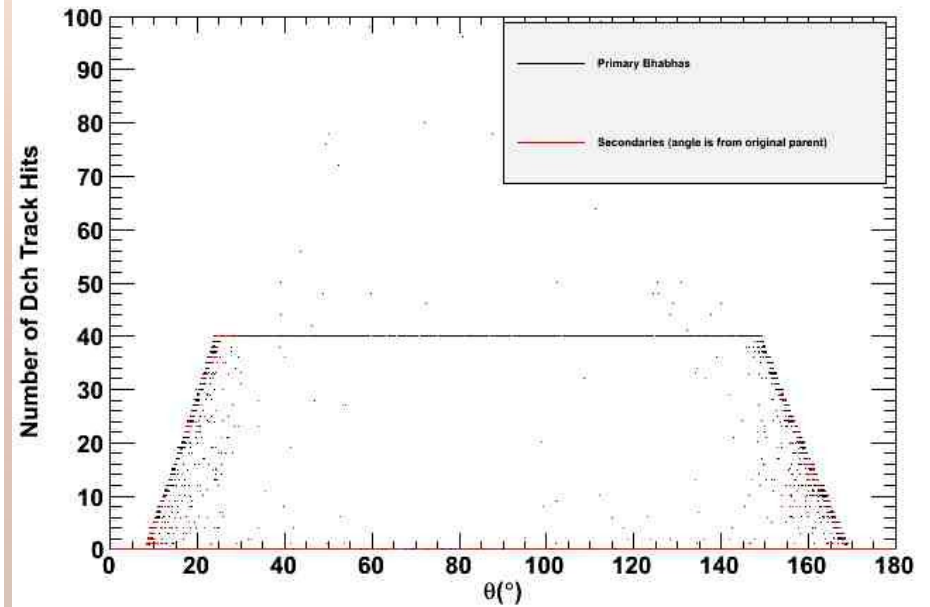


Longbwd Geometry: SimHit Checks

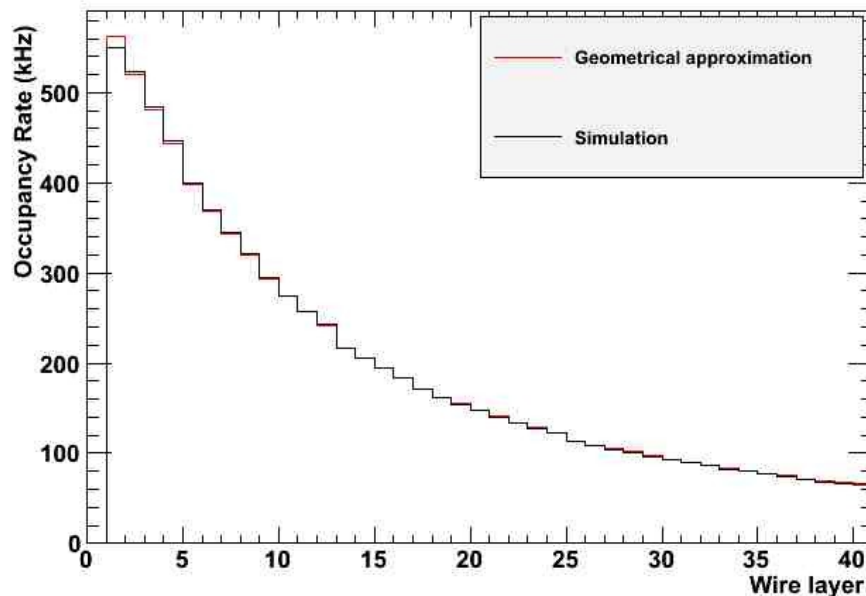
SimHits in Radial-z Plane (longbwd)



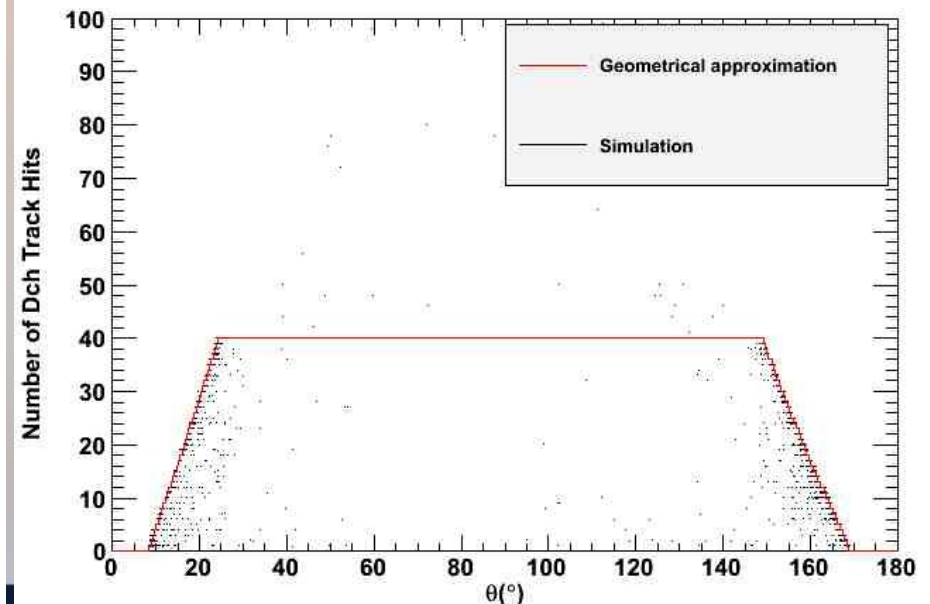
Number of Dch Track Hits vs. θ (longbwd)



Predicted Occupancy Rate per Wire Layer

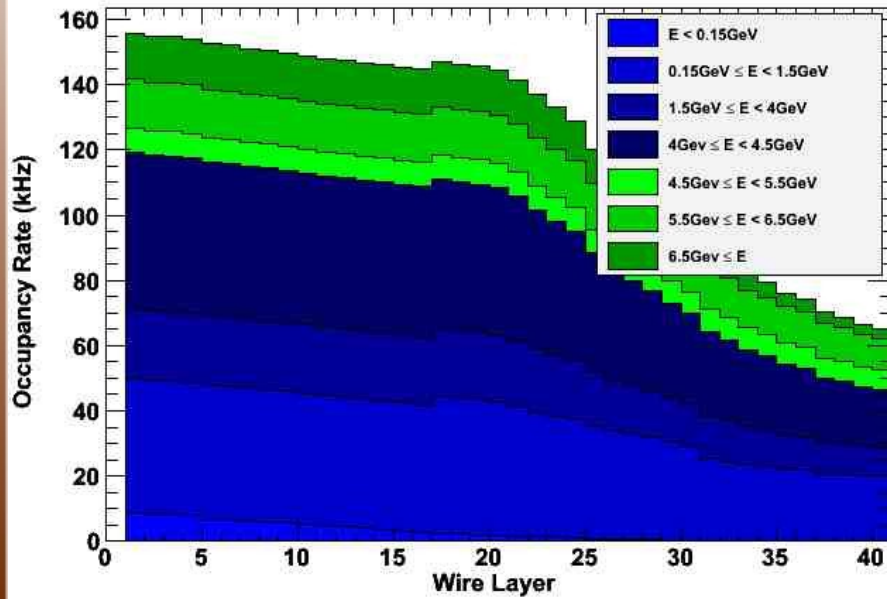


Number of Dch Track Hits vs. θ (longbwd)

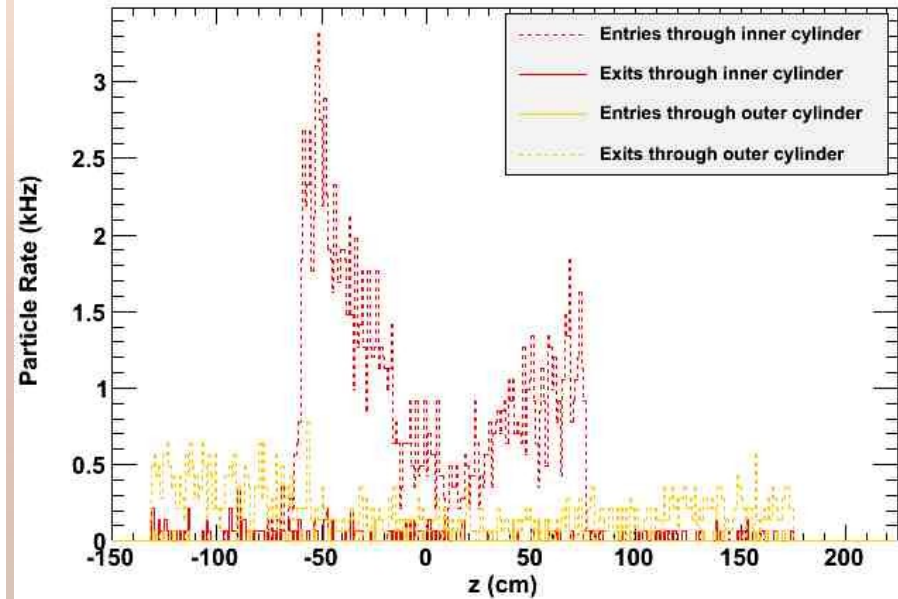


Longbwd Geometry (shielded): Occupancy Rates

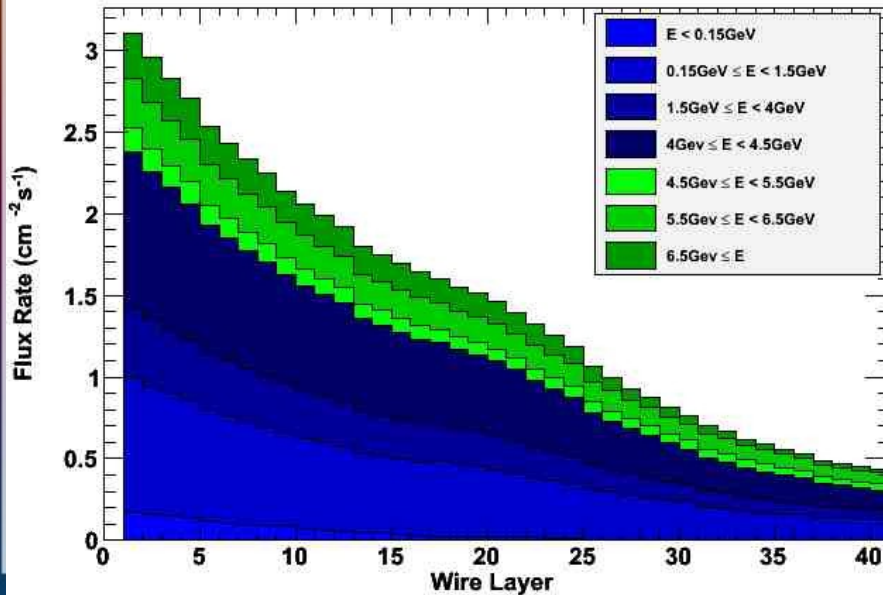
Occupancy Rate per Dch Wire Layer (longbwd_shielded)



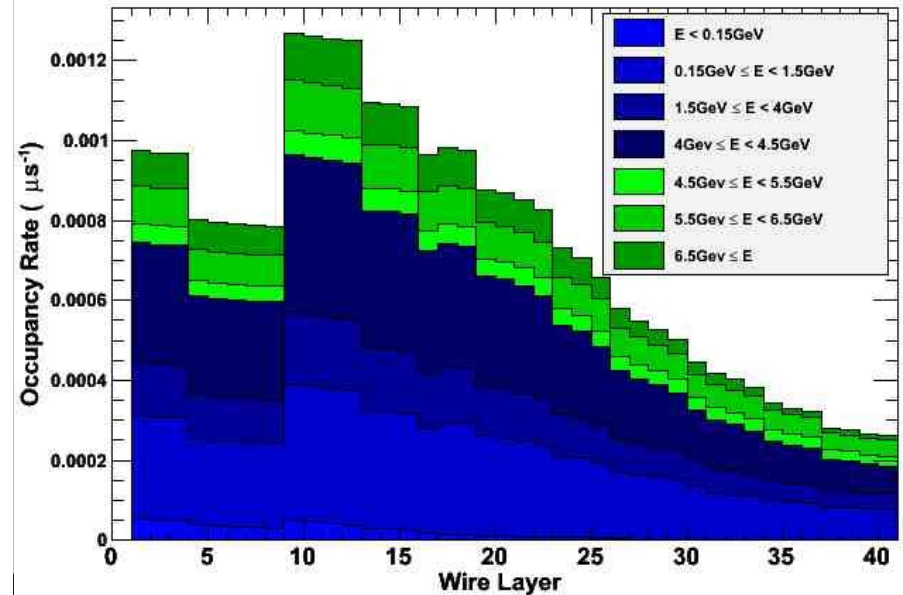
Rate of Particles Entering and Exiting Dch vs. z (longbwd_shielded)



Flux Rate per Dch Wire Layer (longbwd_shielded)

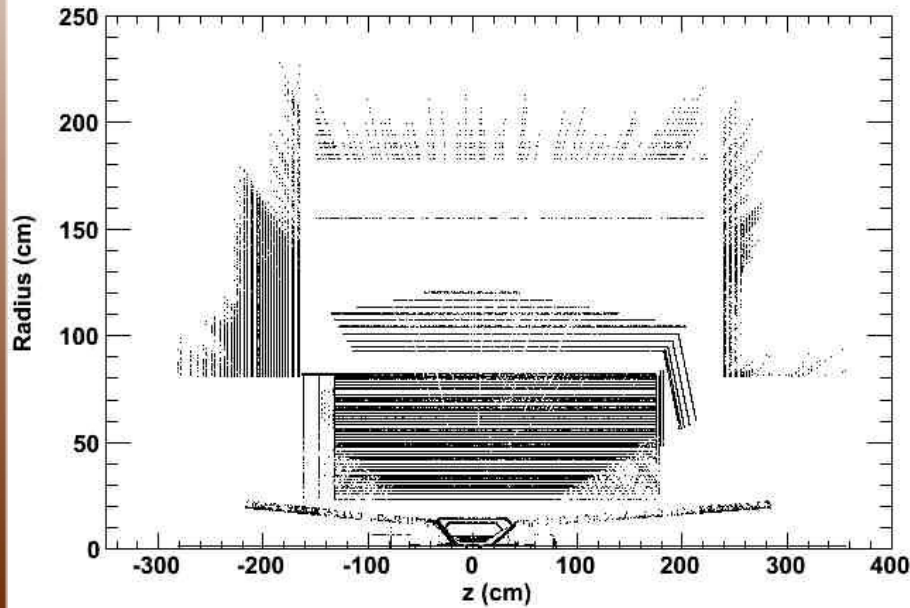


Occupancy Rate per Individual Dch Wire (longbwd_shielded)

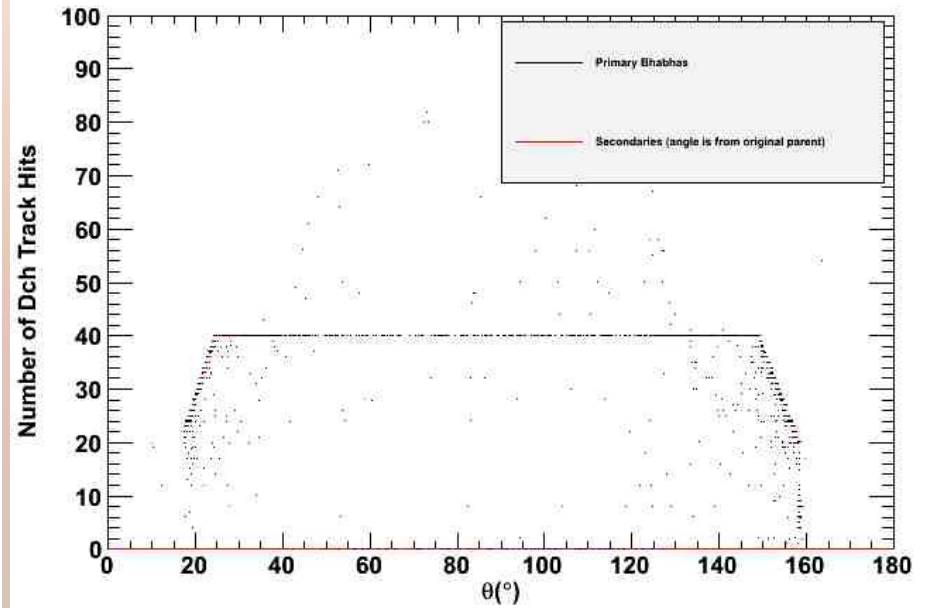


Longbwd (shielded) Geometry: SimHit Checks

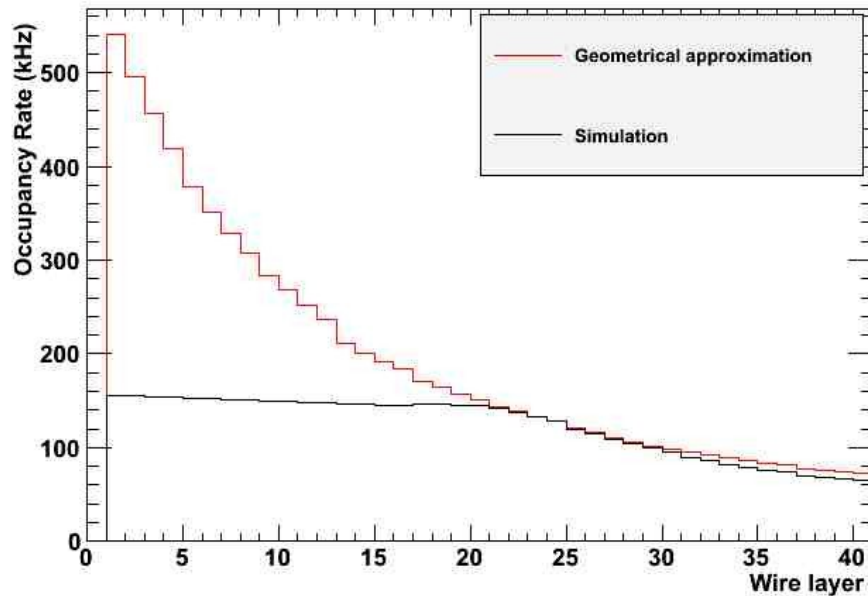
SimHits in Radial-z Plane (longbwd_shielded)



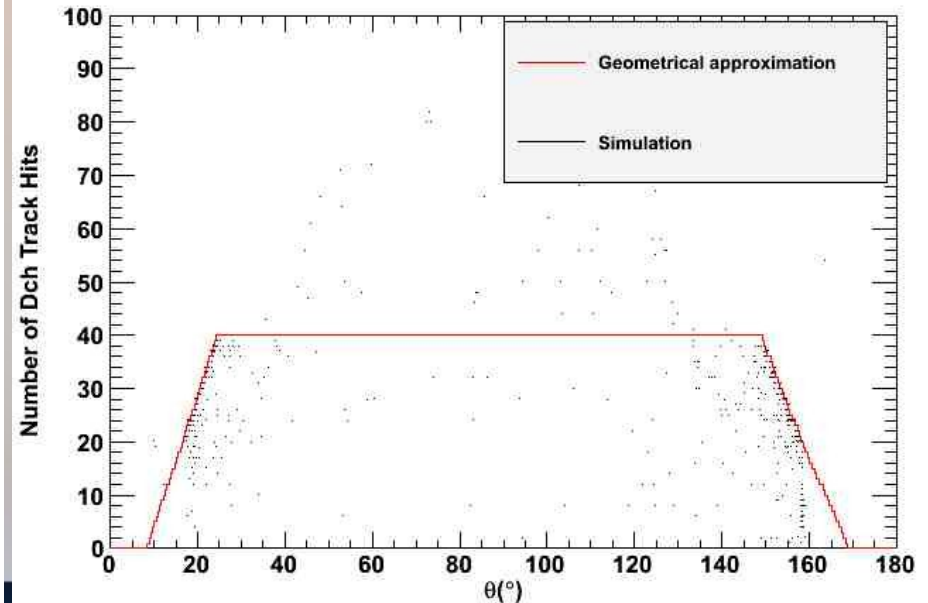
Number of Dch Track Hits vs. θ (longbwd_shielded)



Predicted Occupancy Rate per Wire Layer

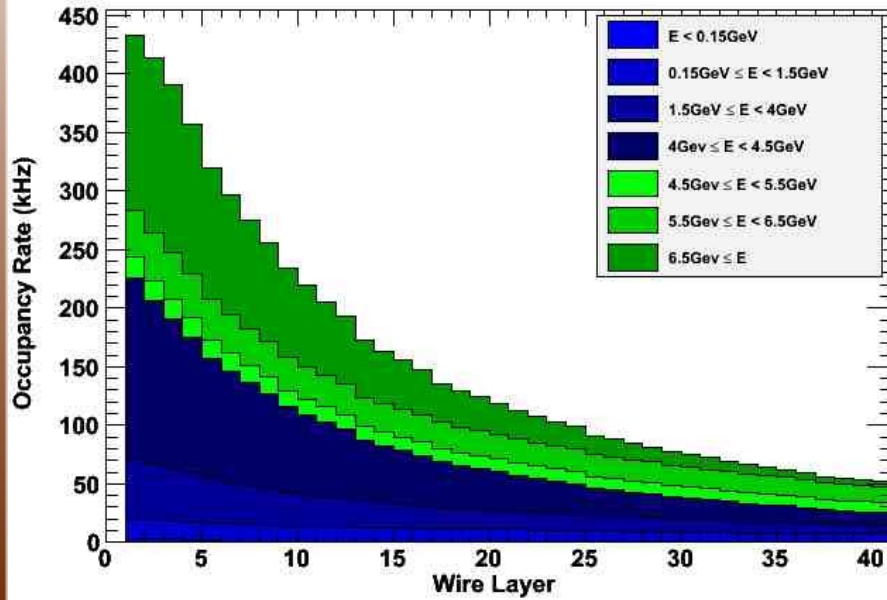


Number of Dch Track Hits vs. θ (longbwd_shielded)

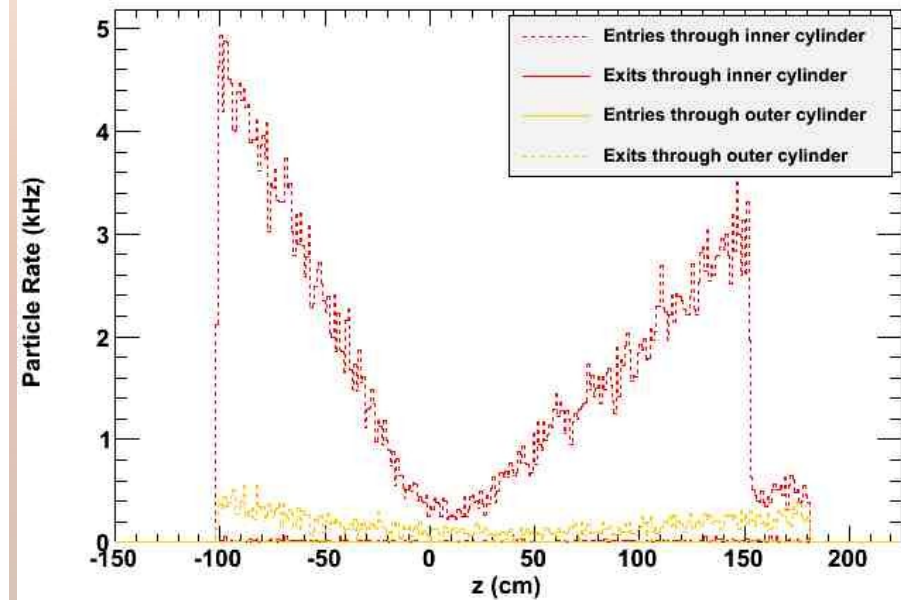


Longfwd Geometry: Occupancy Rates

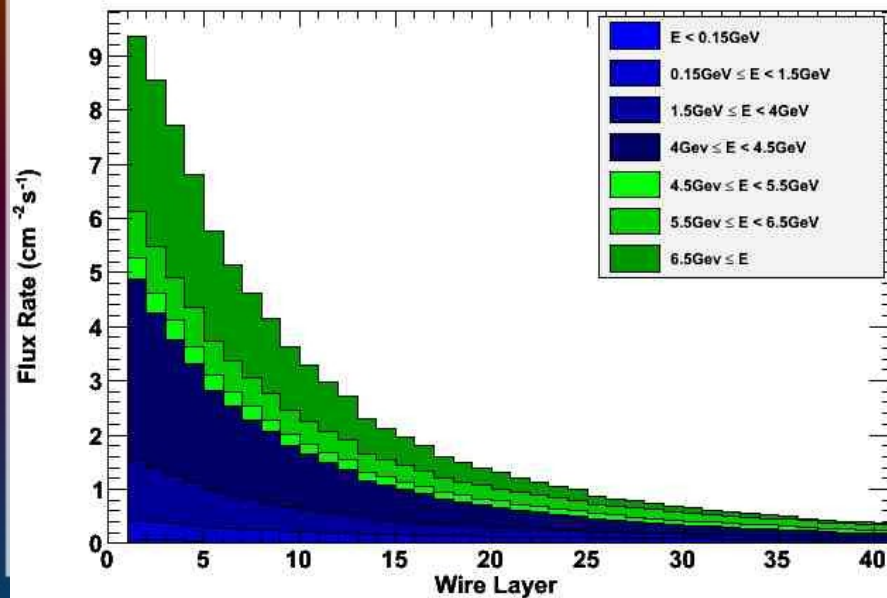
Occupancy Rate per Dch Wire Layer (longfwd)



