

# Update on Pair Background Studies

## Outline:

- > VXD hit study – ~5x increase in ILD\_o1\_v05 w.r.t. LOI (ILD\_00fw)
- > Comparison of back-scatter patterns
- > Origin of background increase: fieldX03 (new anti-DID)
- > Update of the background hit densities for DBD

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Update on Pair Background Studies  
DESY, 23 January 2013



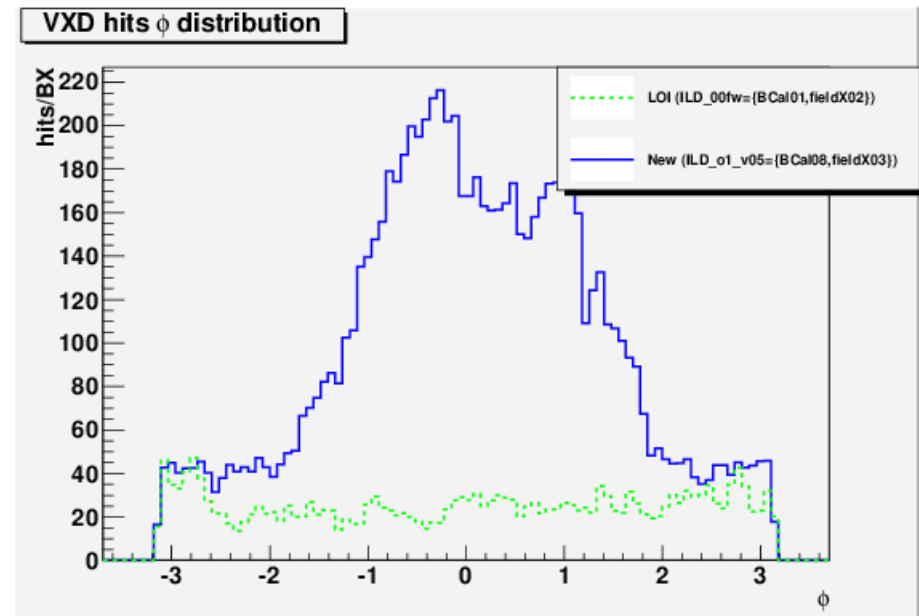
# Observation of increased backgrounds in new simulations

Total number of hits observed  
In VXD  $\sim 5x$  larger than quoted  
In LOI.

Angular distribution reveals a  
hot spot.

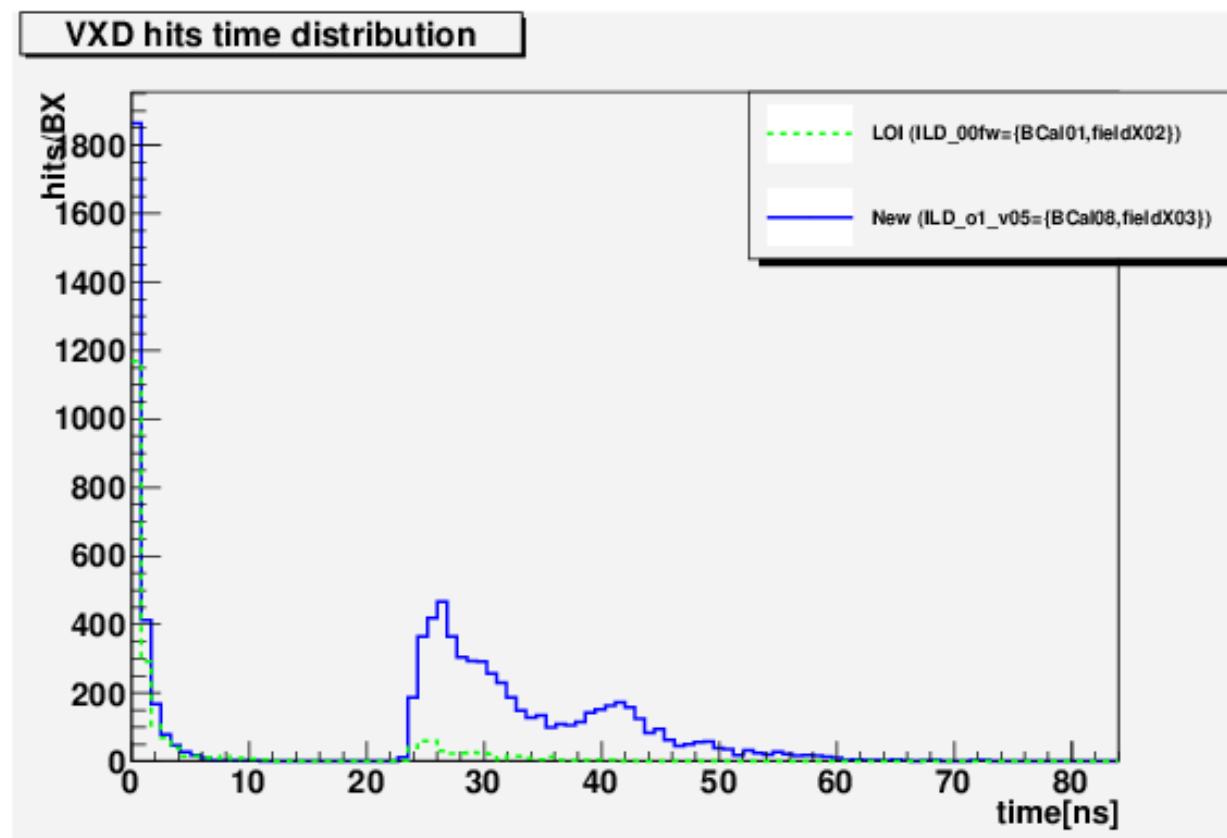
Main changes in the setup:

