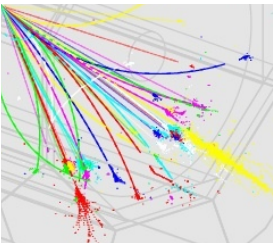


CALICE Meeting

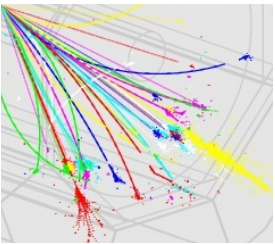
RAL 08.02.2007

M. Stanitzki



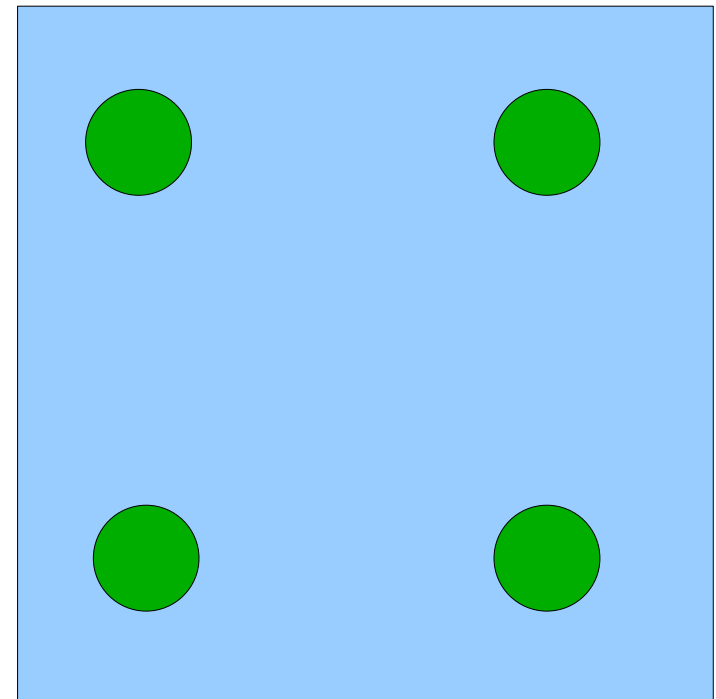
Overview

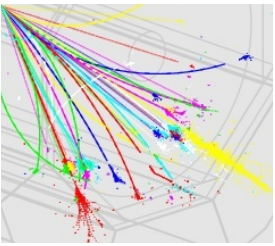
- Pixel Positioning (Giulio and Marcel)
- Hit occupancies



The Problem

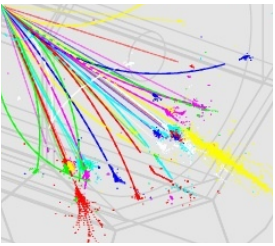
- How to place the n diodes within the pixel
- Want to optimize coverage
- 4 Diodes relatively simple
- >4 Diodes unclear
- No analytical solution available