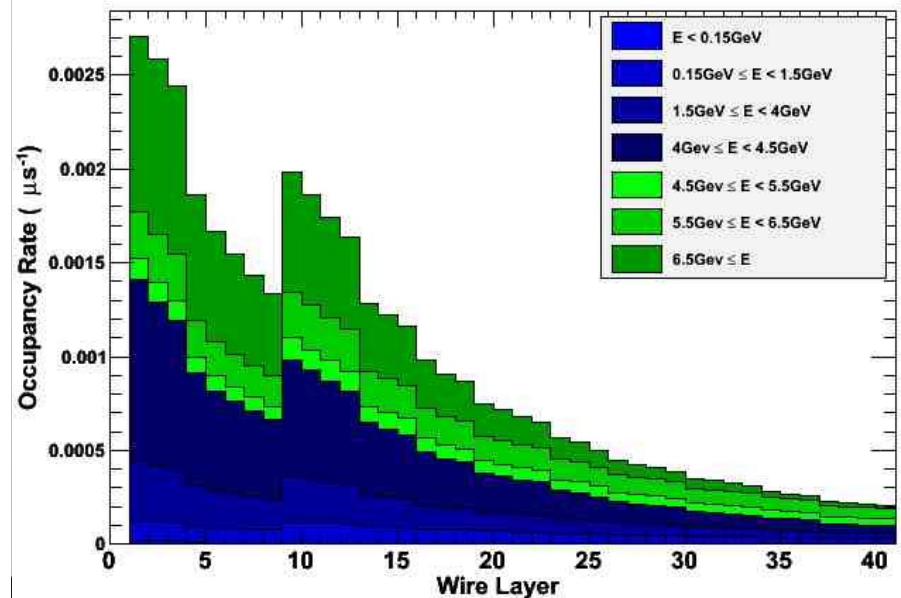
Rate of Particles Entering and Exiting Dch vs. z (longfwd)



Flux Rate per Dch Wire Layer (longfwd)

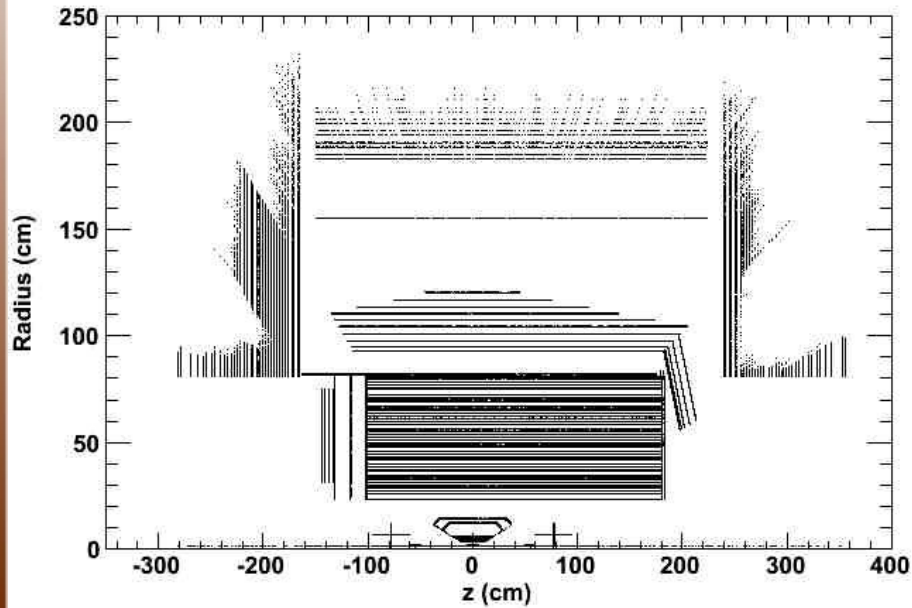


Occupancy Rate per Individual Dch Wire (longfwd)

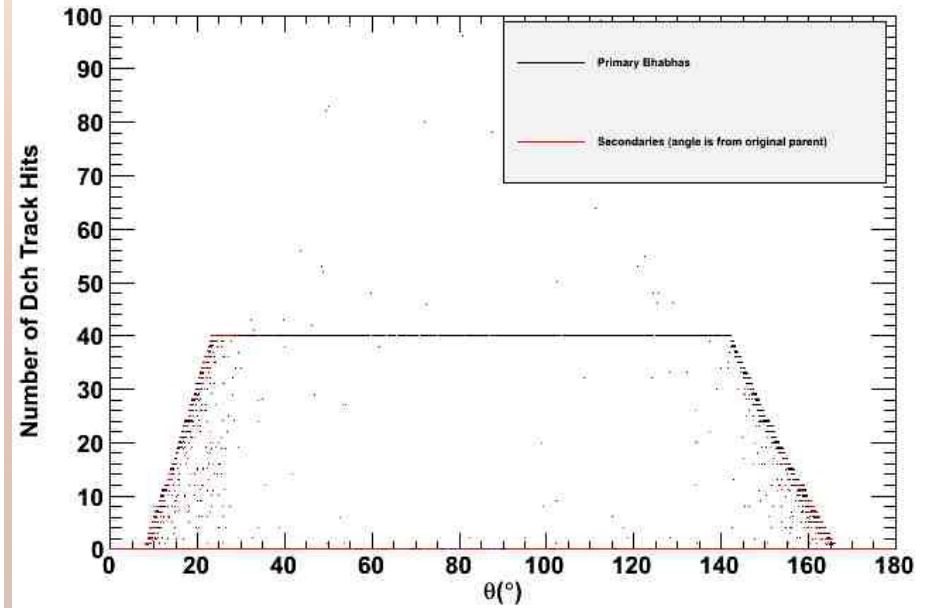


Longfwd Geometry: SimHit Checks

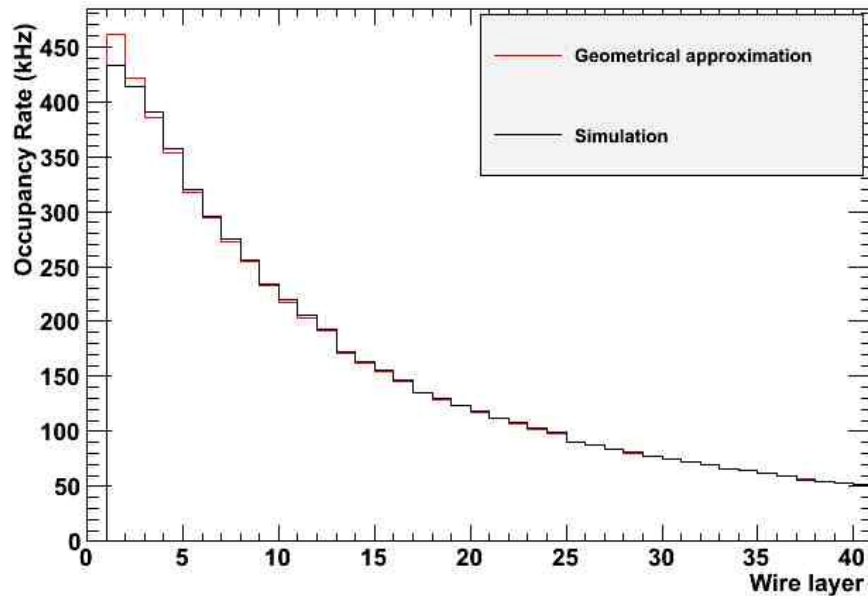
SimHits in Radial-z Plane (longfwd)



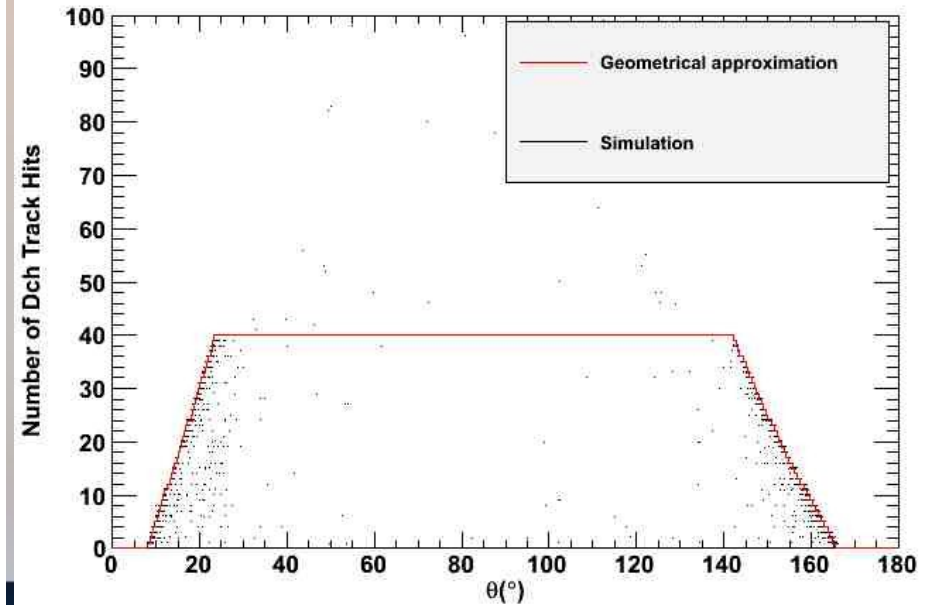
Number of Dch Track Hits vs. θ (longfwd)



Predicted Occupancy Rate per Wire Layer

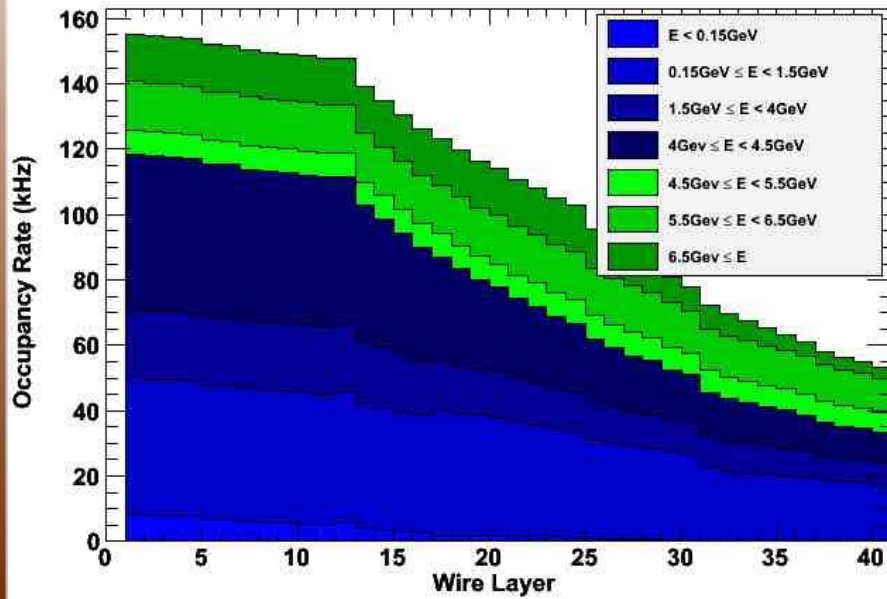


Number of Dch Track Hits vs. θ (longfwd)

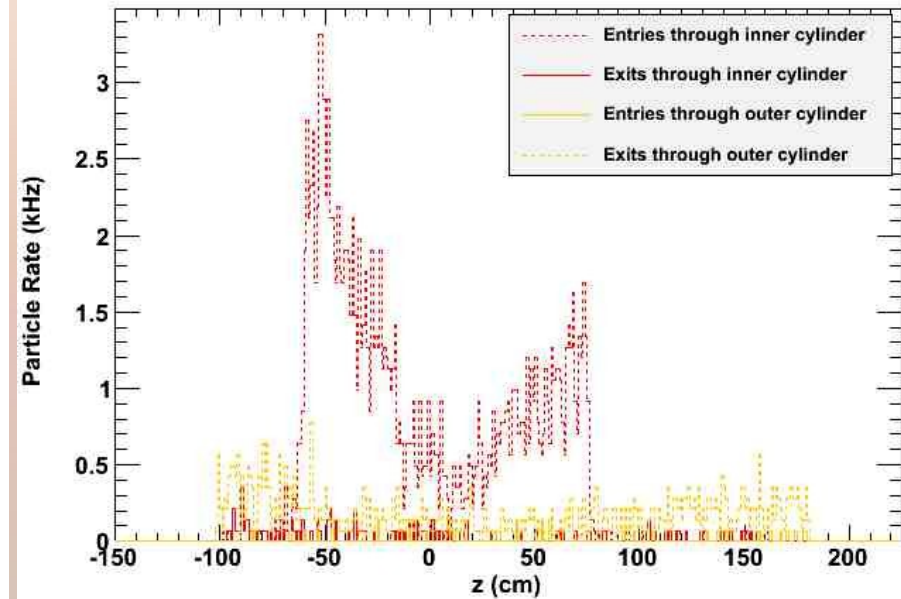


Longfwd Geometry (shielded): Occupancy Rates

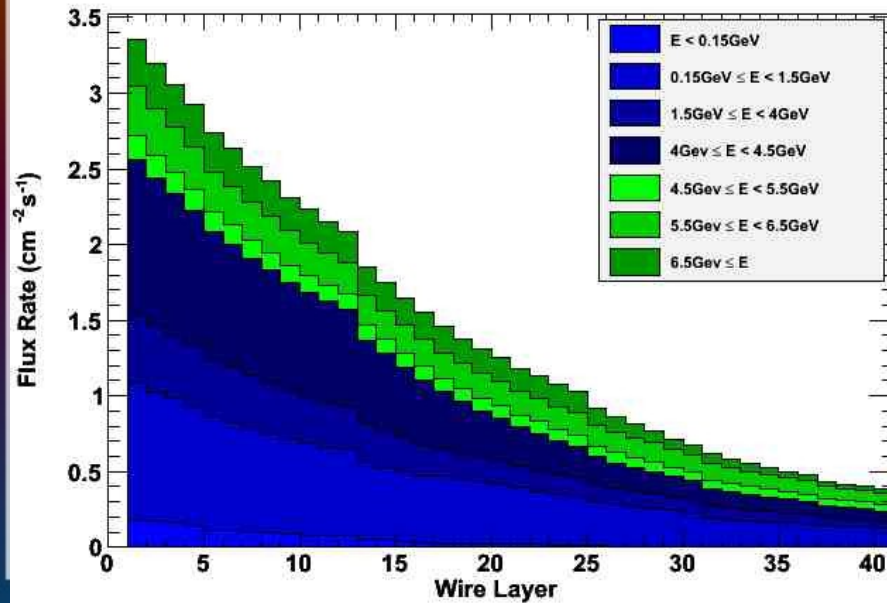
Occupancy Rate per Dch Wire Layer (longfwd_shielded)



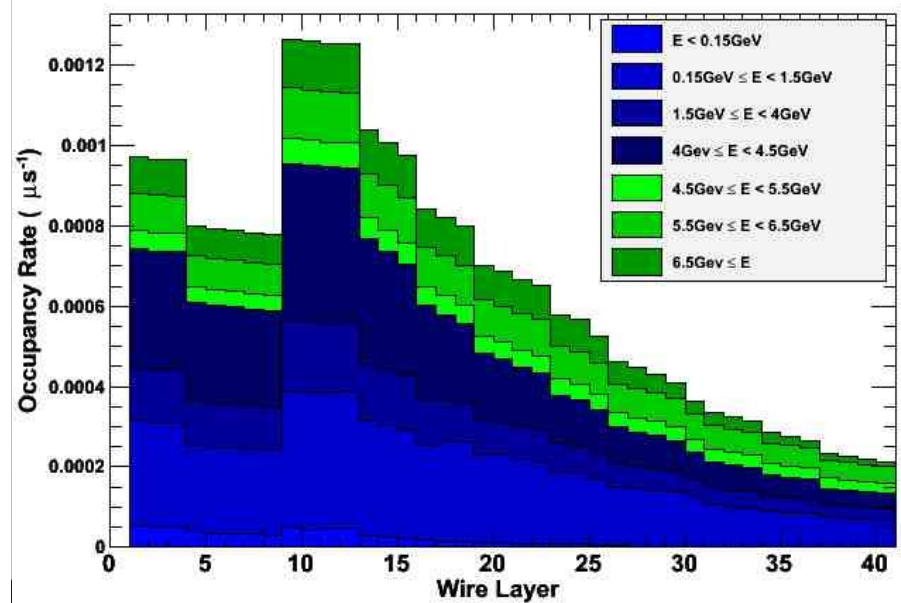
Rate of Particles Entering and Exiting Dch vs. z (longfwd_shielded)



Flux Rate per Dch Wire Layer (longfwd_shielded)

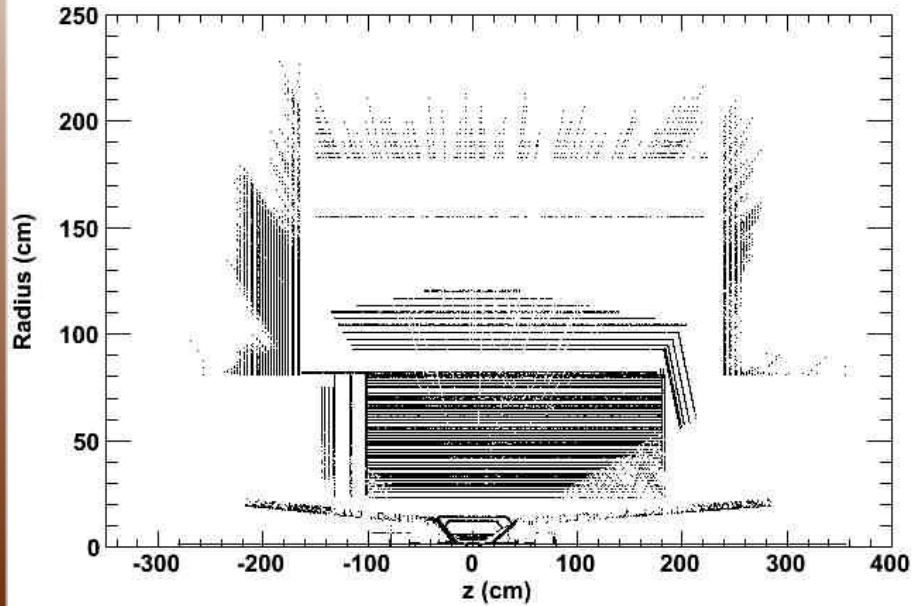


Occupancy Rate per Individual Dch Wire (longfwd_shielded)

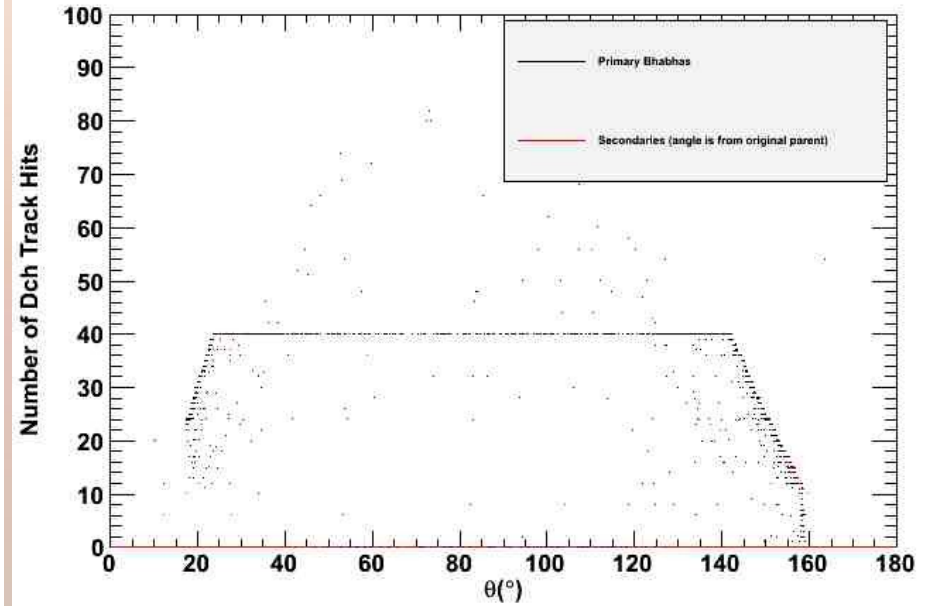


Longfwd (shielded) Geometry: SimHit Checks

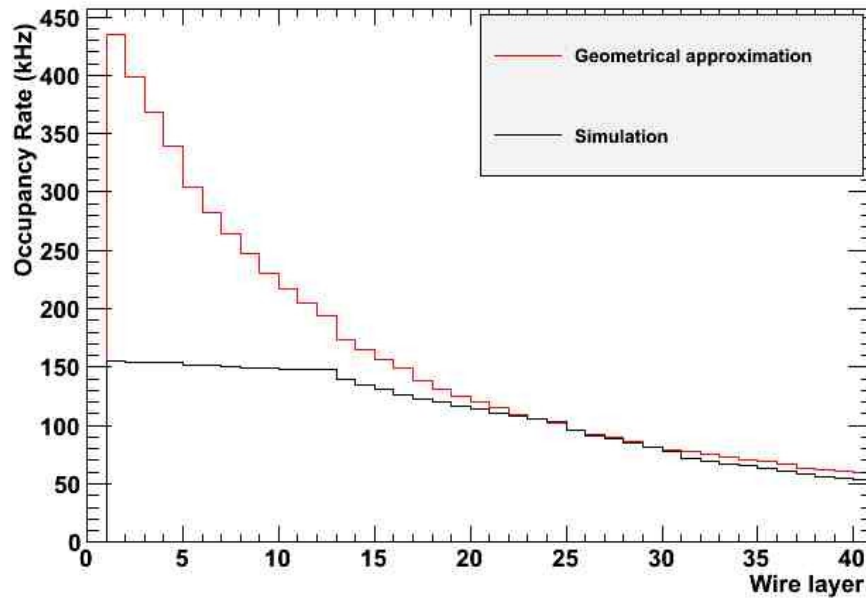
SimHits in Radial-z Plane (longfwd_shielded)



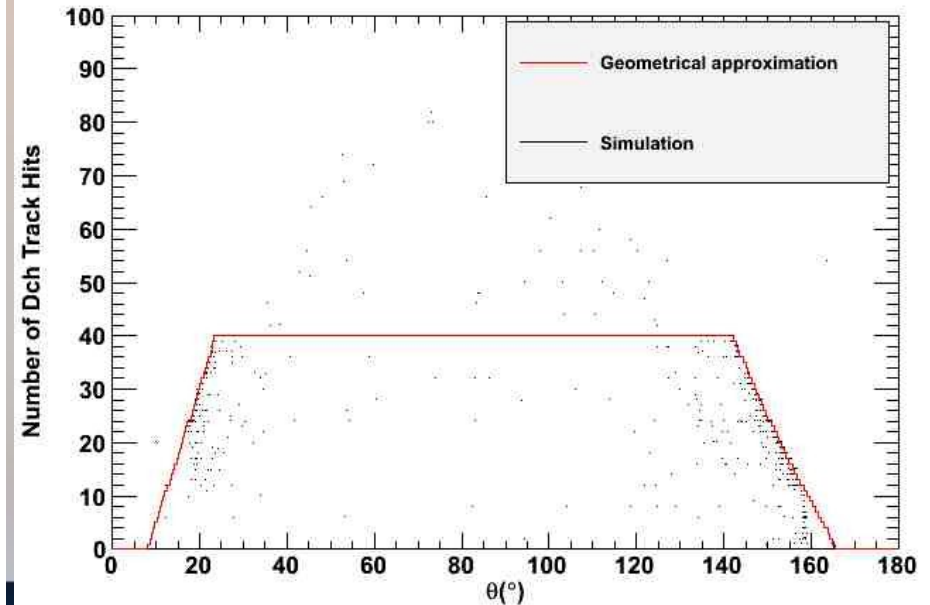
Number of Dch Track Hits vs. θ (longfwd_shielded)