- BCal08 vs BCal01
- fieldX03 vs fieldX02



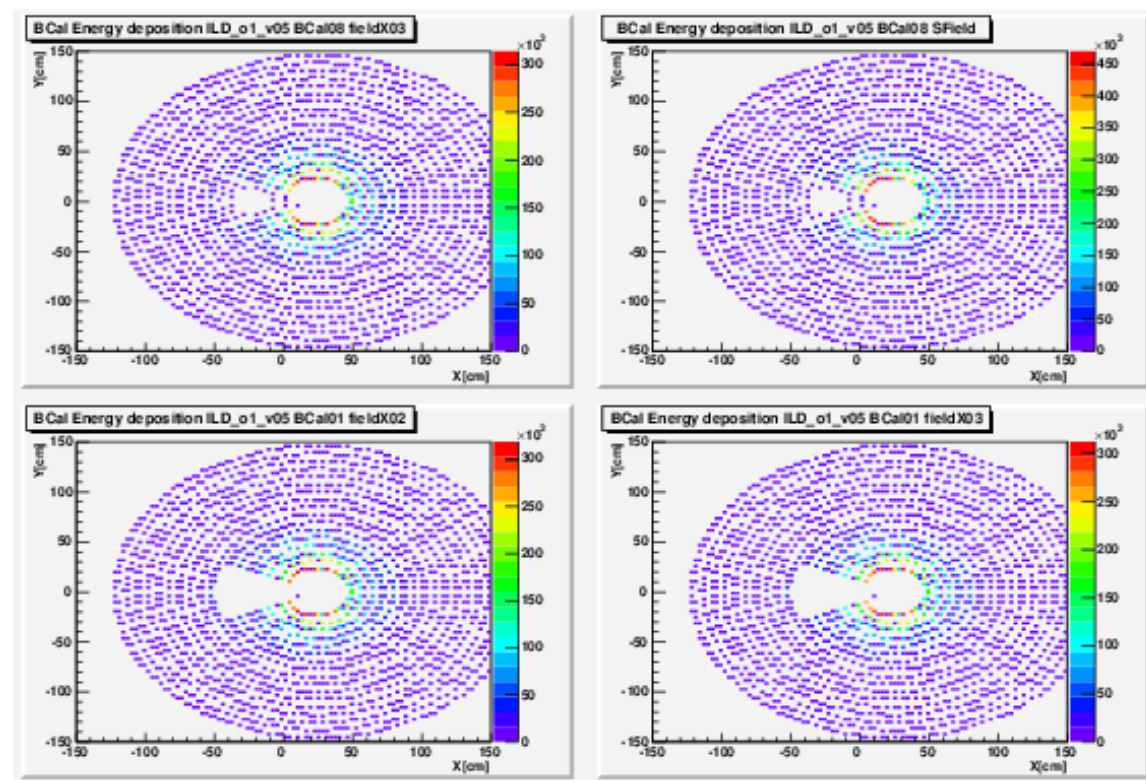
# Backscatter pattern study

The timing of the hits revealed a surplus of backscattered particles from BCal area (~23ns ~2x3500mm)