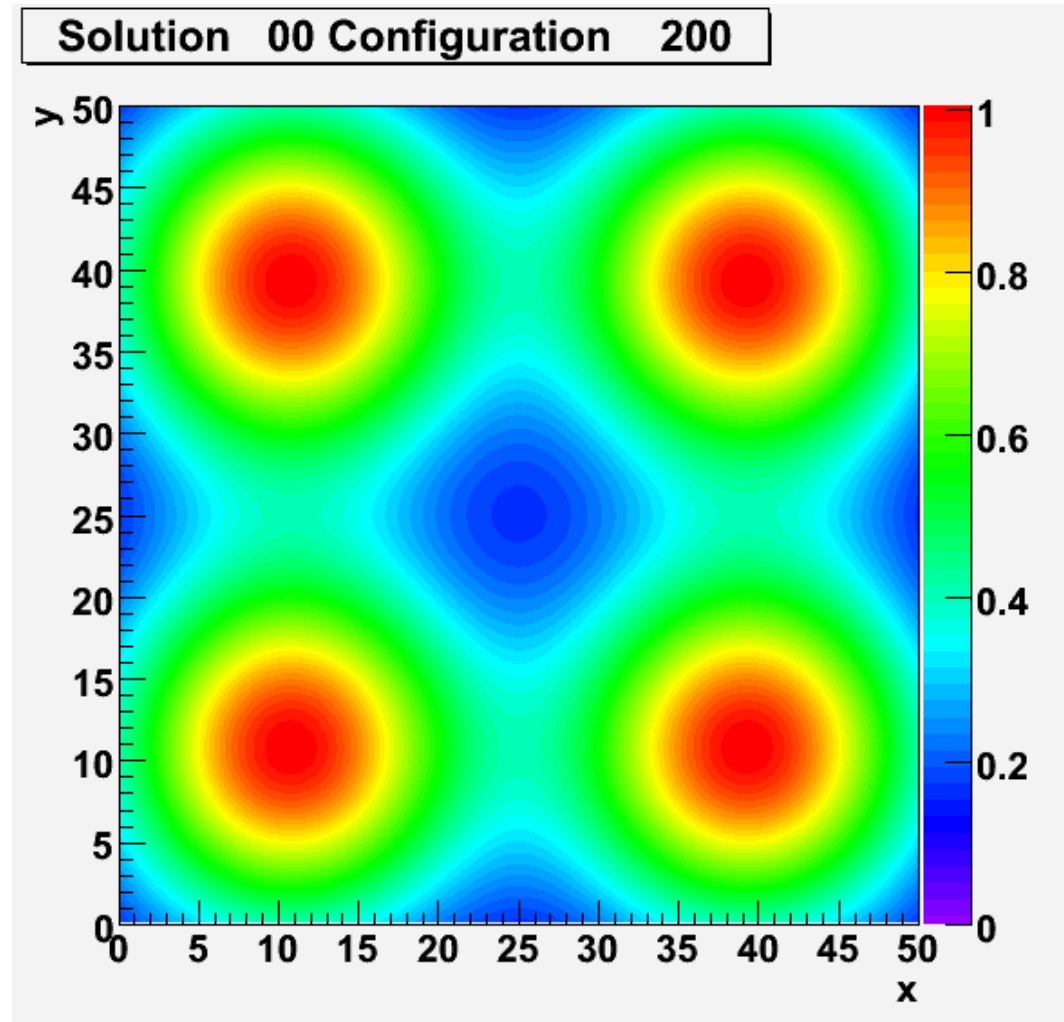
Our Approach

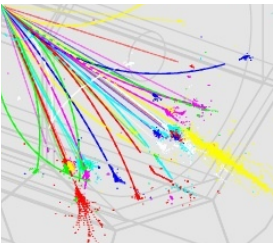
- Use randomly generated configurations
- Diode field approximated as Gaussian with a radial symmetry
- For all configuration calculate the point with the minimum collection efficiency
- Pick the configuration that has the best minimum collection efficiency
- Iterate procedure



First Results

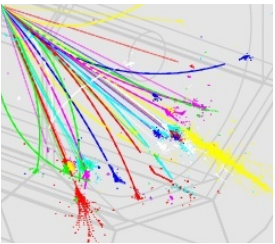
- For $n=4$ some assumptions are made
- Symmetry
- Diodes are located on a diagonal
- We obtain
 - 10.7 10.7
 - 39.3 10.7
 - 10.7 39.3
 - 39.3 39.3





Next steps

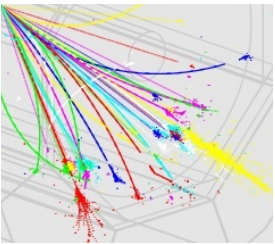
- Work on 6, 8 diode configurations
- This will need a lot of CPU
- Giulio will provide a realistic charge collection function (Gaussian should be close, though).
- We can also put in the constraints for the available area to place the diodes after the design is almost finalised.
- We'll make the code available soon



Occupancy studies

Point made by Paul

- MOKKA does not save 1 particle 1 Hit 1 cell
- 1 Cell may have several hits from several particles
- So my occupancy studies for a single event were wrong, because I assumed only particle per hit
- Paul : can we access this in LCIO ?
- Paul : If so, please document !