Predicted Occupancy Rate per Wire Layer

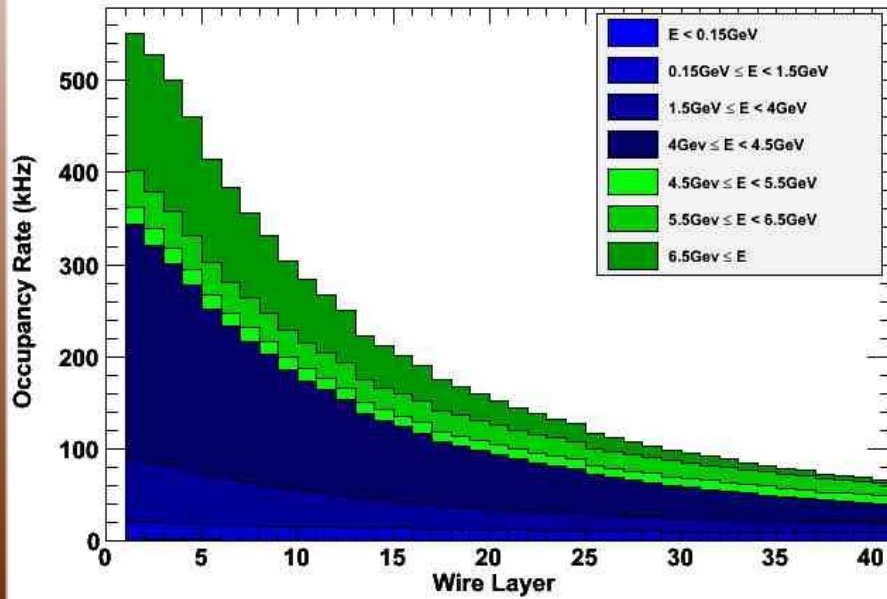


Number of Dch Track Hits vs. θ (longfwd_shielded)

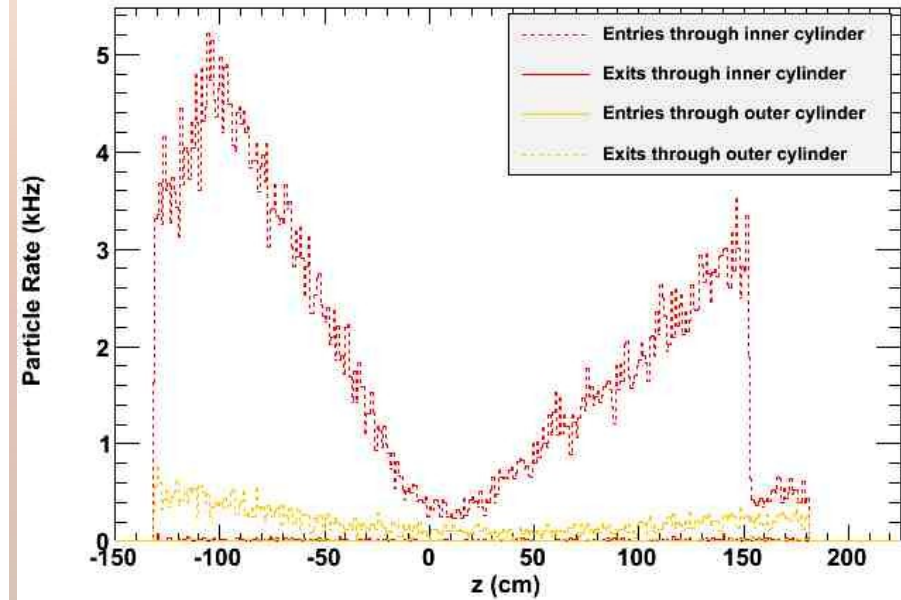


Longbwdfwd Geometry: Occupancy Rates

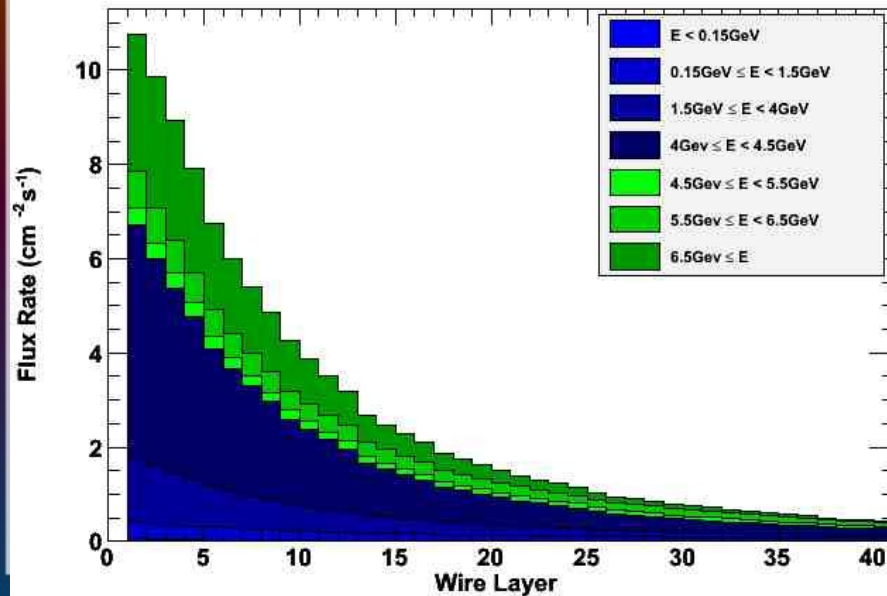
Occupancy Rate per Dch Wire Layer (longbwdfwd)



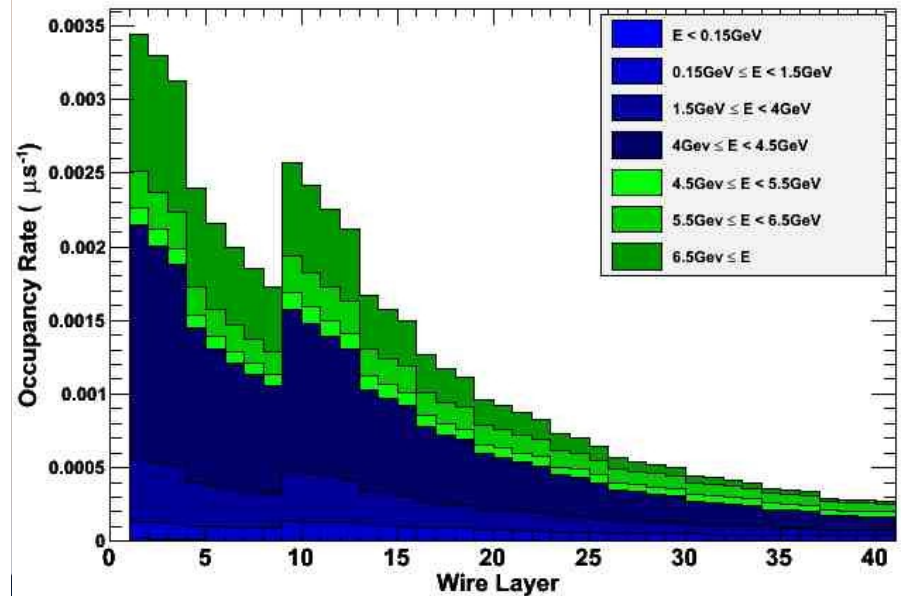
Rate of Particles Entering and Exiting Dch vs. z (longbwdfwd)



Flux Rate per Dch Wire Layer (longbwdfwd)

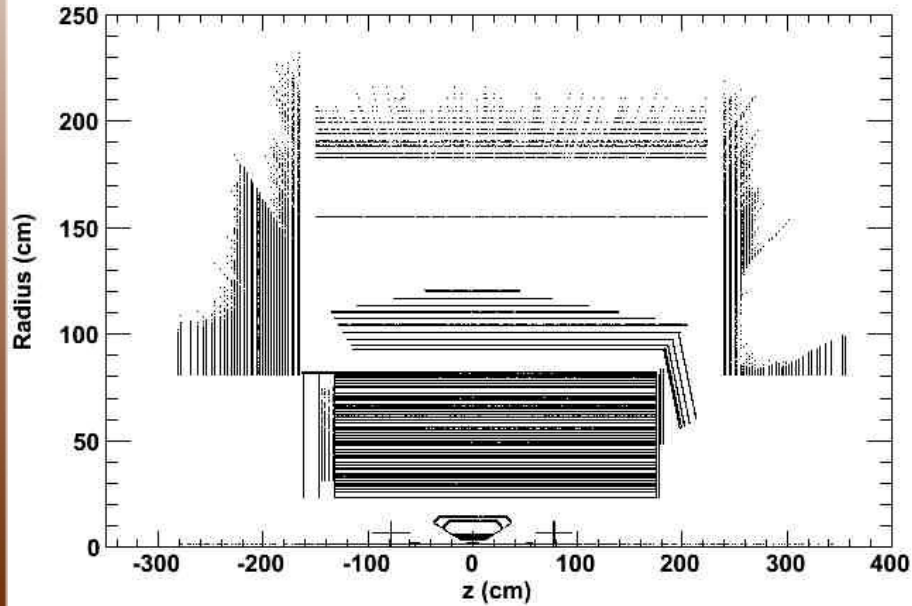


Occupancy Rate per Individual Dch Wire (longbwdfwd)

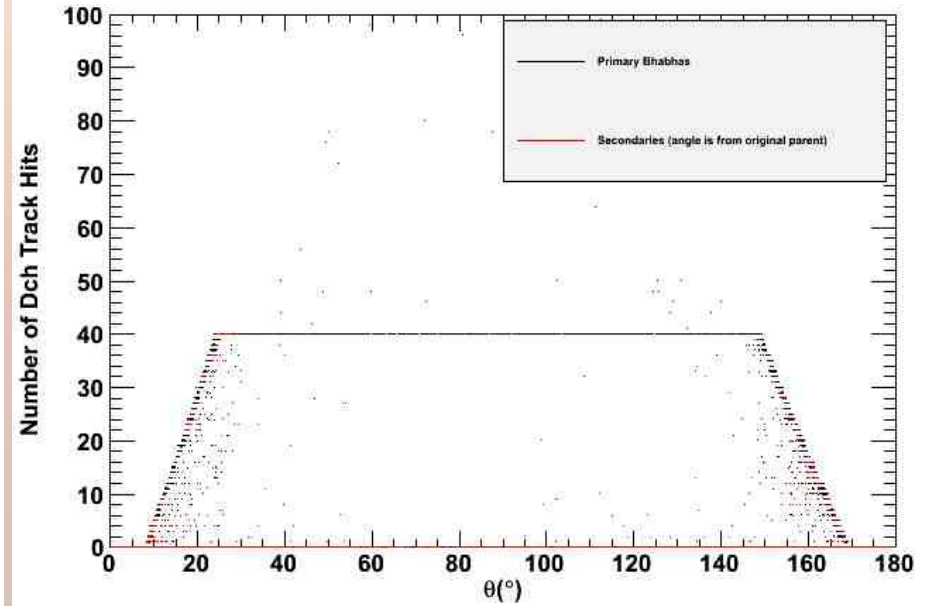


Longbwdfwd Geometry: SimHit Checks

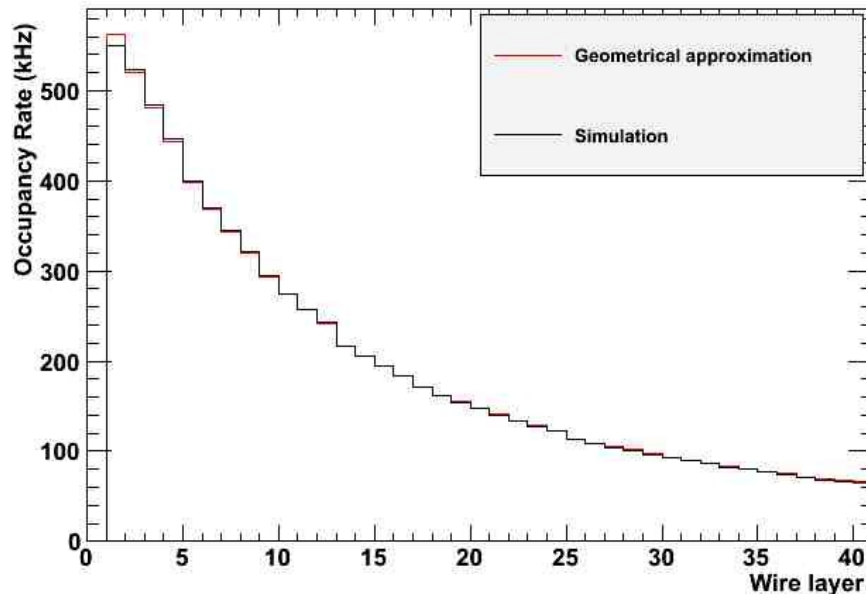
SimHits in Radial-z Plane (longbwd)



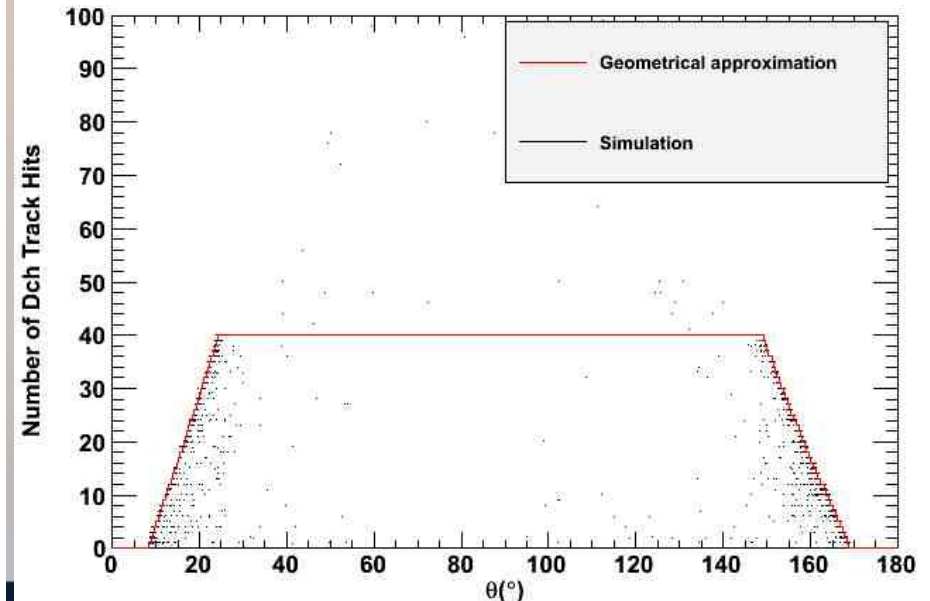
Number of Dch Track Hits vs. θ (longbwd)



Predicted Occupancy Rate per Wire Layer

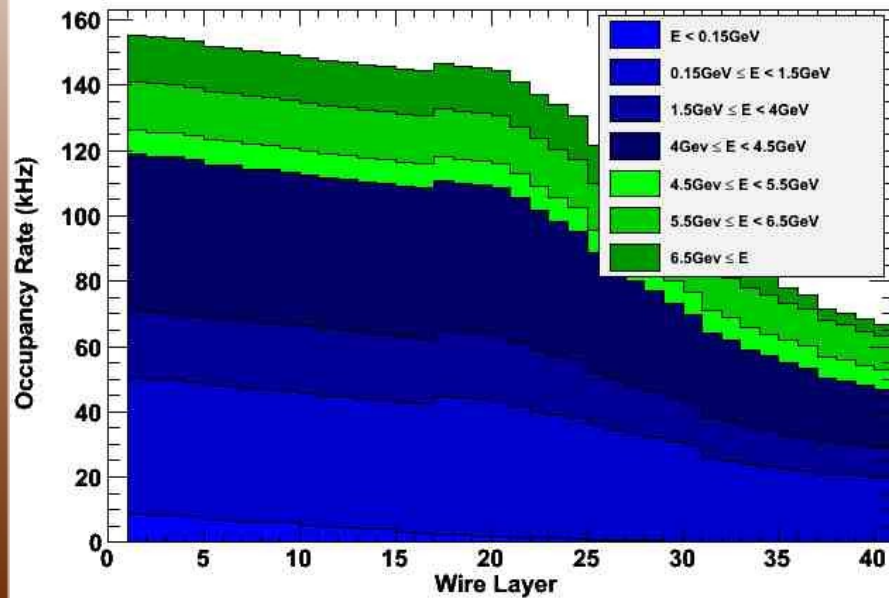


Number of Dch Track Hits vs. θ (longbwd)

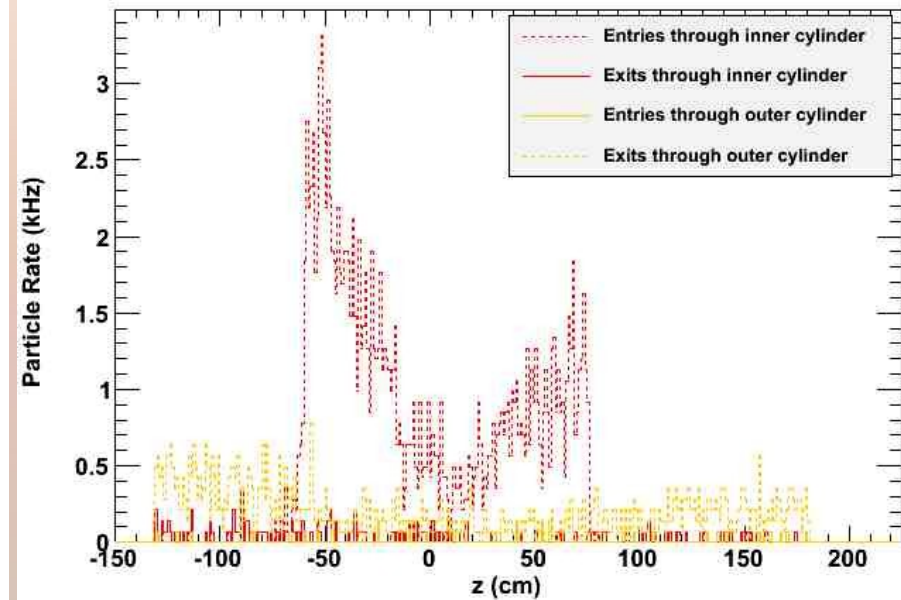


Longbwdfwd Geometry (shielded): Occupancy Rates

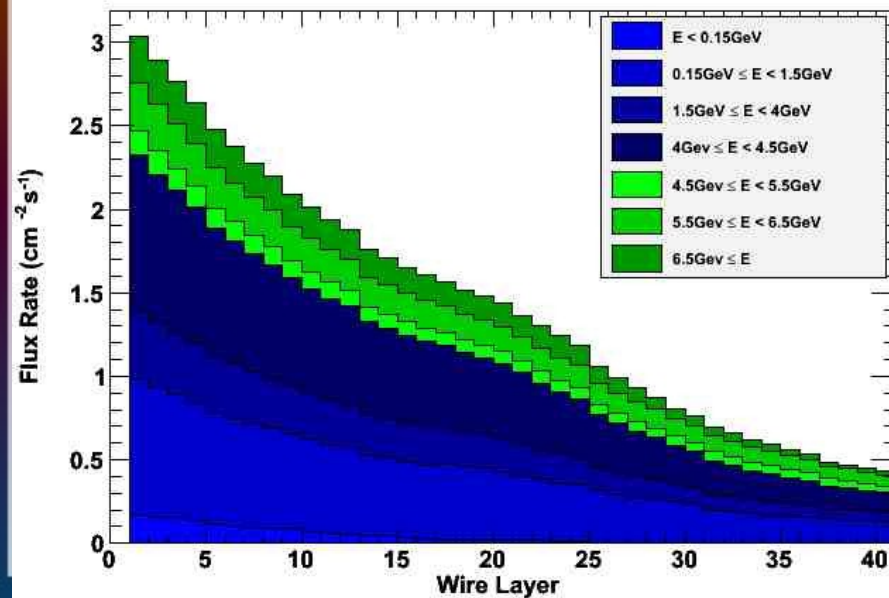
Occupancy Rate per Dch Wire Layer (longbwdfwd_shielded)



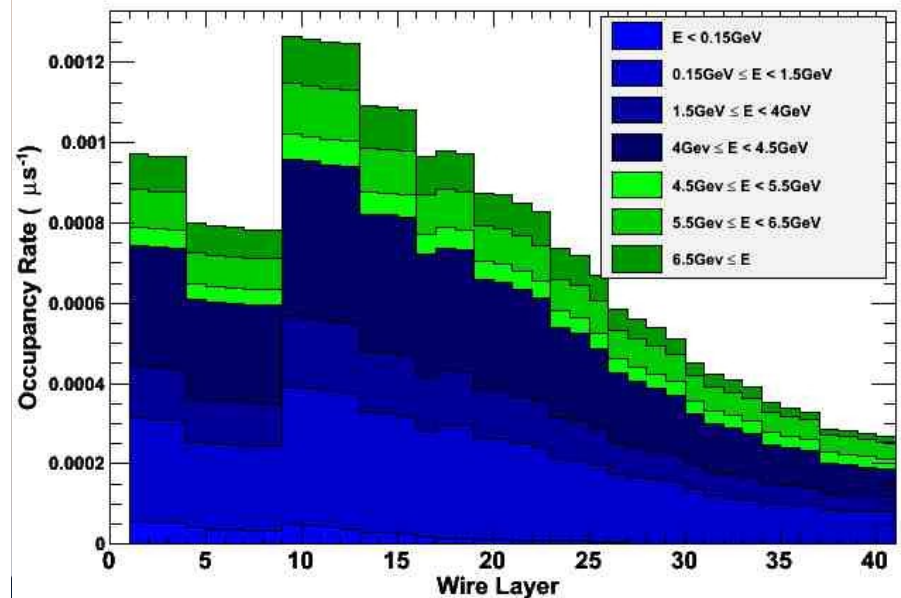
Rate of Particles Entering and Exiting Dch vs. z (longbwdfwd_shielded)



Flux Rate per Dch Wire Layer (longbwdfwd_shielded)

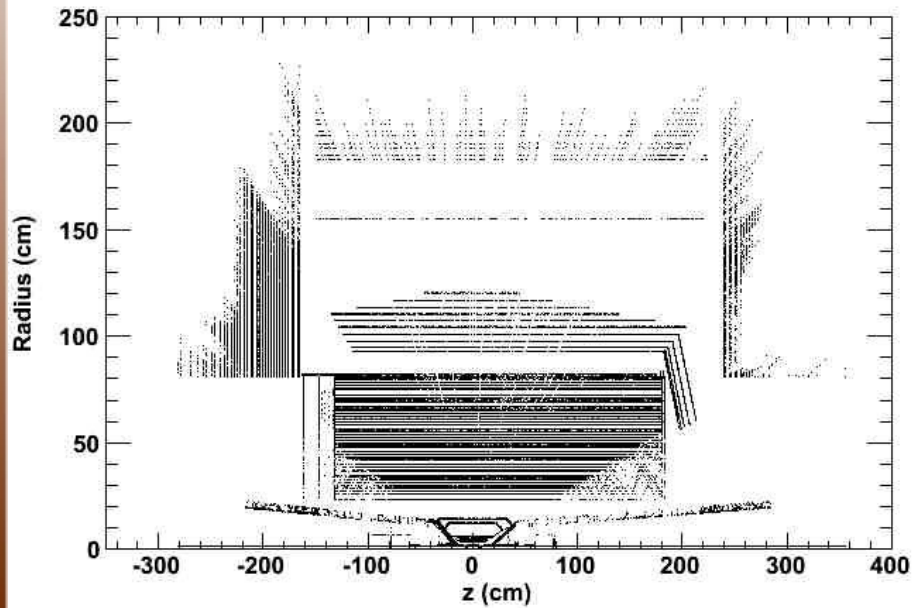


Occupancy Rate per Individual Dch Wire (longbwdfwd_shielded)