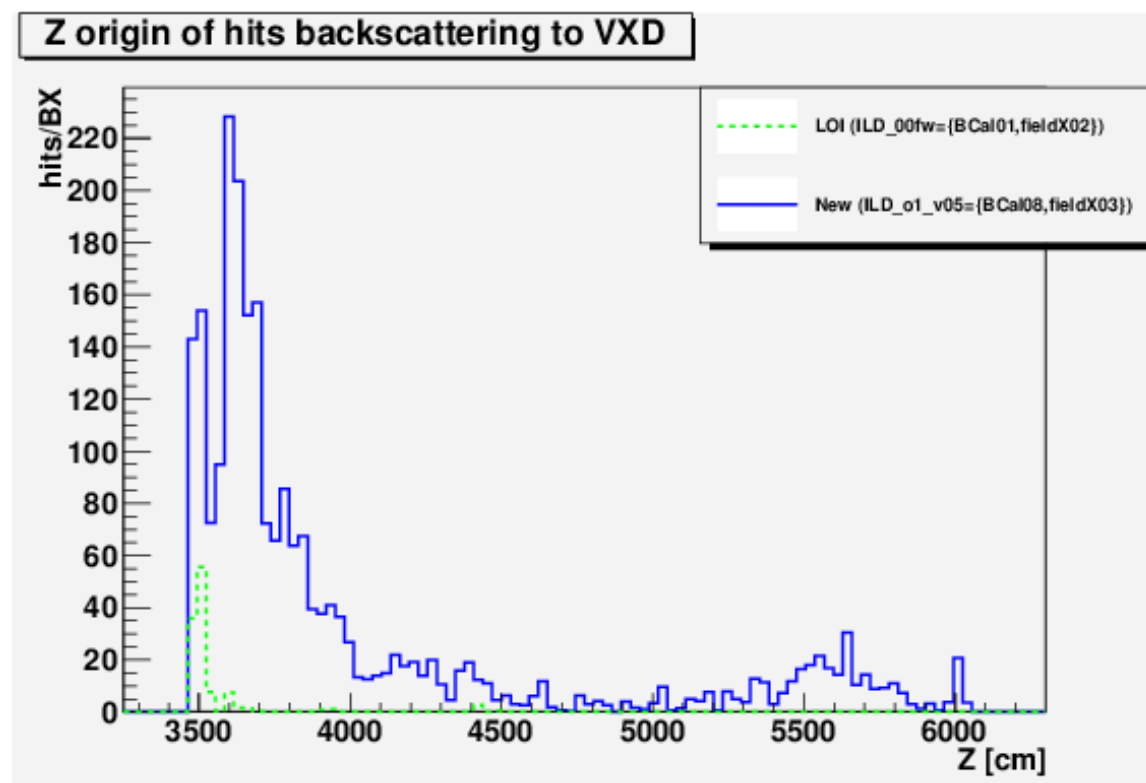
# Backscatter pattern study

BCal geometry difference clearly observed in the hits X/Y distribution



# Backscatter pattern study

The Z-vertex distribution also revealed that most of the extra hits come from the region of and behind BCal.