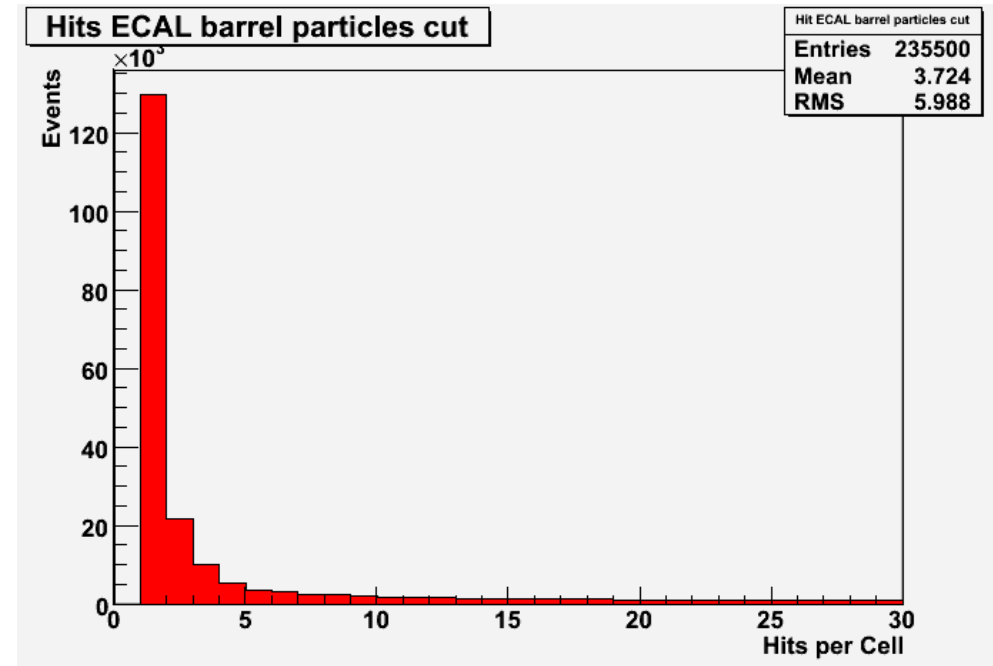
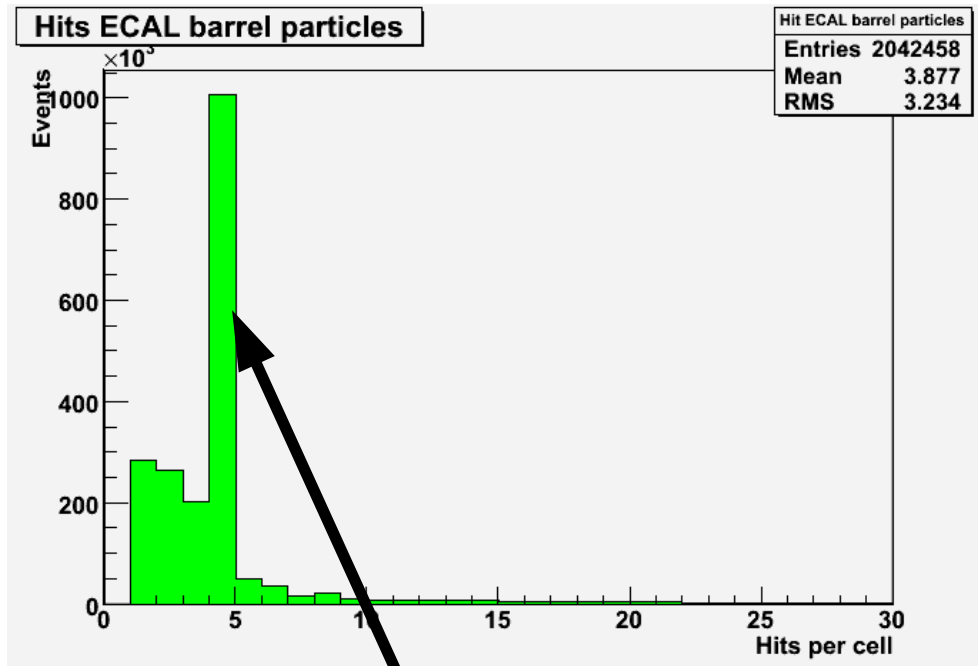
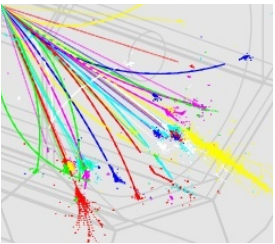