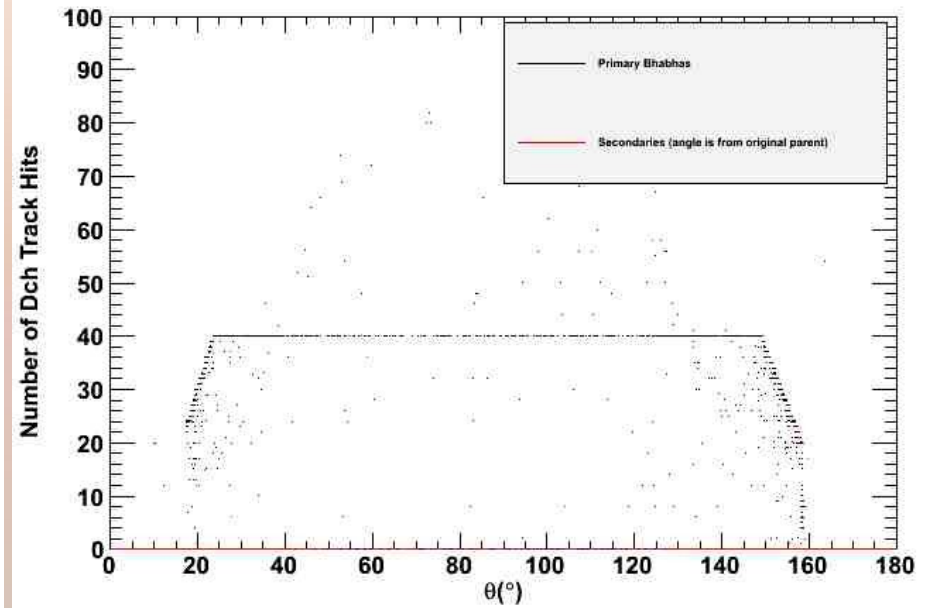


Longbwdfwd Geometry (shielded): SimHit Checks

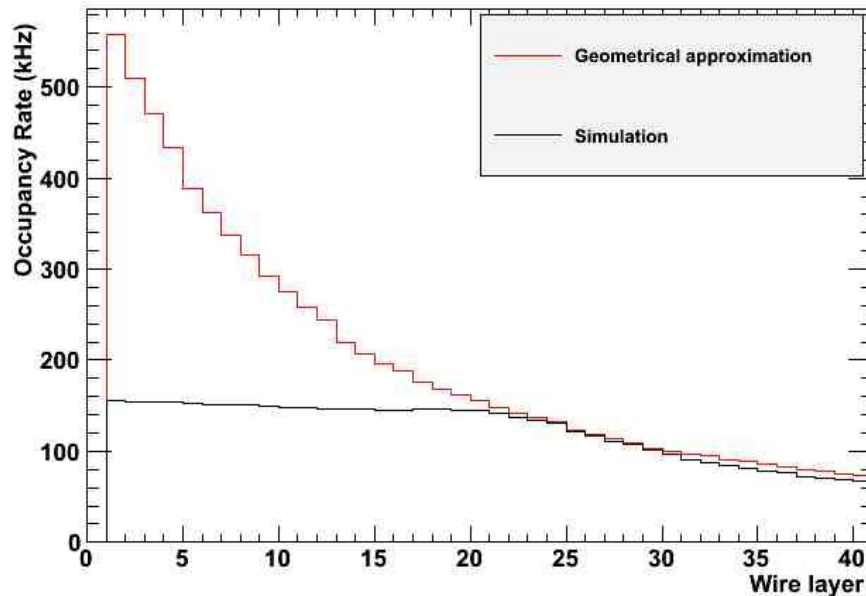
SimHits in Radial-z Plane (longbwdfwd_shielded)



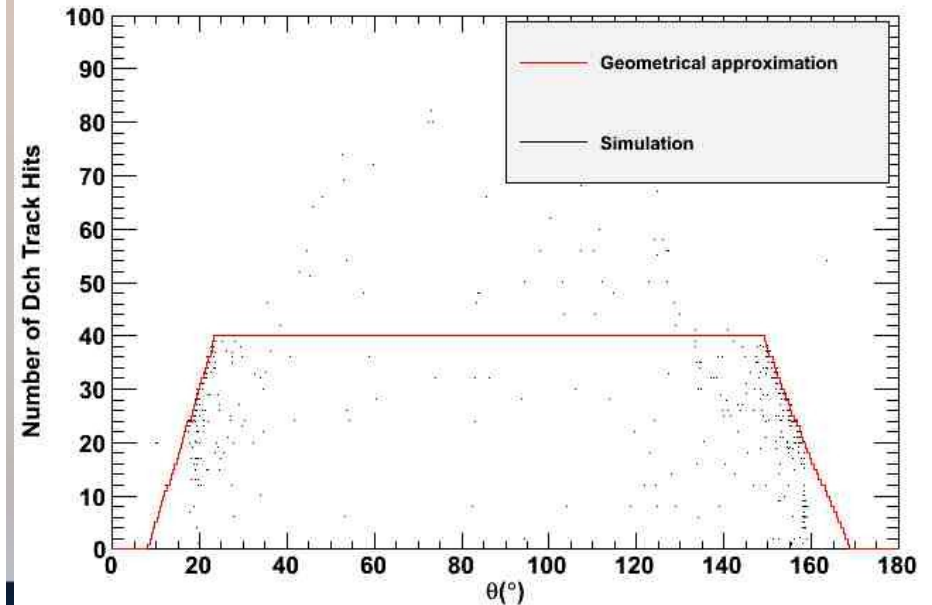
Number of Dch Track Hits vs. θ (longbwdfwd_shielded)



Predicted Occupancy Rate per Wire Layer

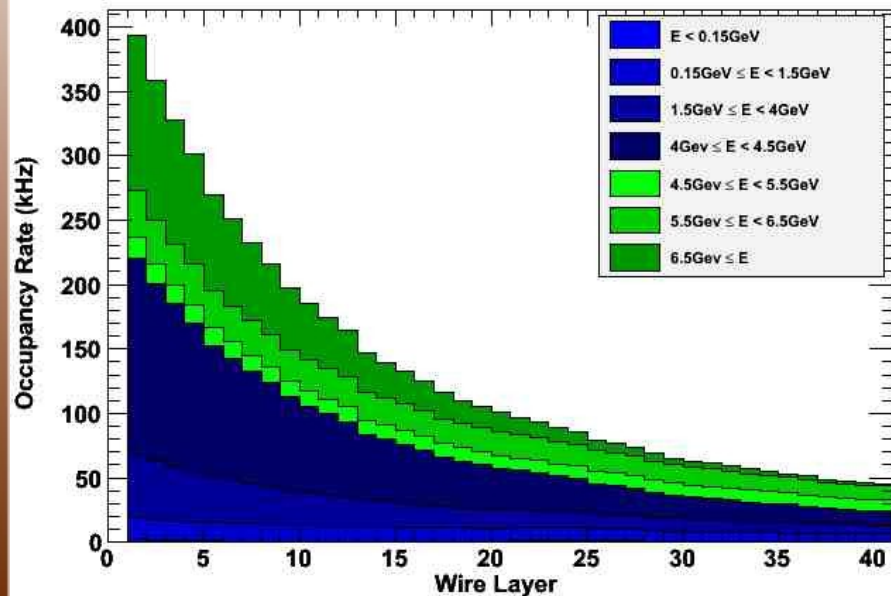


Number of Dch Track Hits vs. θ (longbwdfwd_shielded)

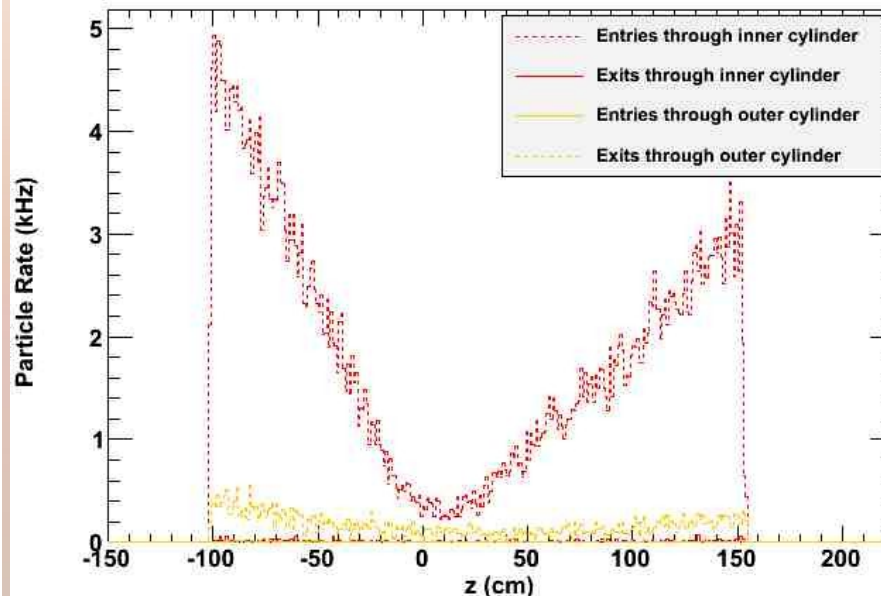


Shortfwd Geometry: Occupancy Rates

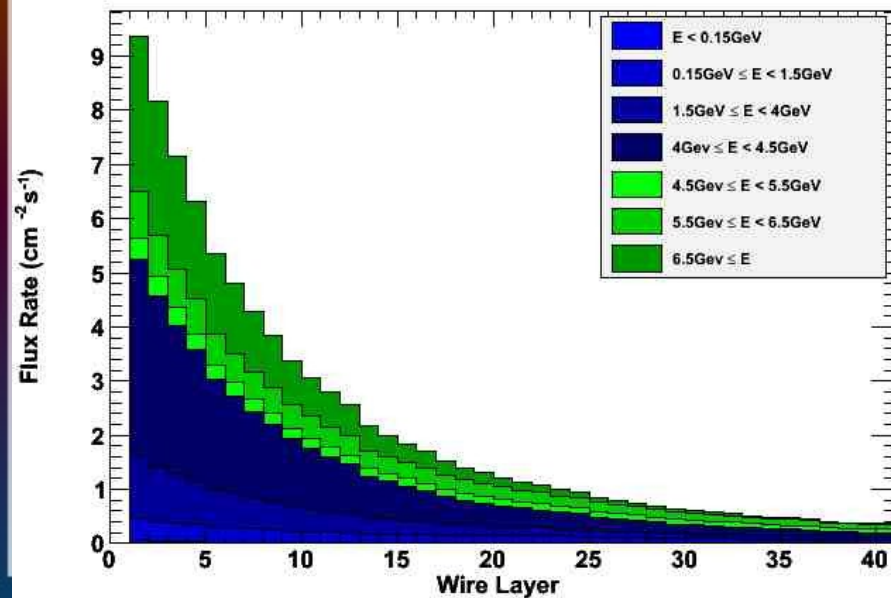
Occupancy Rate per Dch Wire Layer (shortfwd)



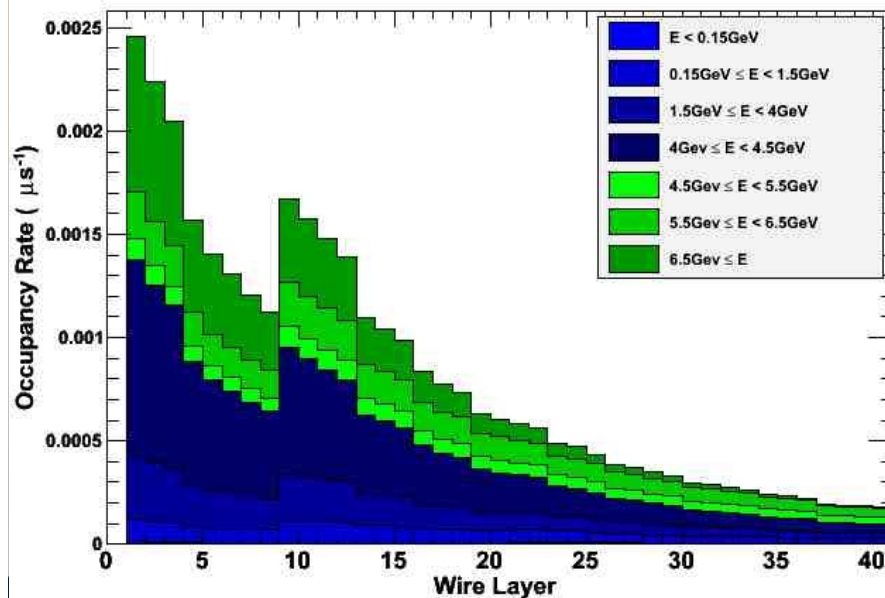
Rate of Particles Entering and Exiting Dch vs. z (shortfwd)



Flux Rate per Dch Wire Layer (shortfwd)

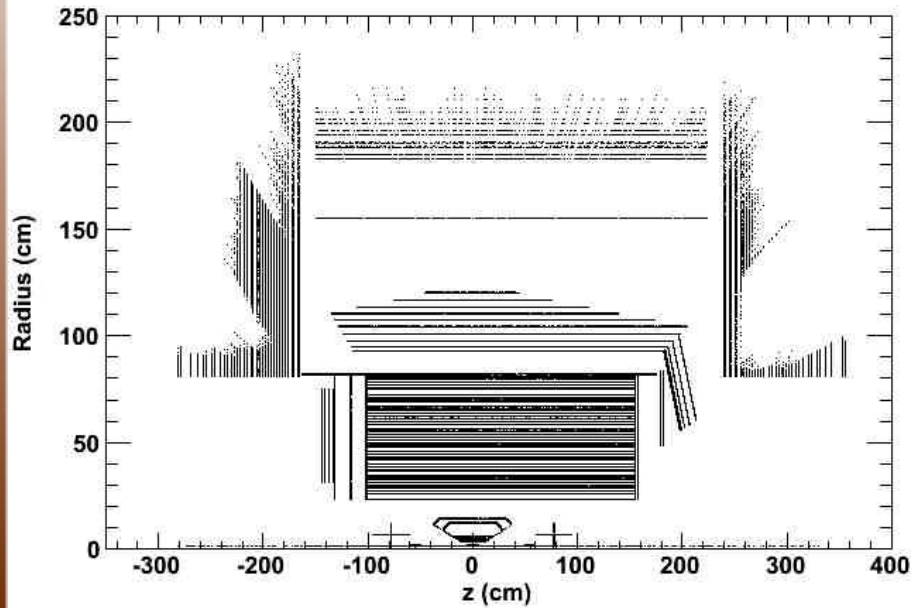


Occupancy Rate per Individual Dch Wire (shortfwd)

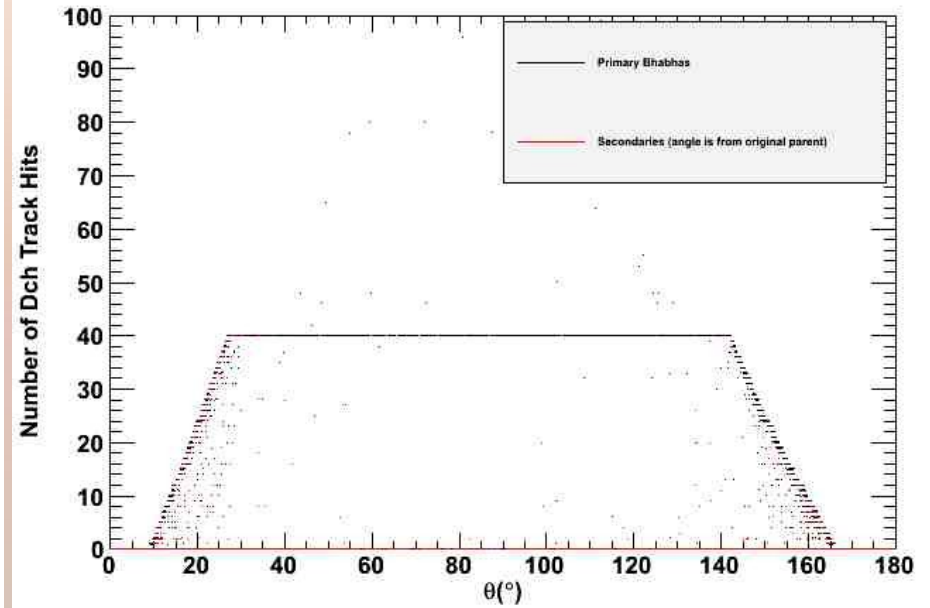


Shortfwd Geometry: SimHit Checks

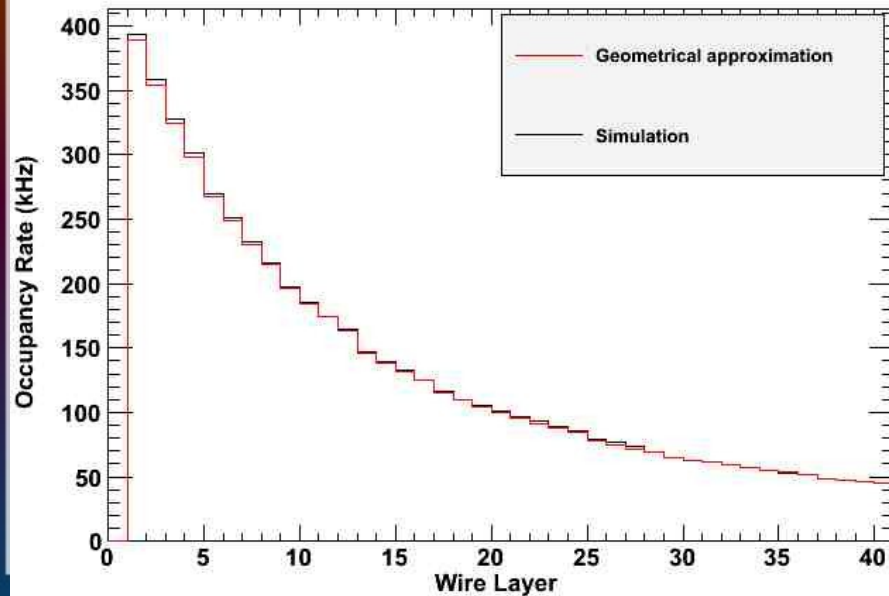
SimHits in Radial-z Plane (shortfwd)



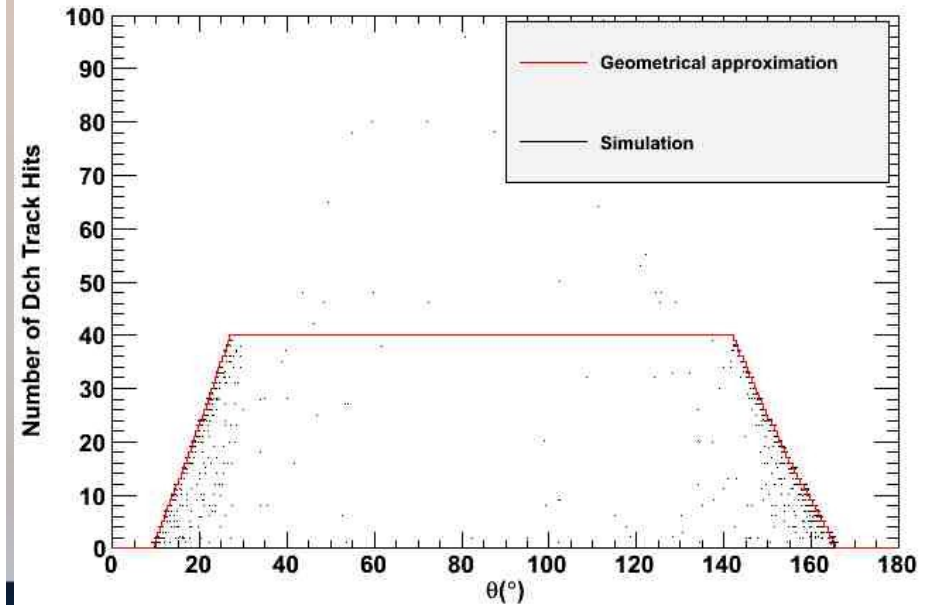
Number of Dch Track Hits vs. θ (shortfwd)



Occupancy Rate per Dch Wire Layer (shortfwd)

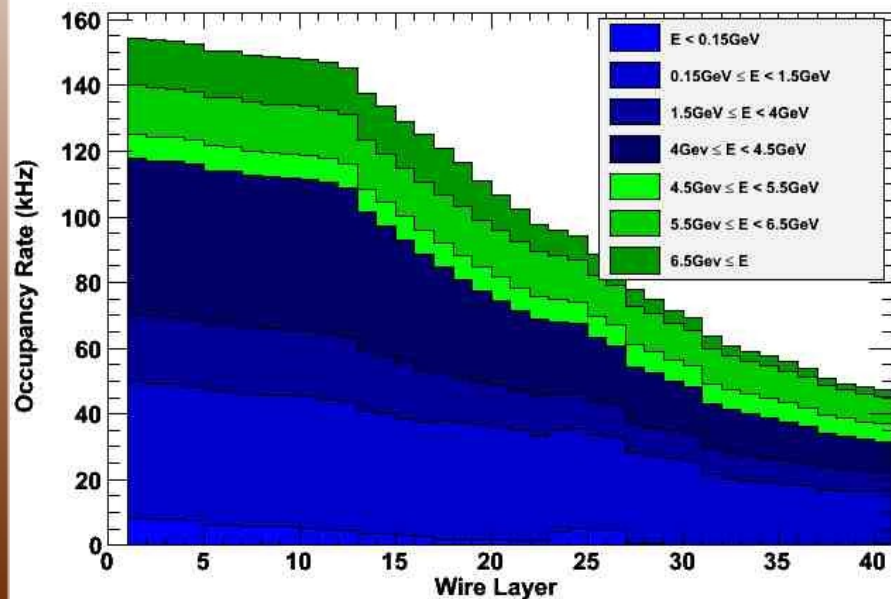


Number of Dch Track Hits vs. θ (shortfwd)

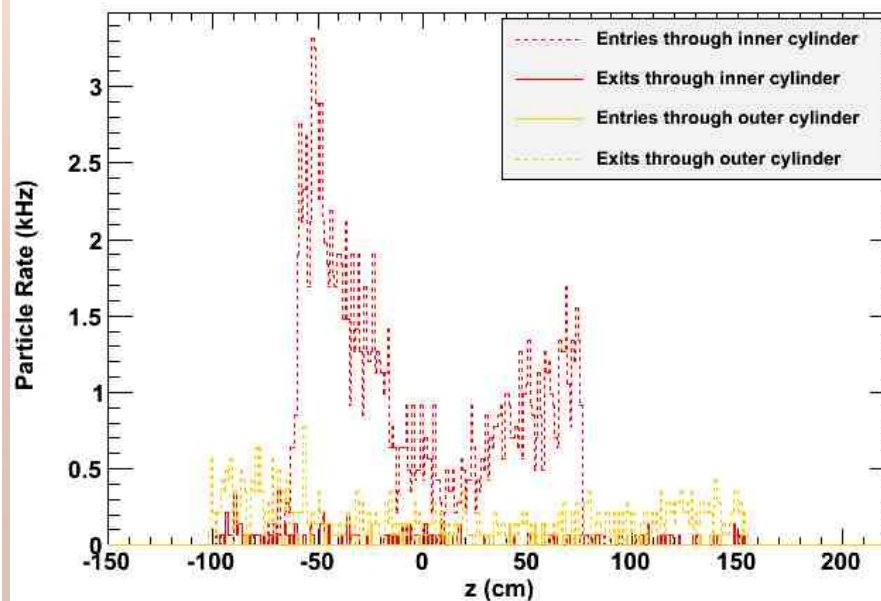


Shortfwd Geometry (shielded): Occupancy Rates

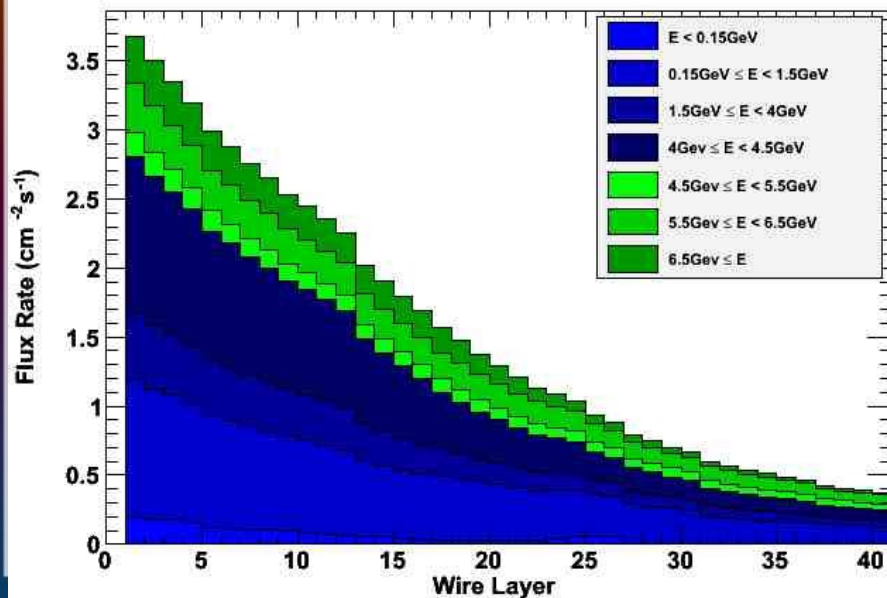
Occupancy Rate per Dch Wire Layer (shortfwd_shielded)