## Additional studies:

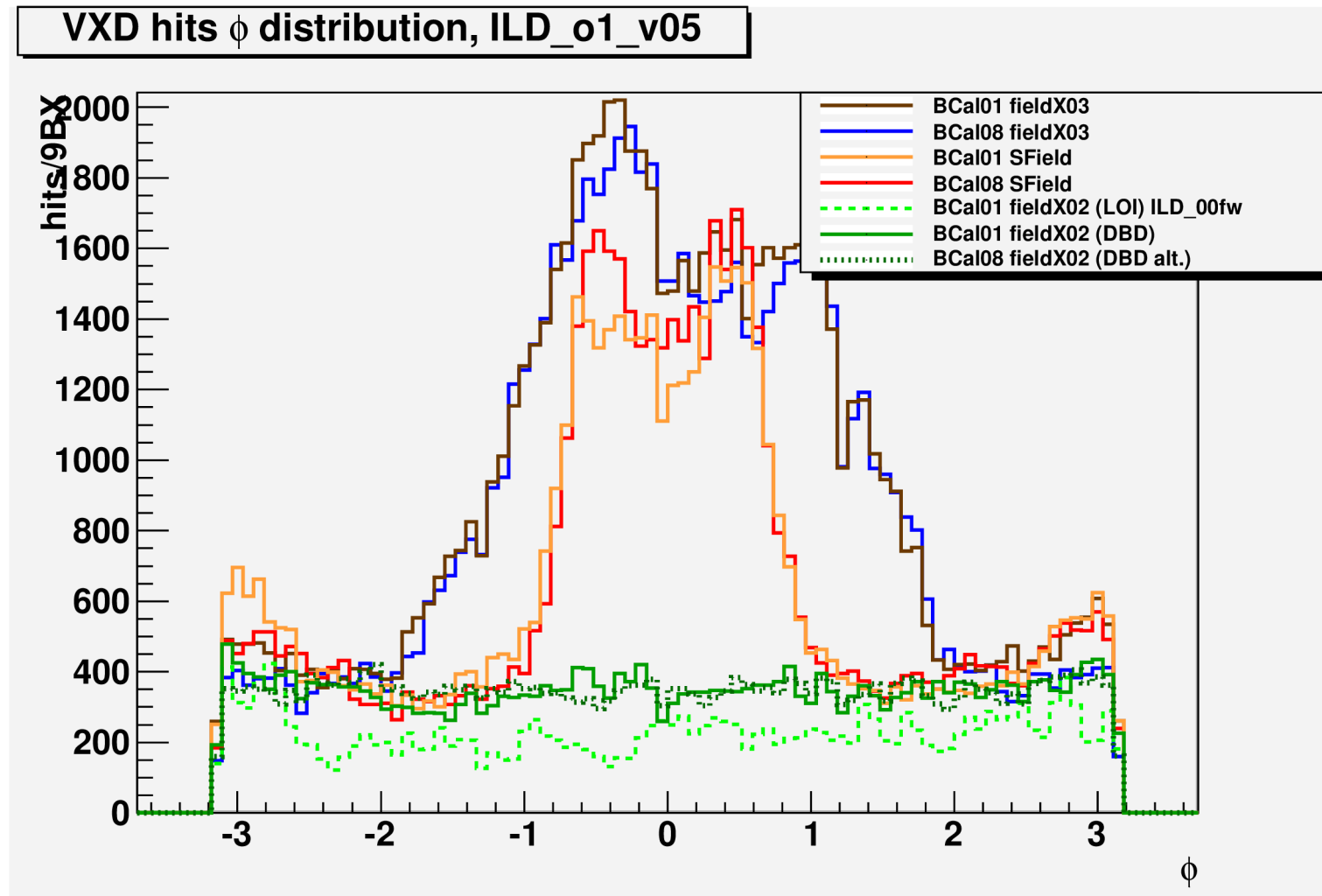
Several combinations of the field and detector geometries were studied:

| Base       | Variation                        |
|------------|----------------------------------|
| ILD_00fw   | BCal01, fieldX02 (default = LOI) |
| ILD_00fw   | BCal01, fieldX02 (new beam)      |
| ILD_o1_v05 | BCal01, fieldX02                 |
| ILD_o1_v05 | BCal08, fieldX02                 |
| ILD_o1_v05 | BCal01, fieldX03                 |
| ILD_o1_v05 | BCal08, fieldX03 (default)       |
| ILD_o1_v05 | BCal01, SField                   |
| ILD_o1_v05 | BCal08, SField                   |