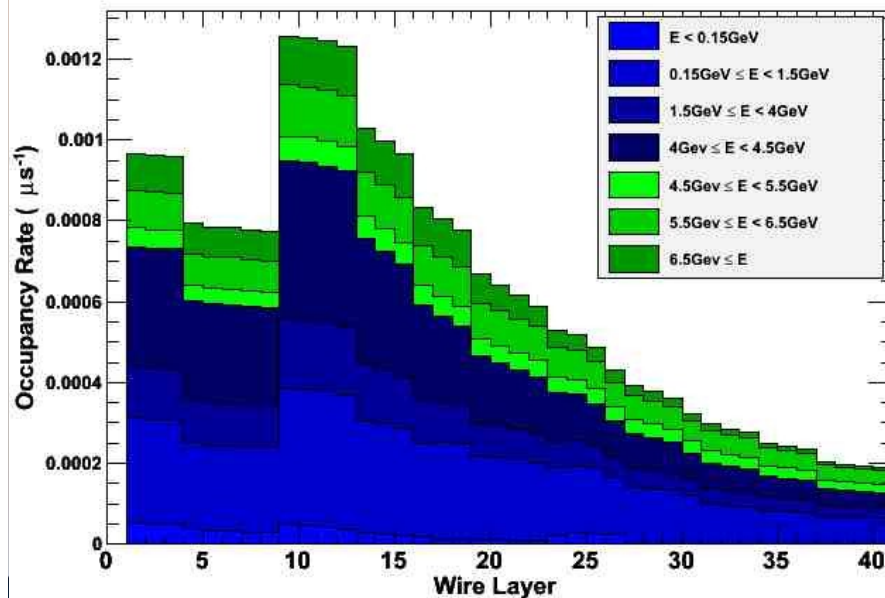
Rate of Particles Entering and Exiting Dch vs. z (shortfwd_shielded)



Flux Rate per Dch Wire Layer (shortfwd_shielded)

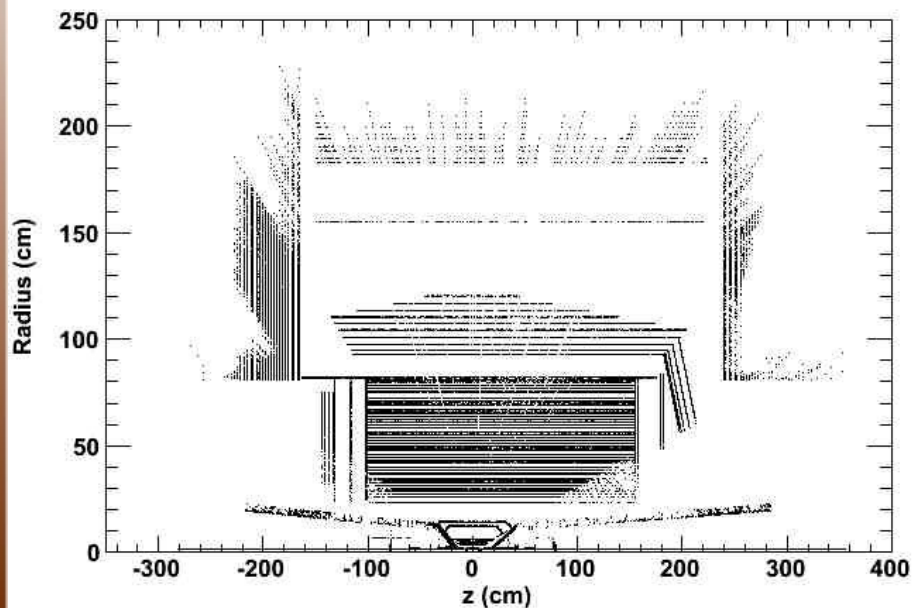


Occupancy Rate per Individual Dch Wire (shortfwd_shielded)

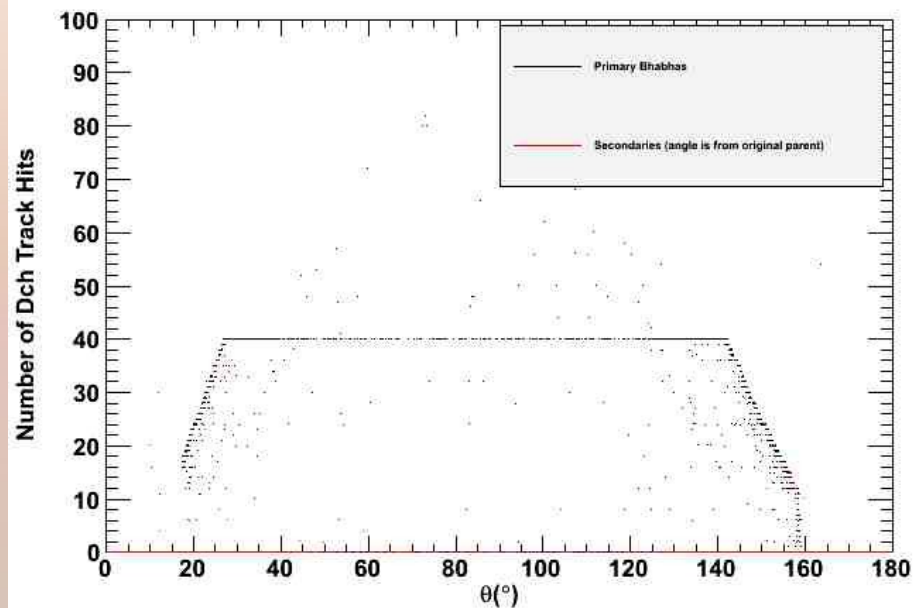


Shortfwd Geometry (shielded): SimHit Checks

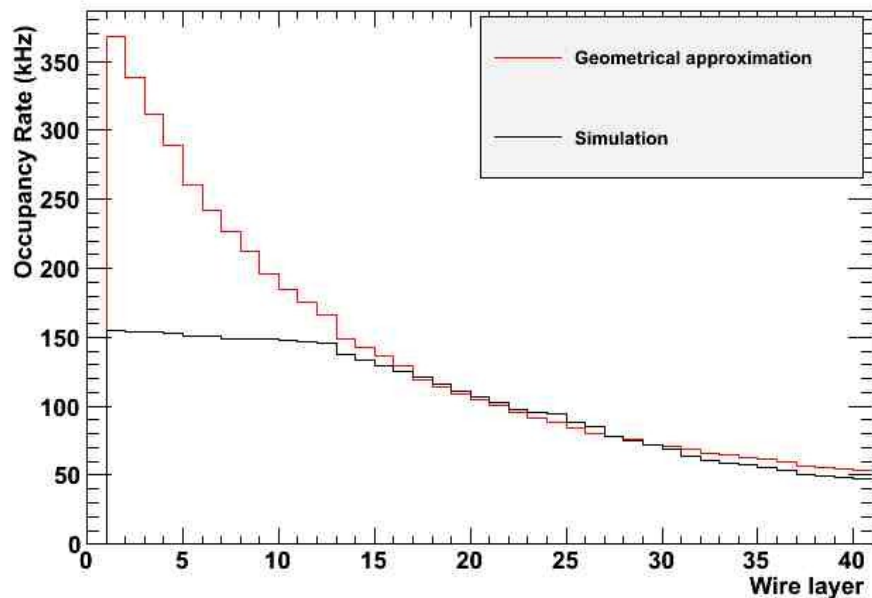
SimHits in Radial-z Plane (shortfwd_shielded)



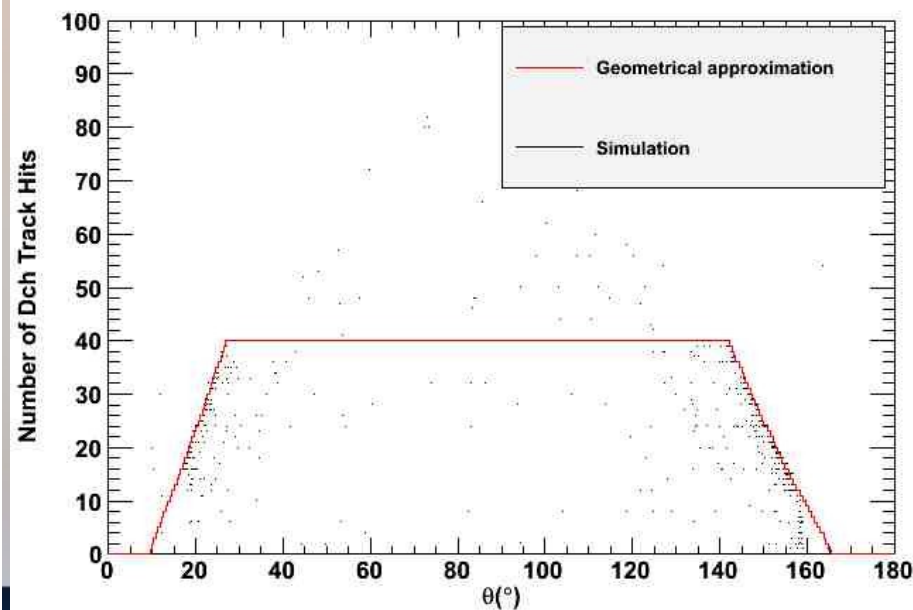
Number of Dch Track Hits vs. θ (shortfwd_shielded)



Predicted Occupancy Rate per Wire Layer

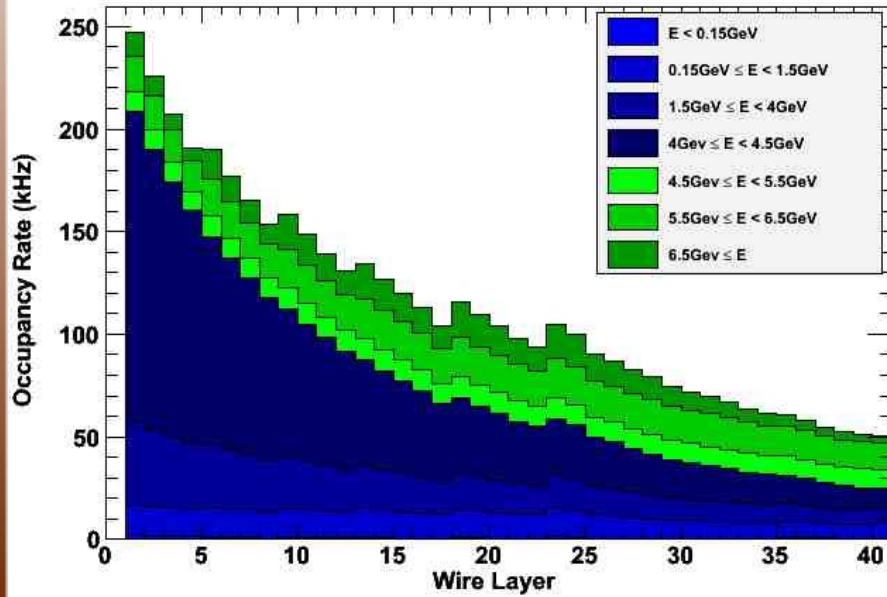


Number of Dch Track Hits vs. θ (shortfwd_shielded)

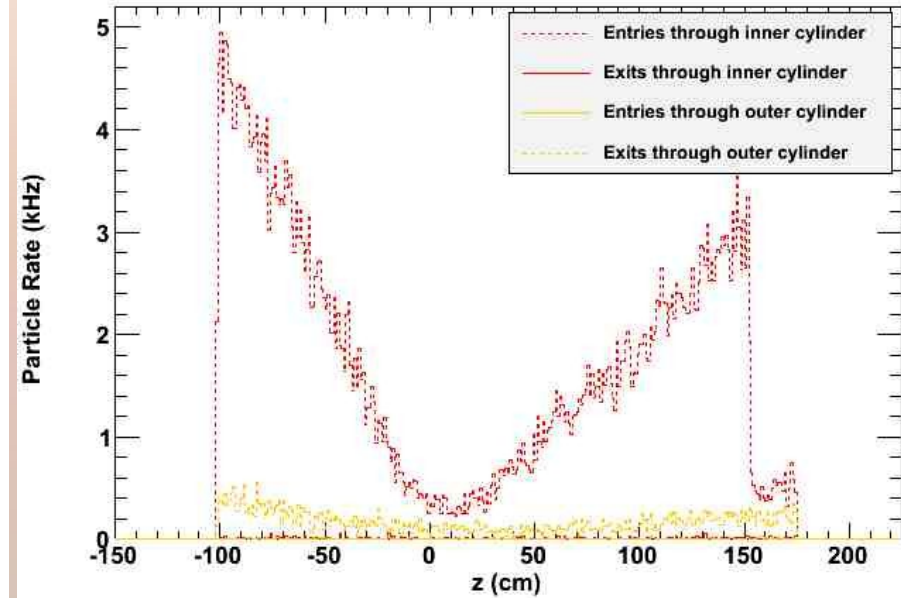


Weddingcake Geometry: Occupancy Rates

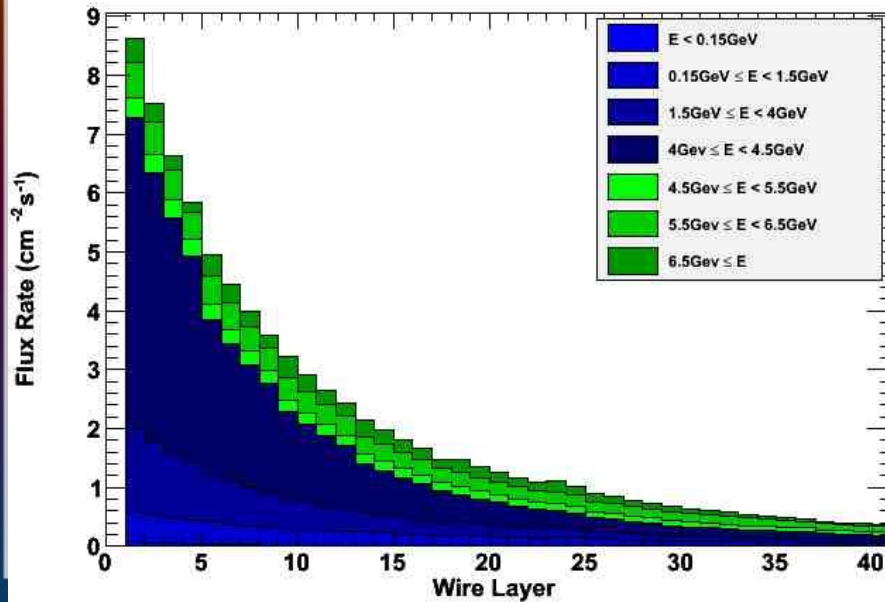
Occupancy Rate per Dch Wire Layer (weddingcake)



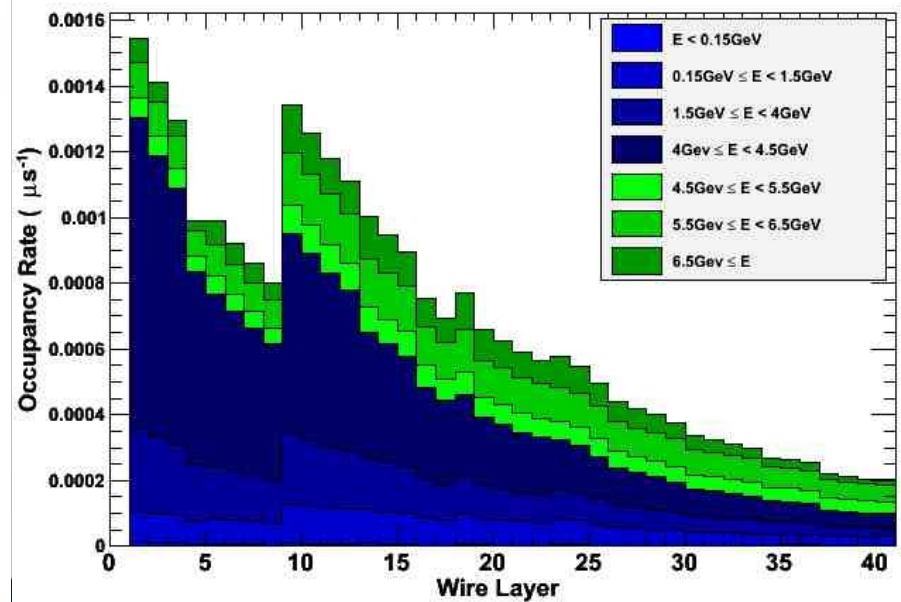
Rate of Particles Entering and Exiting Dch vs. z (weddingcake)



Flux Rate per Dch Wire Layer (weddingcake)

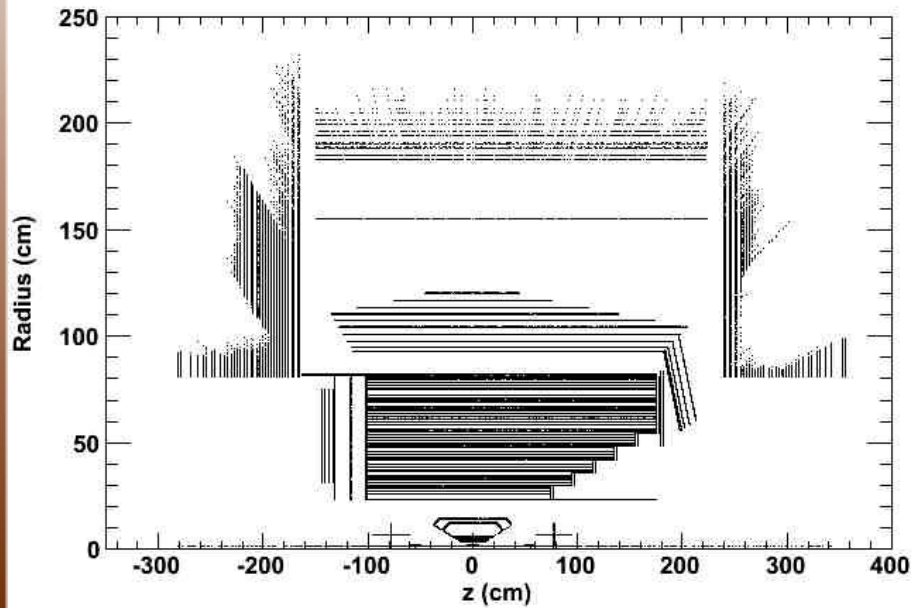


Occupancy Rate per Individual Dch Wire (weddingcake)

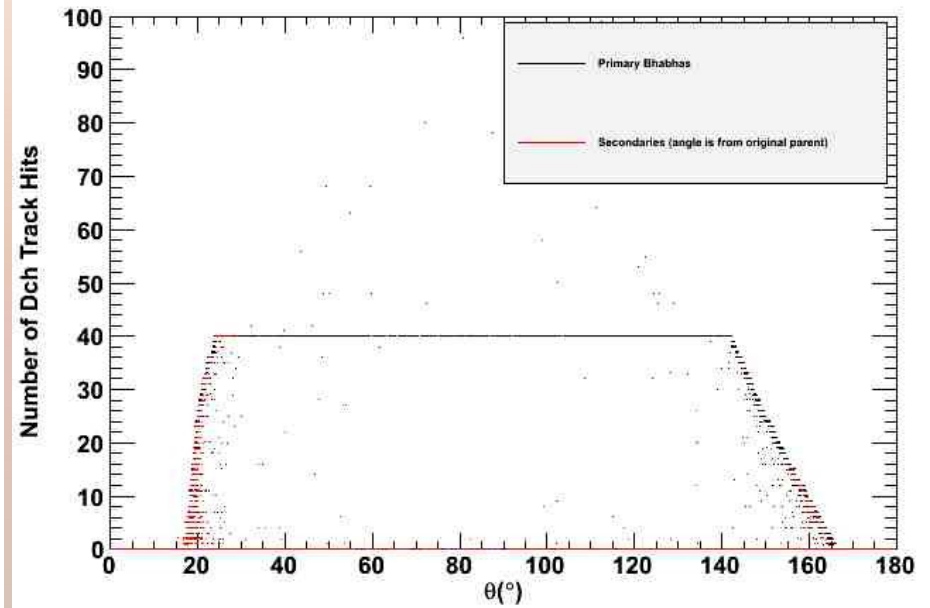


Weddingcake Geometry: SimHit Checks

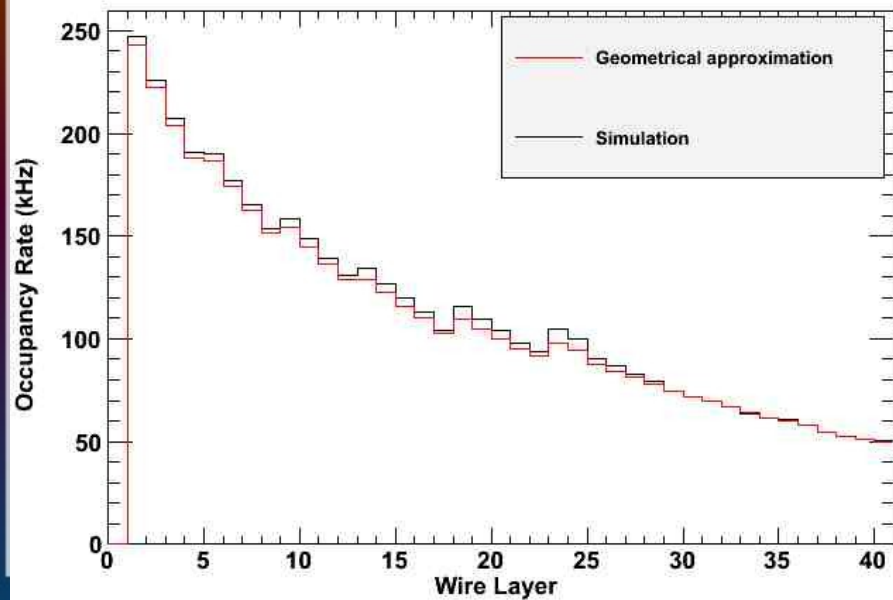
SimHits in Radial-z Plane (weddingcake)



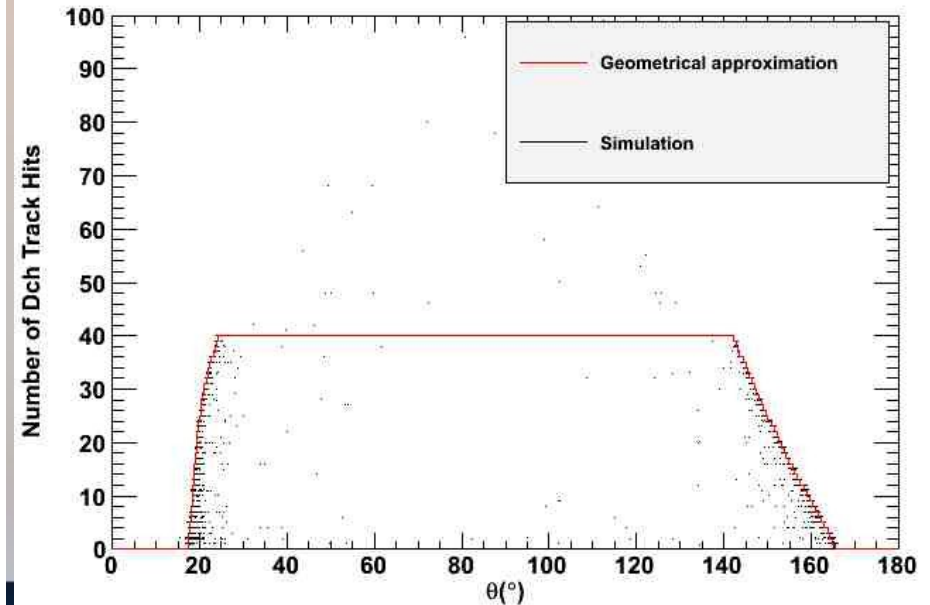
Number of Dch Track Hits vs. θ (weddingcake)



Occupancy Rate per Dch Wire Layer (weddingcake)

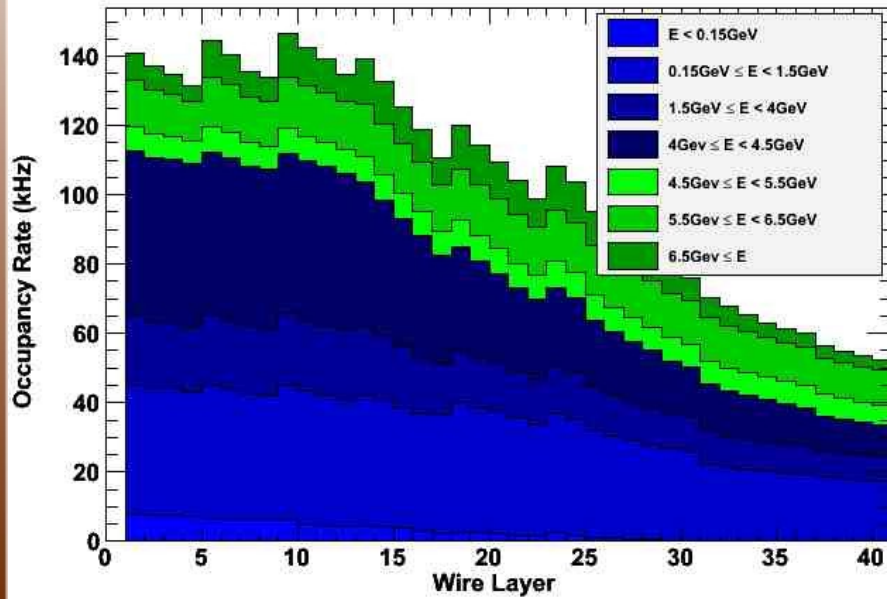


Number of Dch Track Hits vs. θ (weddingcake)

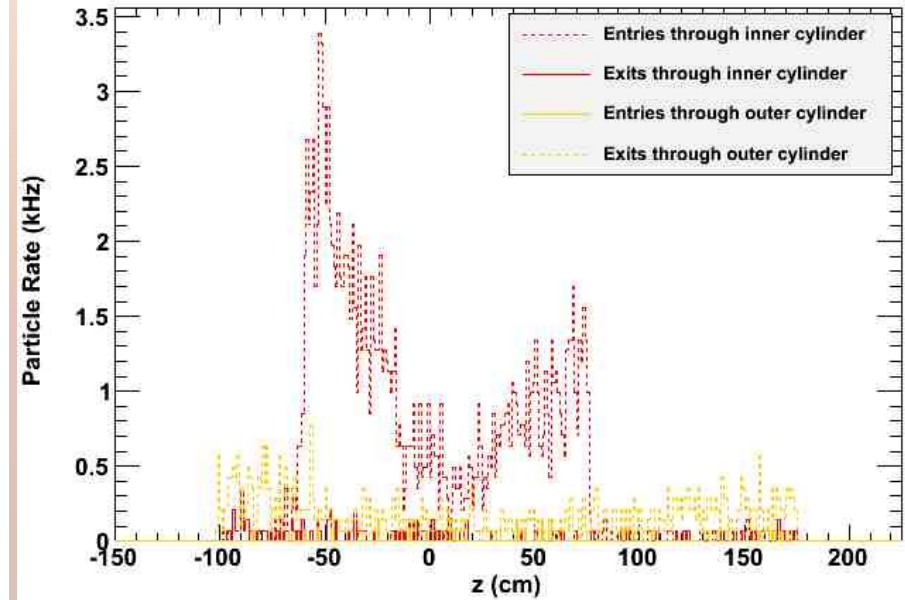


Weddingcake Geometry (shielded): Occupancy Rates

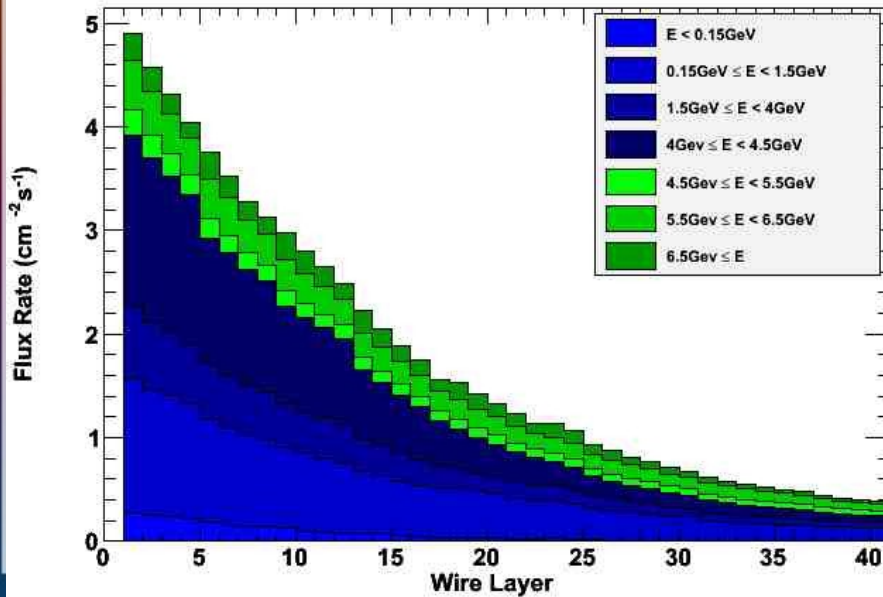
Occupancy Rate per Dch Wire Layer (weddingcake_shielded)



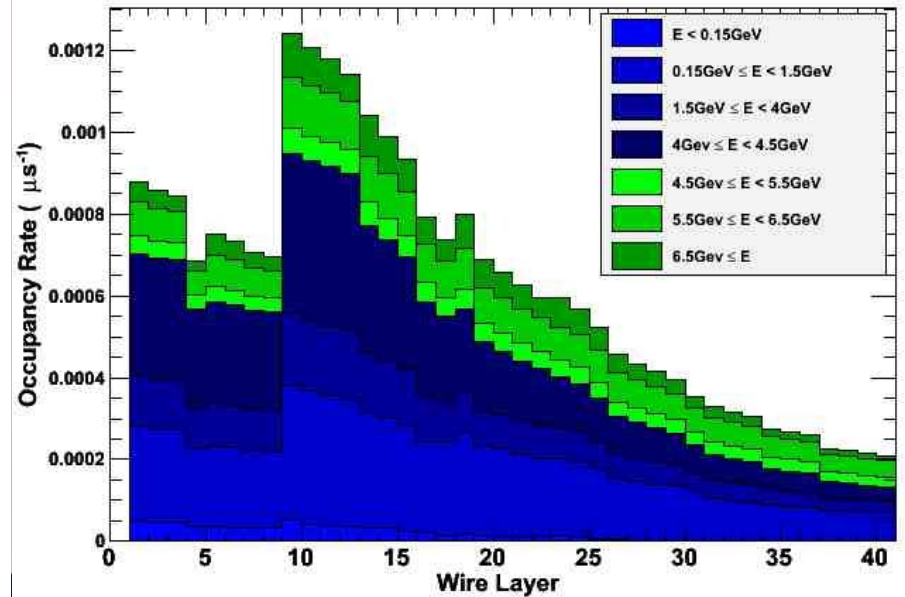
Rate of Particles Entering and Exiting Dch vs. z (weddingcake_shielded)



Flux Rate per Dch Wire Layer (weddingcake_shielded)

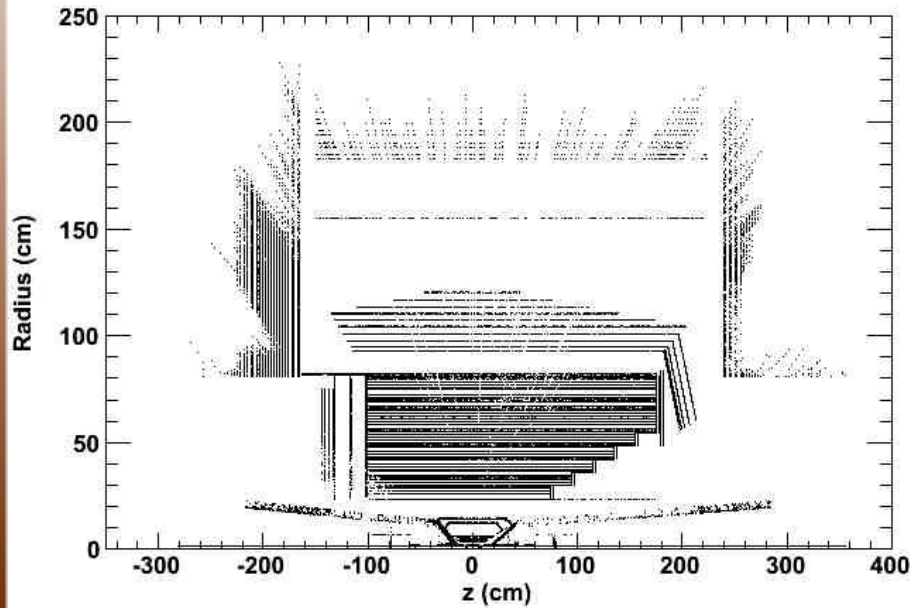


Occupancy Rate per Individual Dch Wire (weddingcake_shielded)

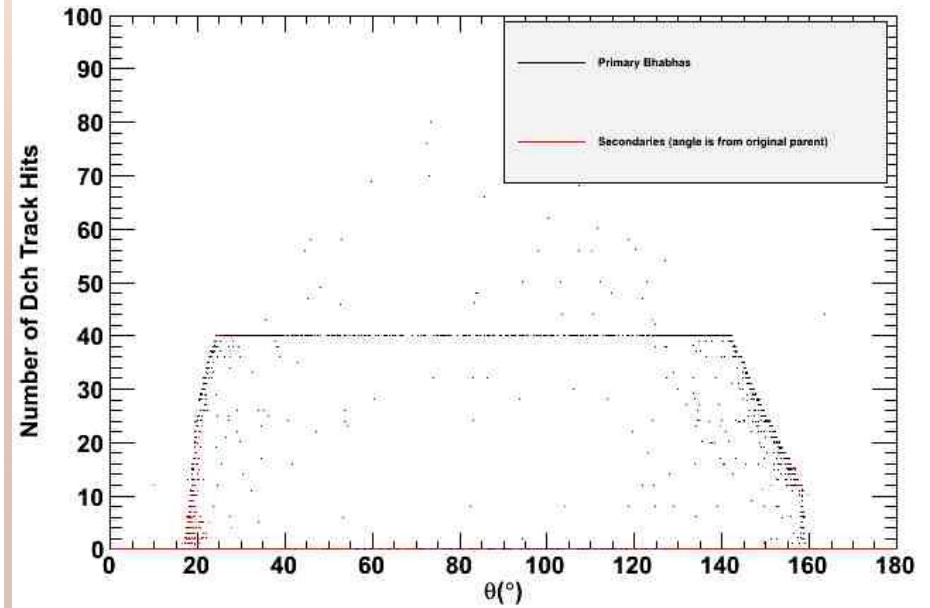


Weddingcake Geometry (shielded): SimHit Checks

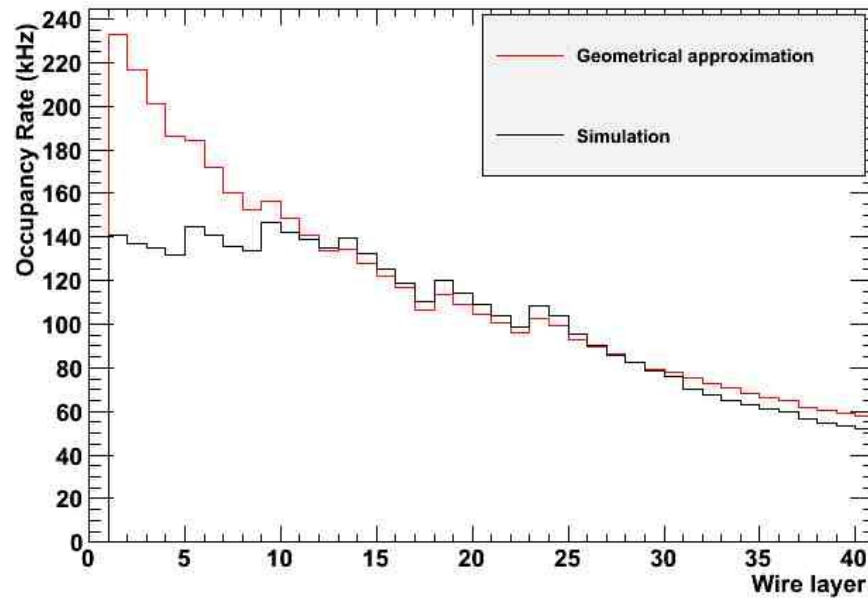
SimHits in Radial-z Plane (weddingcake_shielded)



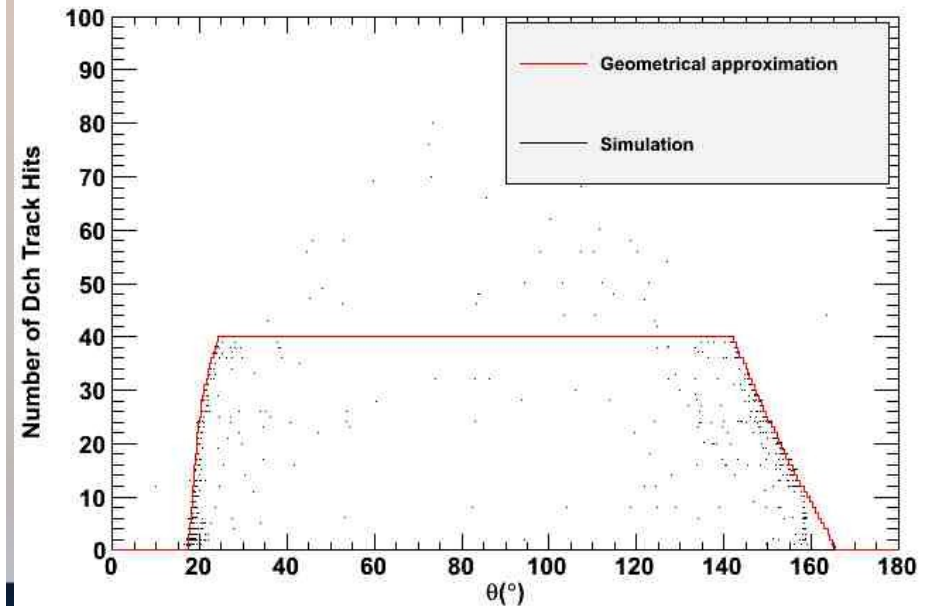
Number of Dch Track Hits vs. θ (weddingcake_shielded)



Predicted Occupancy Rate per Wire Layer

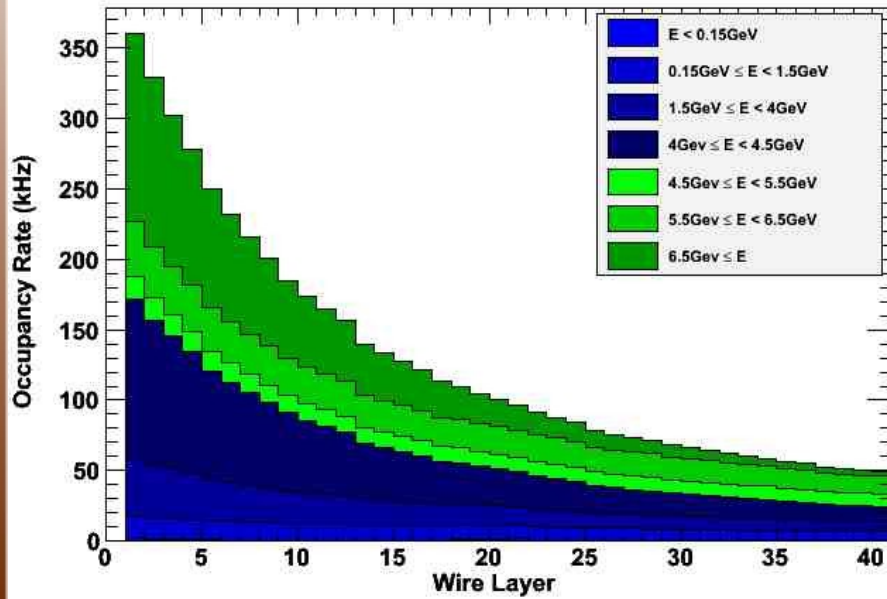


Number of Dch Track Hits vs. θ (weddingcake_shielded)

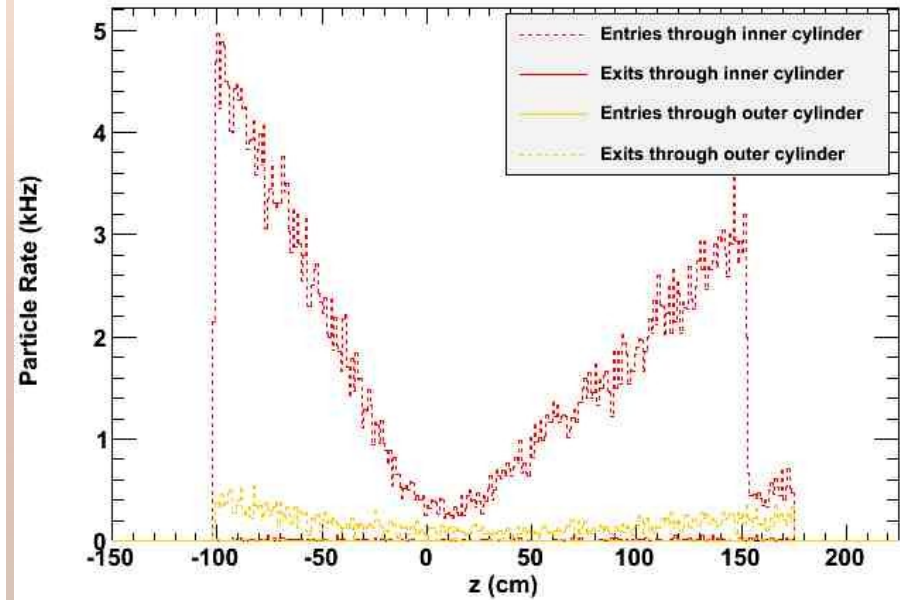


Spherical Geometry: Occupancy Rates

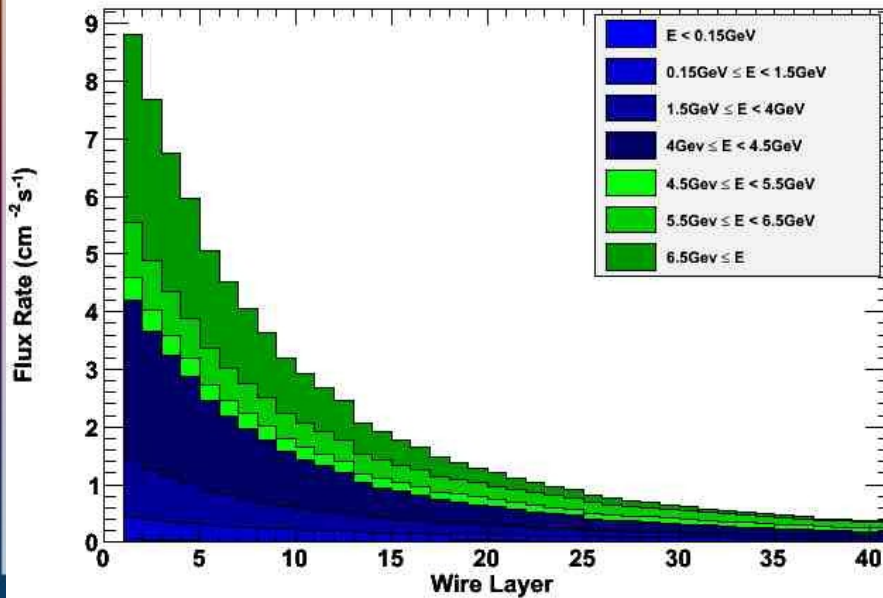
Occupancy Rate per Dch Wire Layer (spherical)



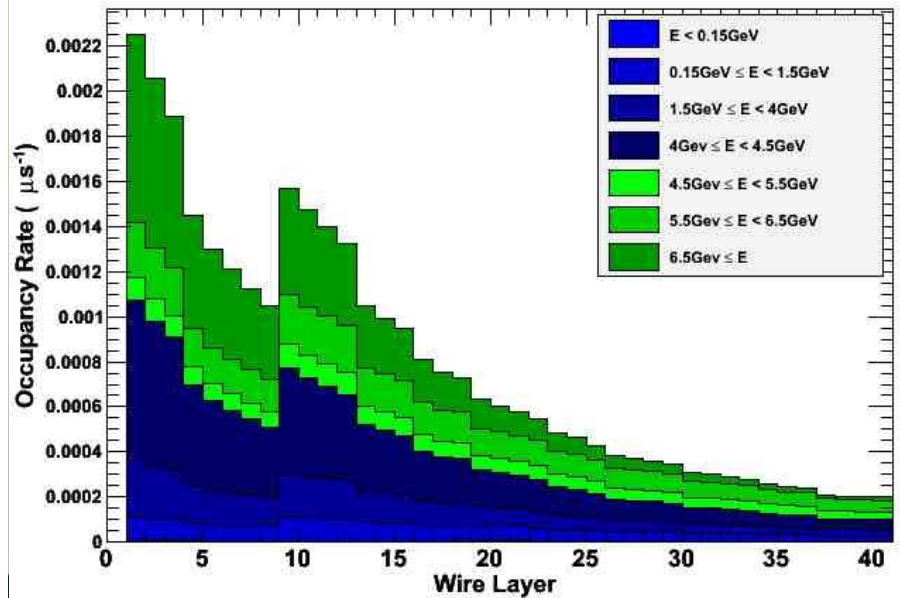
Rate of Particles Entering and Exiting Dch vs. z (spherical)



Flux Rate per Dch Wire Layer (spherical)