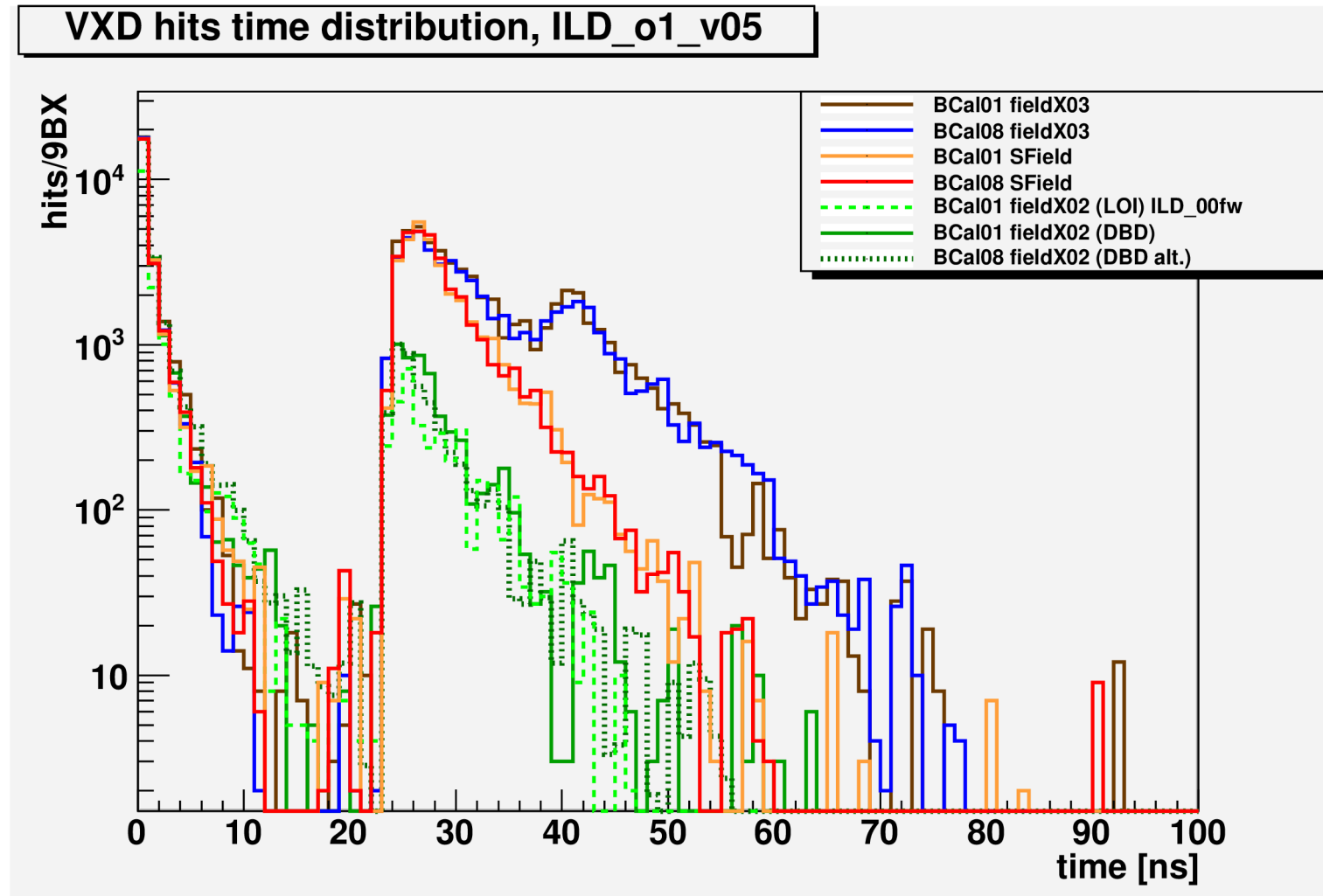
# Origin of the background:

Bcal geometries agree within each other, while the magnetic fields play big role



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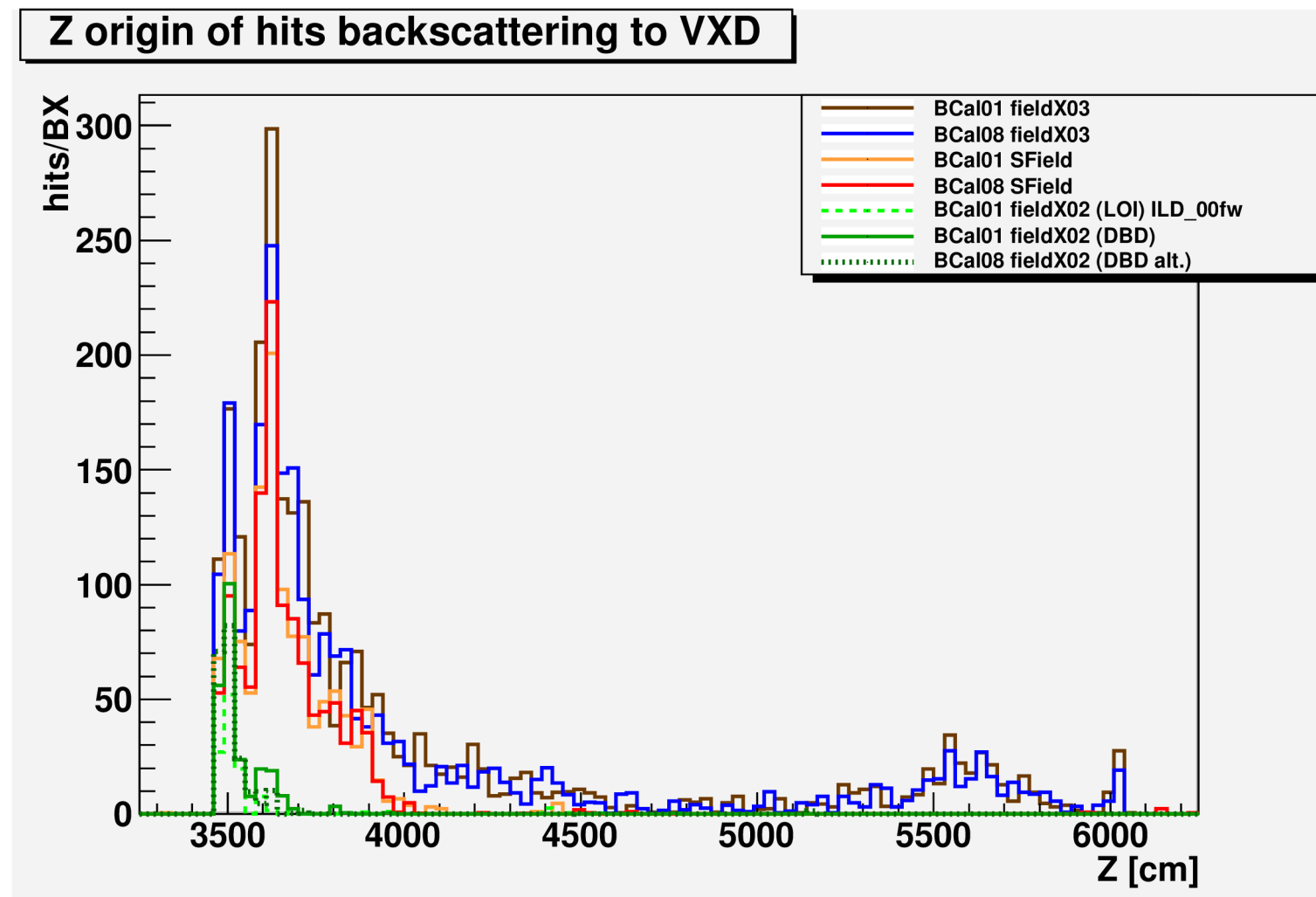
Bcal geometries agree within each other, while the magnetic fields play big role





# Origin of the background:

Bcal geometries agree within each other, while the magnetic fields play big role



## Update of the hit densities:

Proposal: use the ILD\_o1\_v05 with BCal08 driver and fieldX02 anti-DID field

| Detector   | LOI   | DBD       |
|------------|-------|-----------|
| VXD Layers | 7.124 | 11.9491   |
|            | 4.516 | 7.45939   |
|            | 0.340 | 0.421855  |
|            | 0.248 | 0.389899  |
|            | 0.046 | 0.0900772 |
|            | 0.032 | 0.075104  |