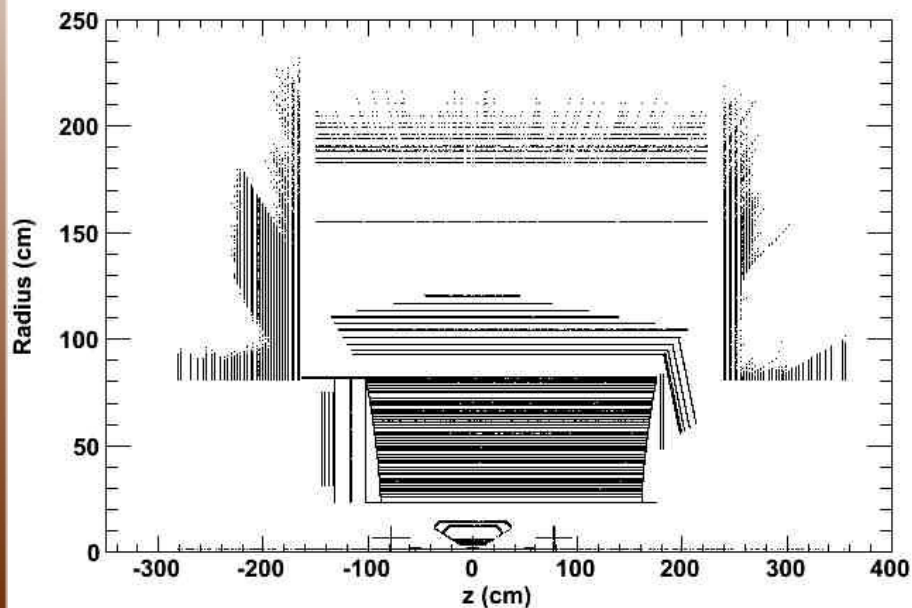


Occupancy Rate per Individual Dch Wire (spherical)

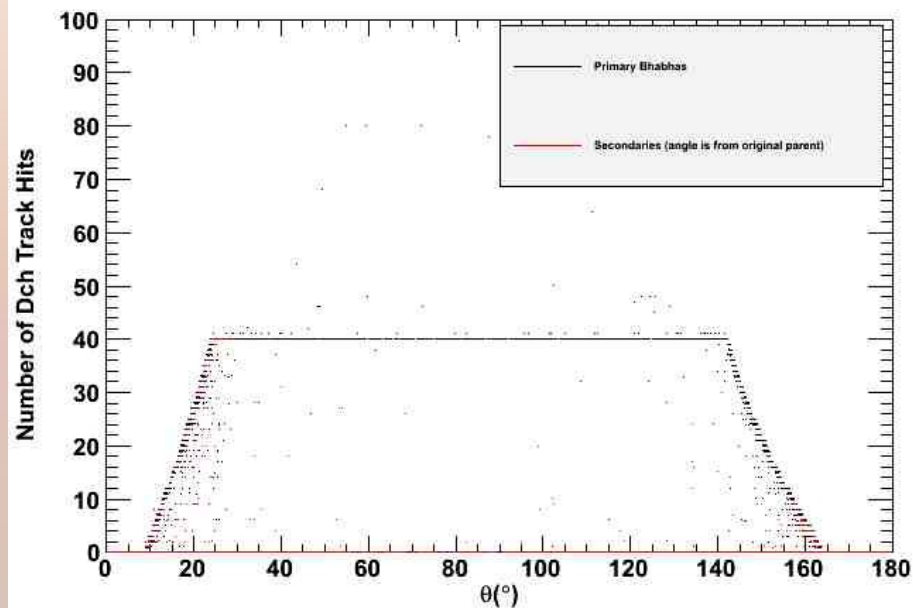


Spherical Geometry: SimHit Checks

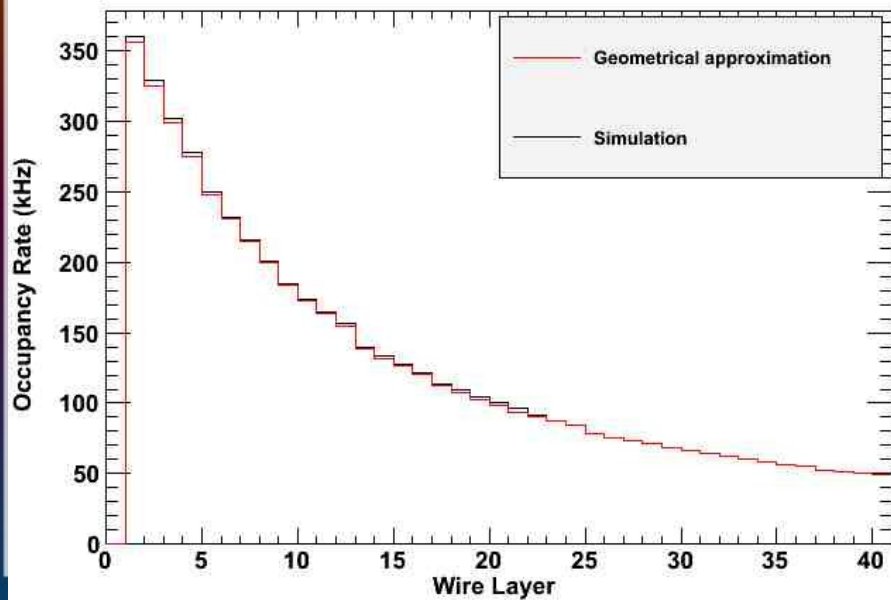
SimHits in Radial-z Plane (spherical)



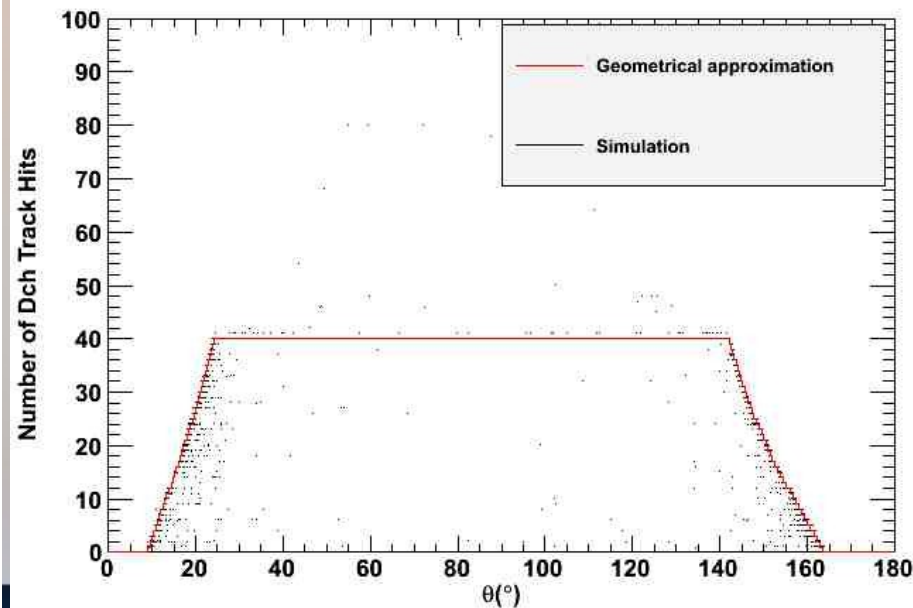
Number of Dch Track Hits vs. θ (spherical)



Occupancy Rate per Dch Wire Layer (spherical)

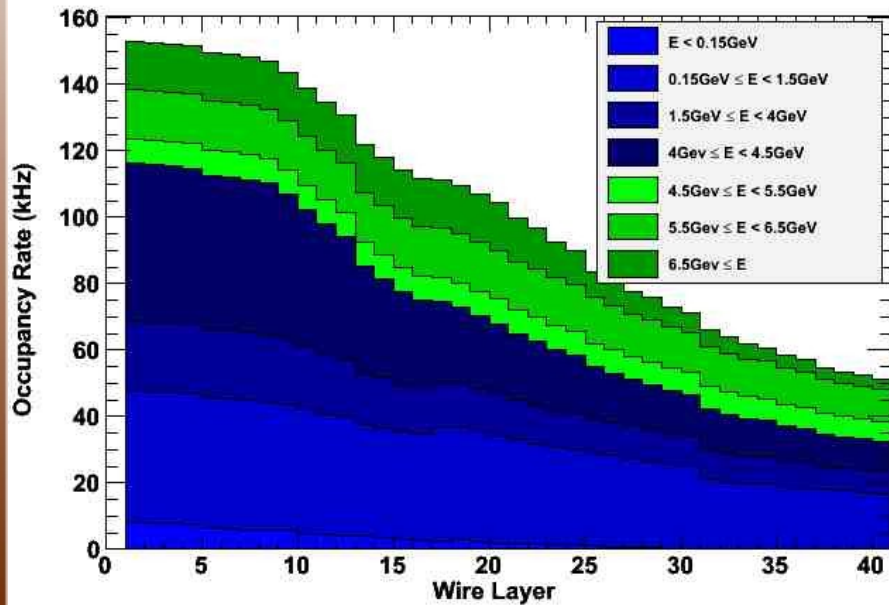


Number of Dch Track Hits vs. θ (spherical)

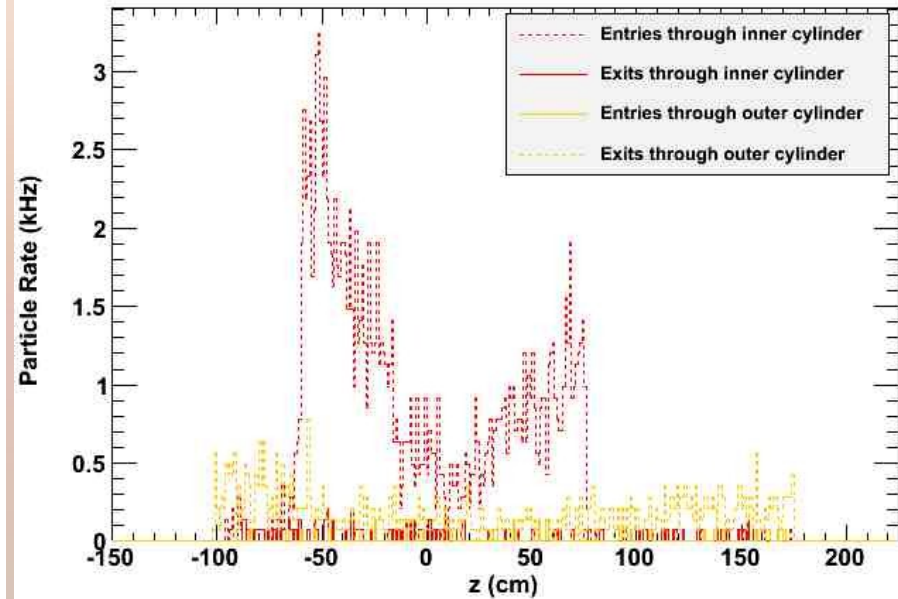


Spherical Geometry (shielded): Occupancy Rates

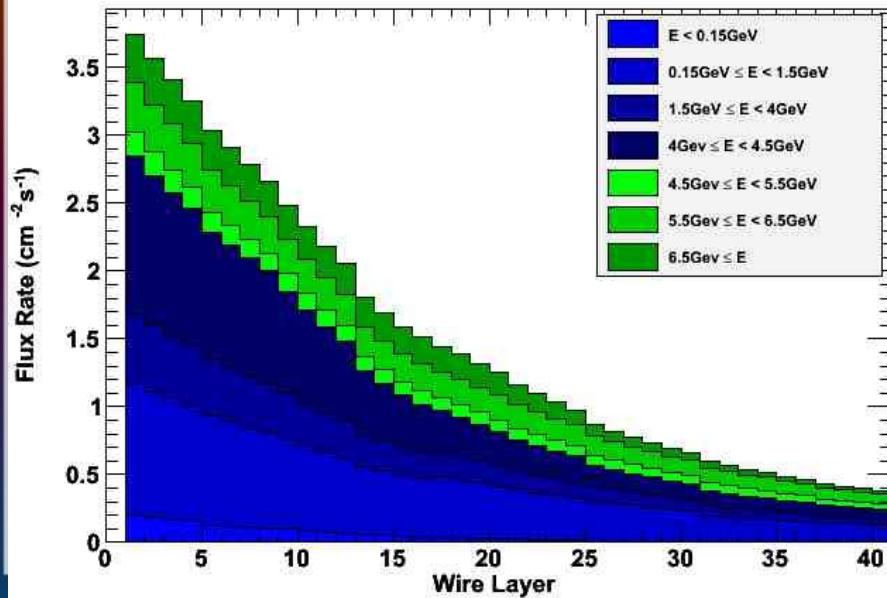
Occupancy Rate per Dch Wire Layer (spherical_shielded)



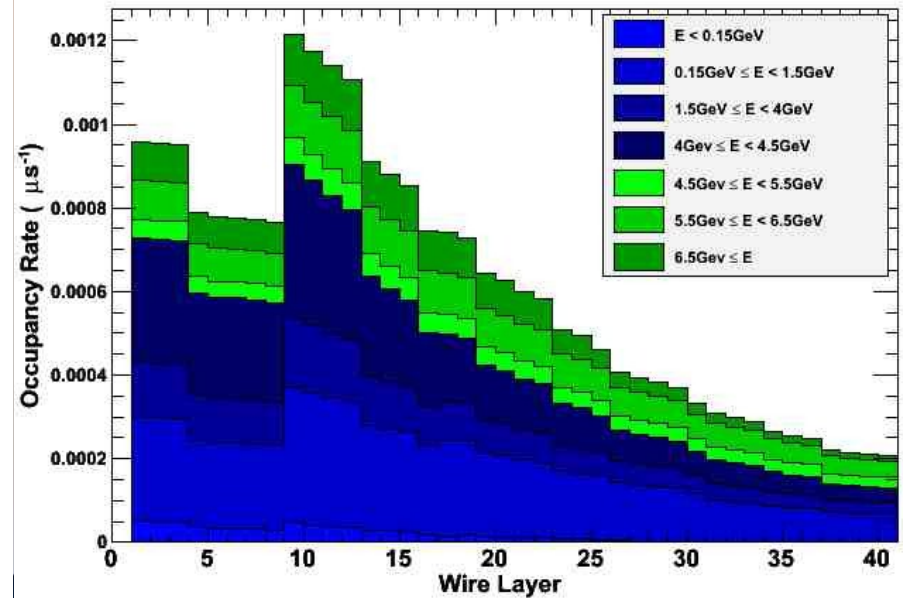
Rate of Particles Entering and Exiting Dch vs. z (spherical_shielded)



Flux Rate per Dch Wire Layer (spherical_shielded)

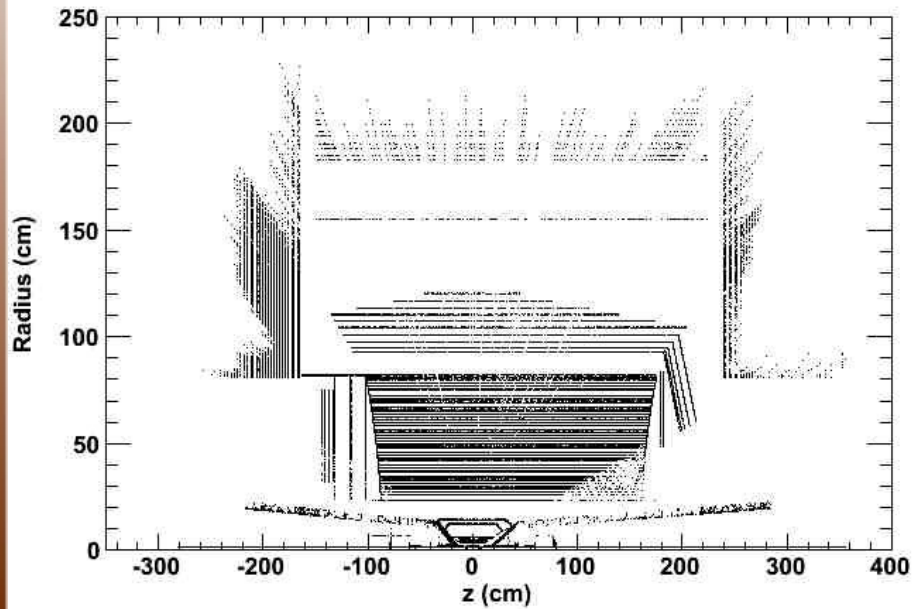


Occupancy Rate per Individual Dch Wire (spherical_shielded)

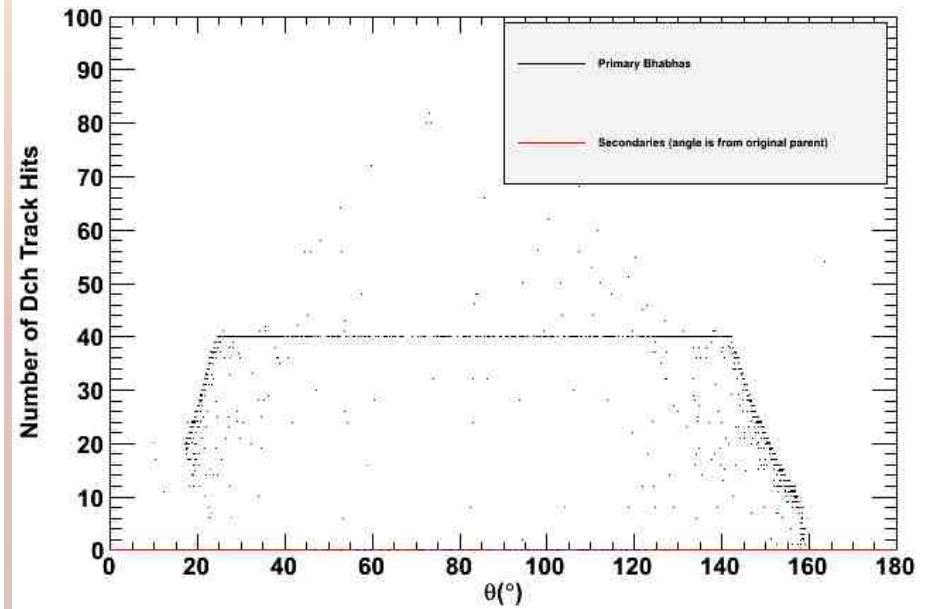


Spherical Geometry (shielded): SimHit Checks

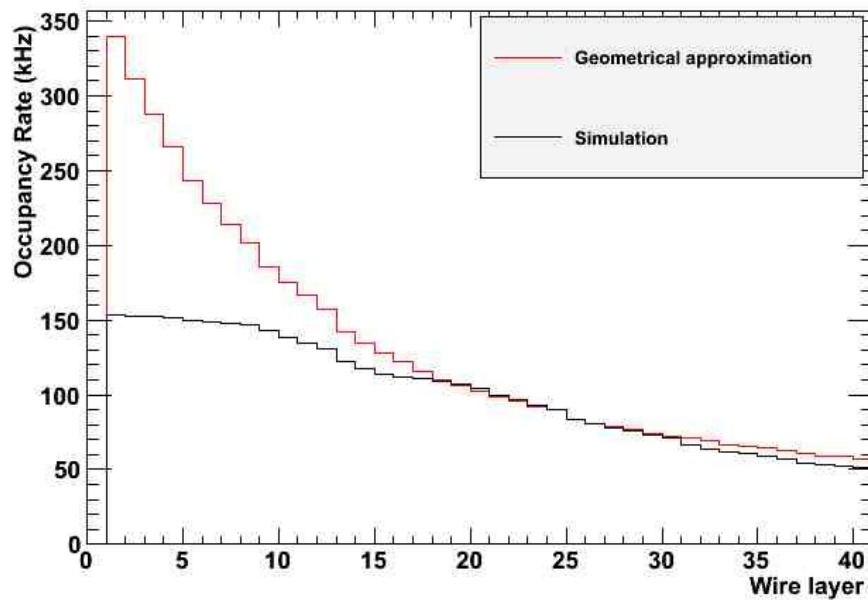
SimHits in Radial-z Plane (spherical_shielded)



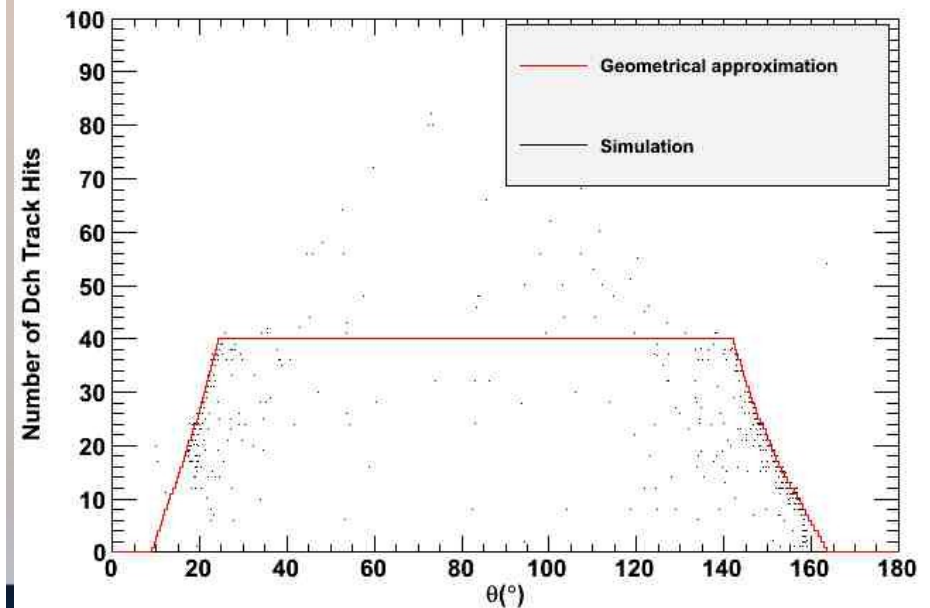
Number of Dch Track Hits vs. θ (spherical_shielded)



Predicted Occupancy Rate per Wire Layer

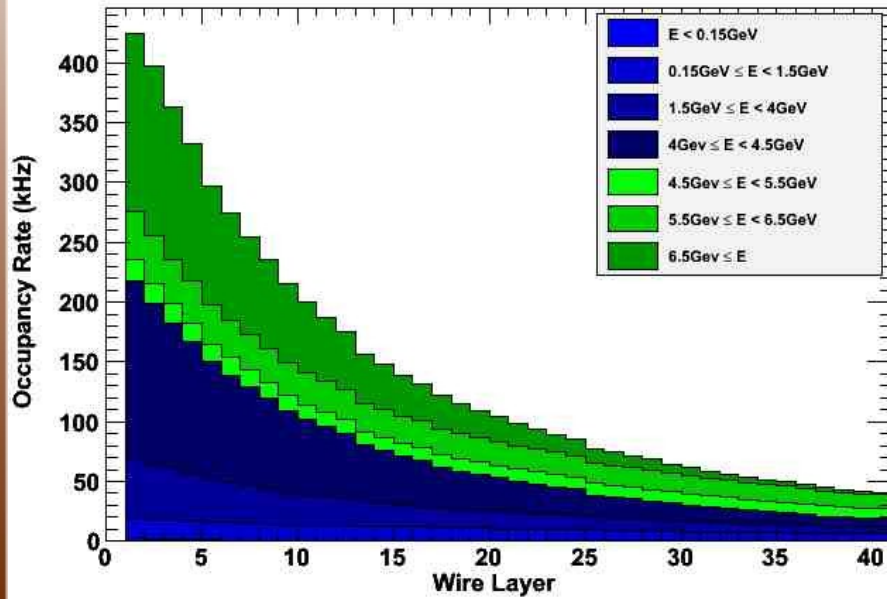


Number of Dch Track Hits vs. θ (spherical_shielded)

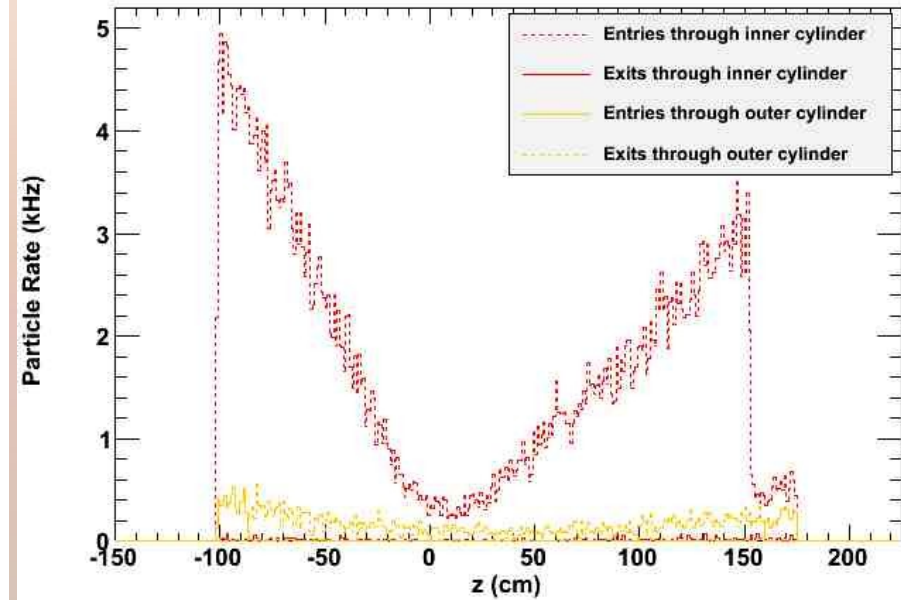


Convex Geometry: Occupancy Rates

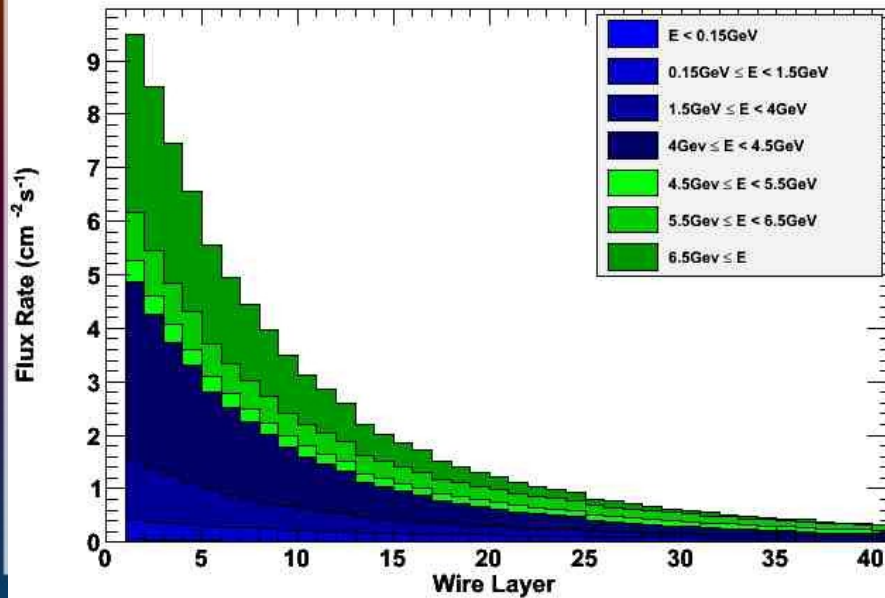
Occupancy Rate per Dch Wire Layer (convex)



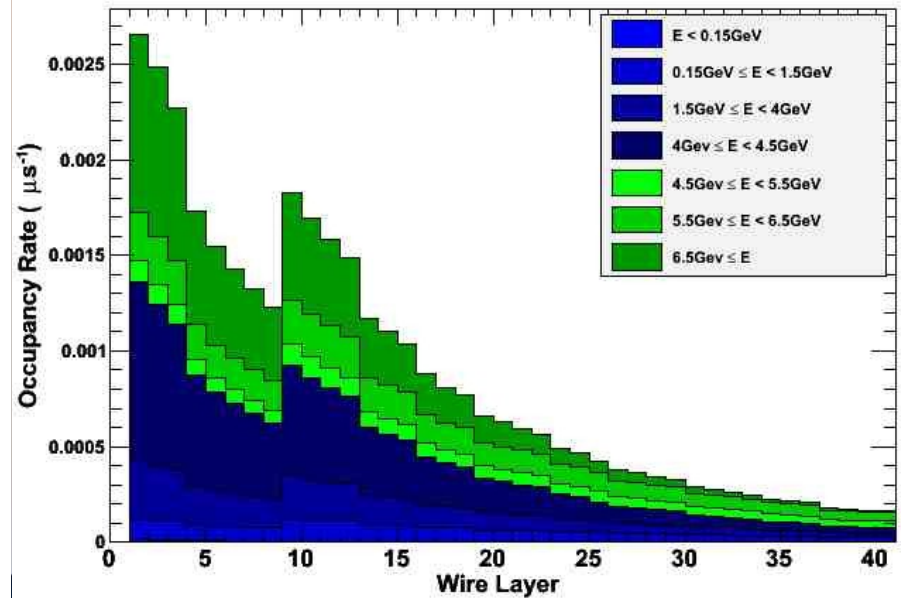
Rate of Particles Entering and Exiting Dch vs. z (convex)



Flux Rate per Dch Wire Layer (convex)

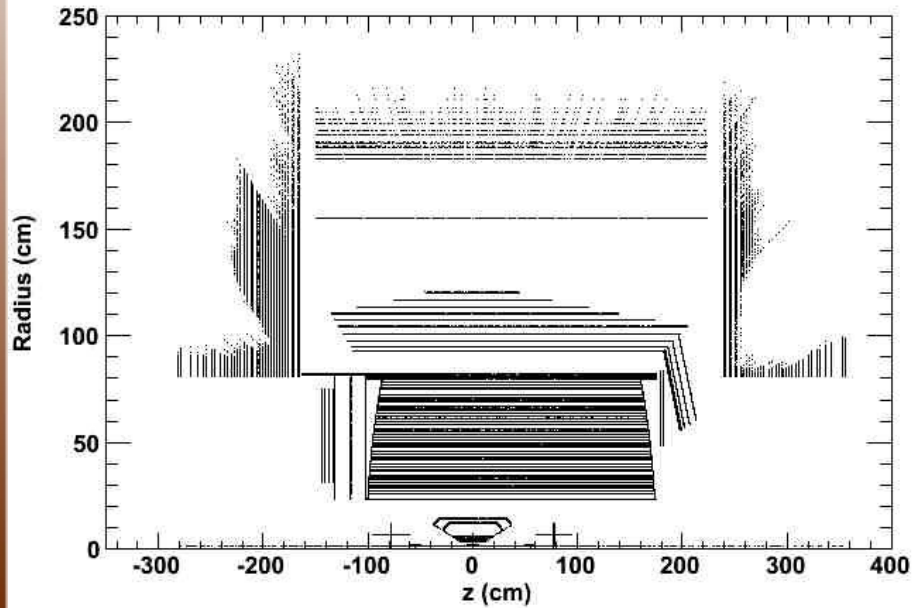


Occupancy Rate per Individual Dch Wire (convex)

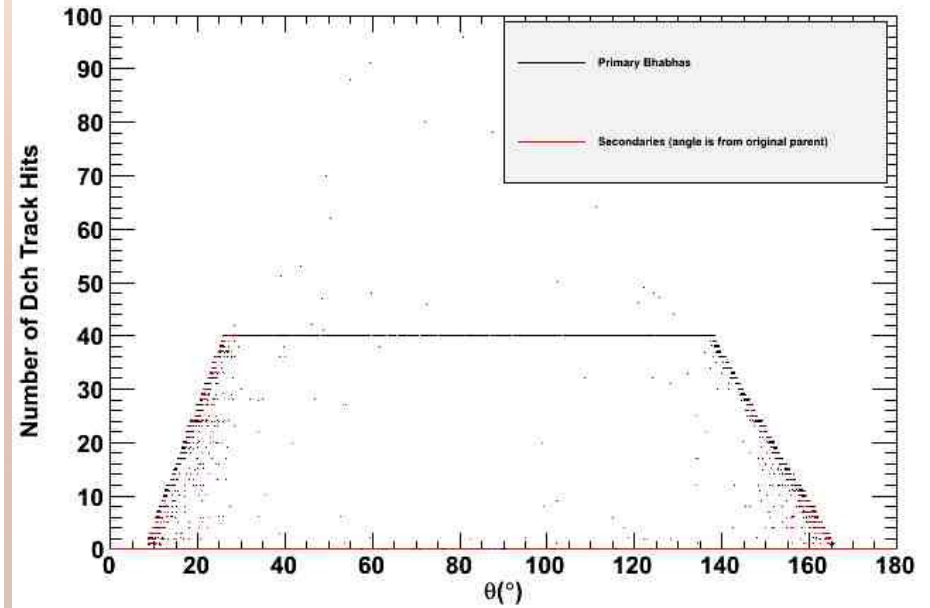


Convex Geometry: SimHit Checks

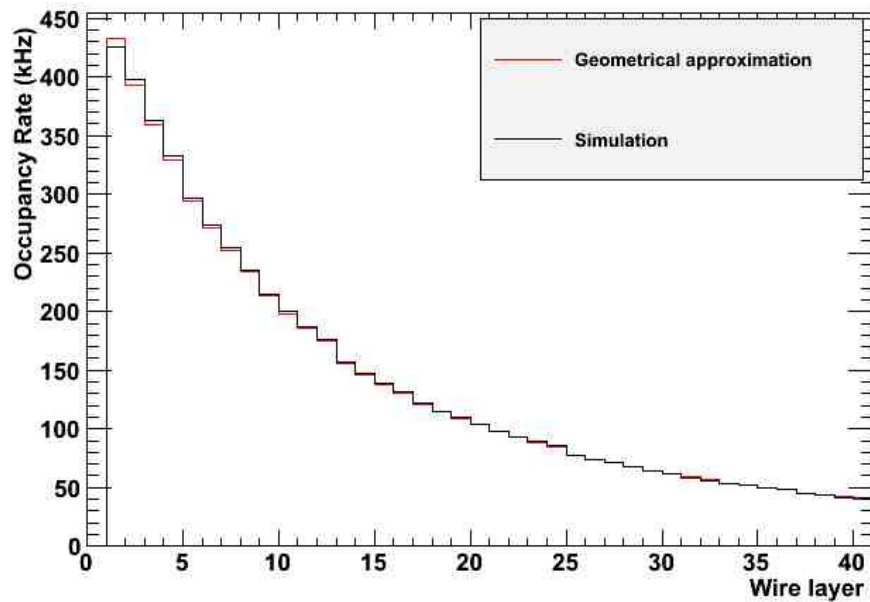
SimHits in Radial-z Plane (convex)



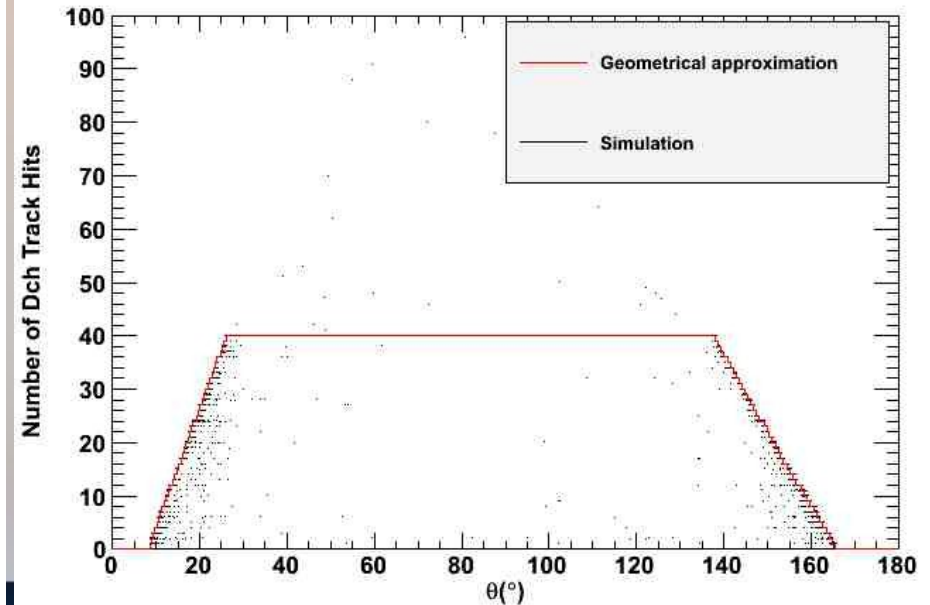
Number of Dch Track Hits vs. θ (convex)



Predicted Occupancy Rate per Wire Layer

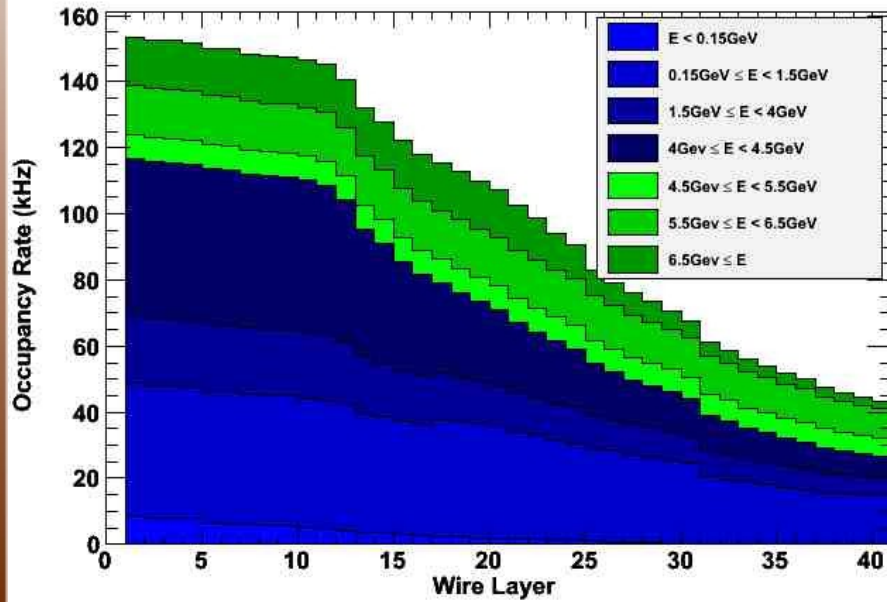


Number of Dch Track Hits vs. θ (convex)

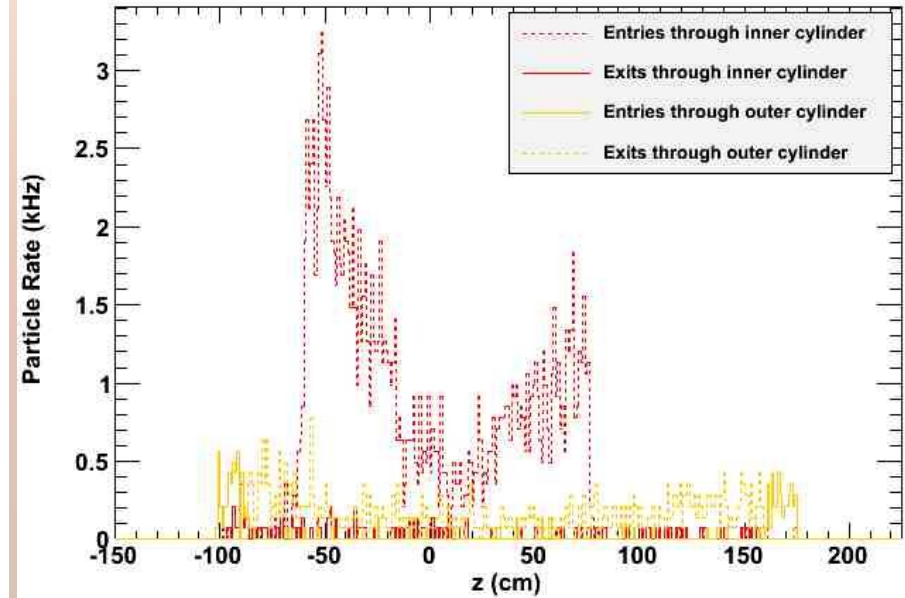


Convex Geometry (shielded): Occupancy Rates

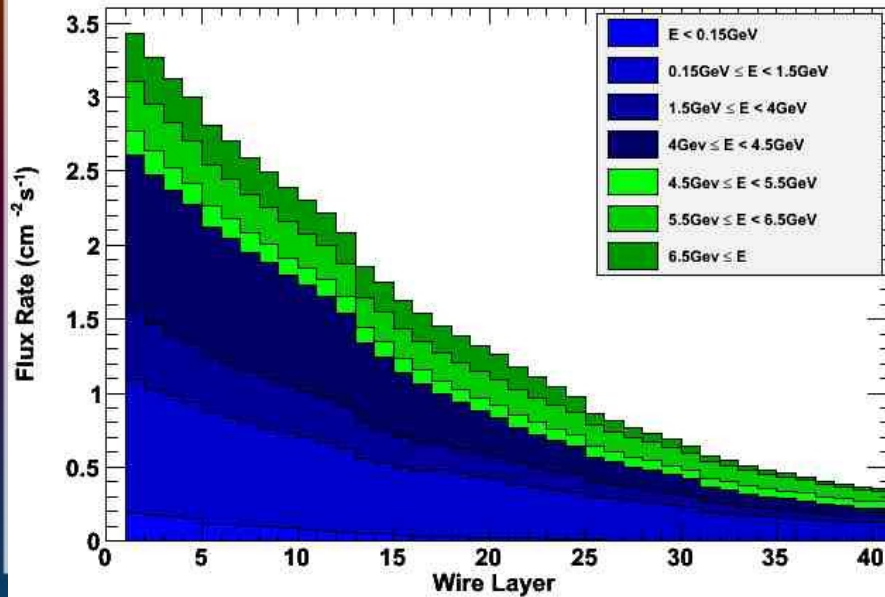
Occupancy Rate per Dch Wire Layer (convex_shielded)



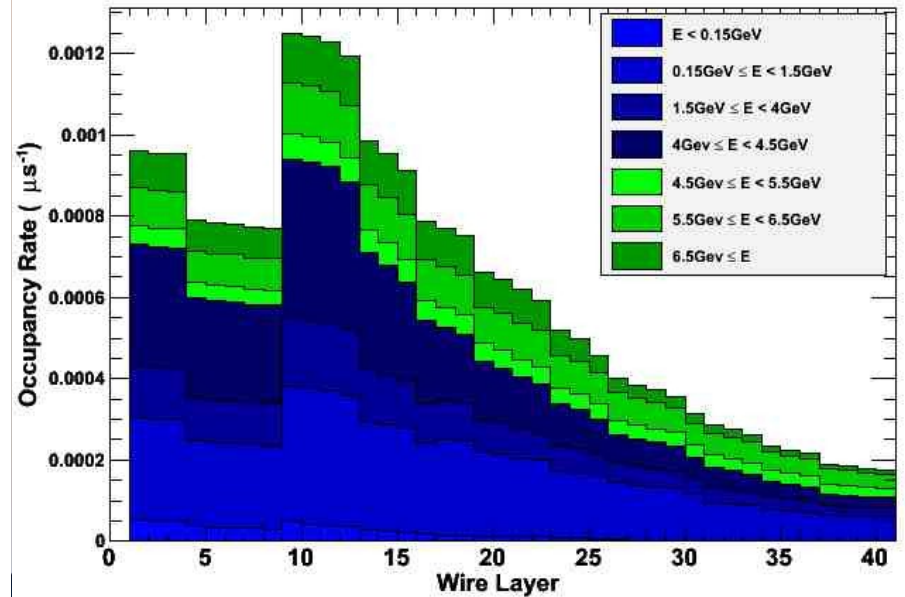
Rate of Particles Entering and Exiting Dch vs. z (convex_shielded)



Flux Rate per Dch Wire Layer (convex_shielded)

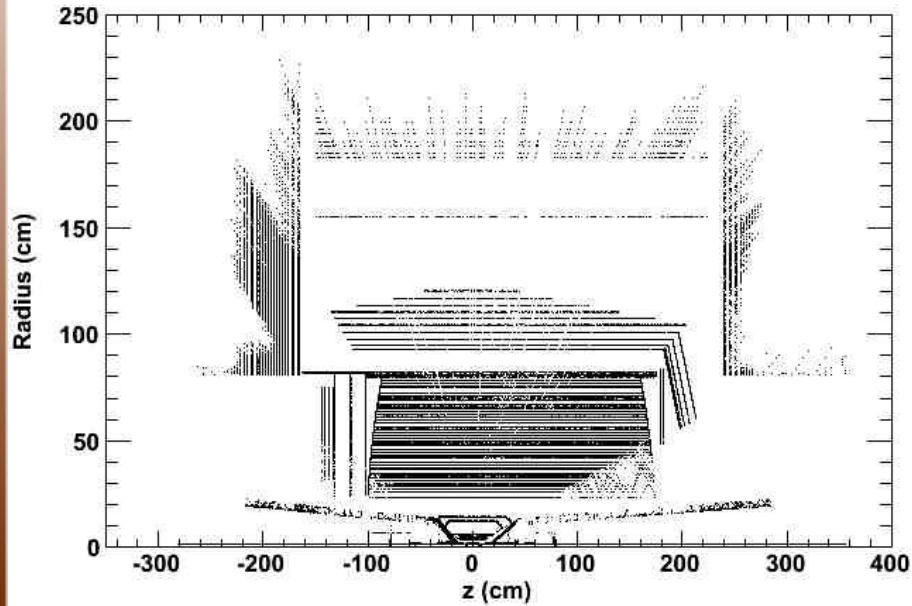


Occupancy Rate per Individual Dch Wire (convex_shielded)

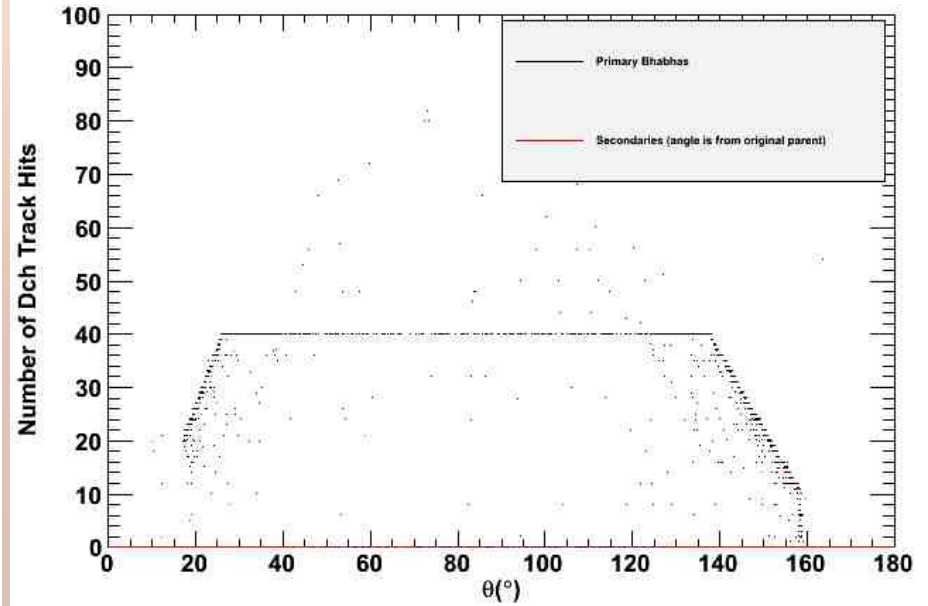


Convex Geometry (shielded): SimHit Checks

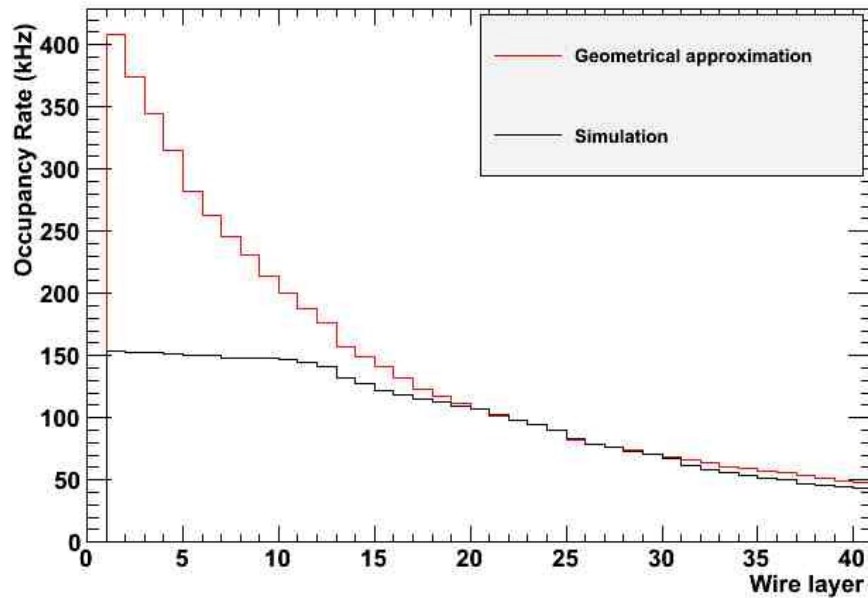
SimHits in Radial-z Plane (convex_shielded)



Number of Dch Track Hits vs. θ (convex_shielded)



Predicted Occupancy Rate per Wire Layer



Number of Dch Track Hits vs. θ (convex_shielded)