Yes, one can

- `virtual int getNMCCContributions () const=0`
Returns the number of MC contributions to the hit.
- `virtual float getEnergyCont (int i) const=0`
Returns the energy in [GeV] of the i-th contribution to the hit.
- `virtual int getPDGCont (int i) const=0`
Returns the PDG code of the shower particle that caused this contribution.

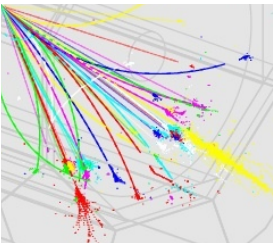
But, there seem to be some issues

Number of hits per cell

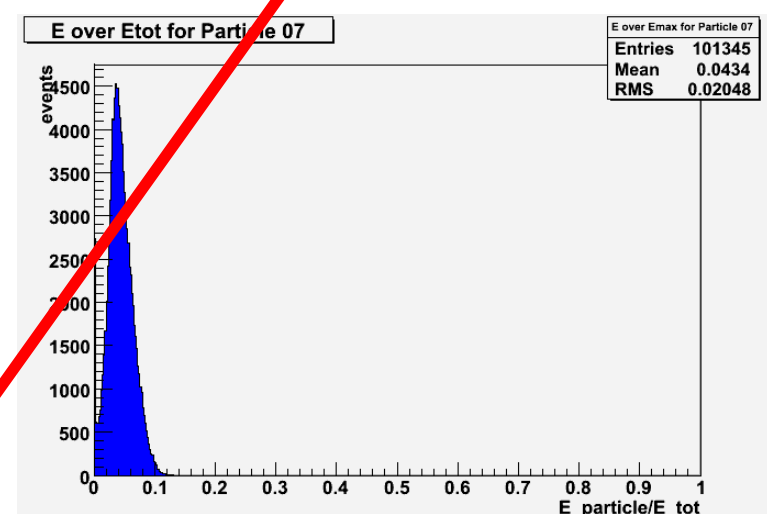
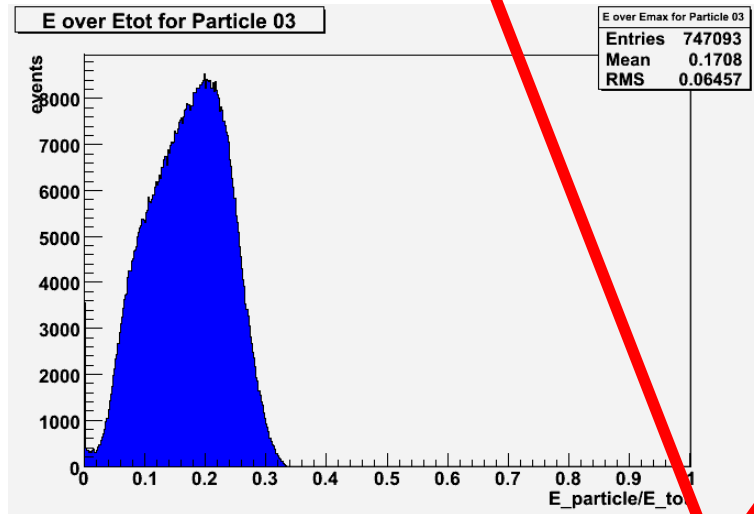
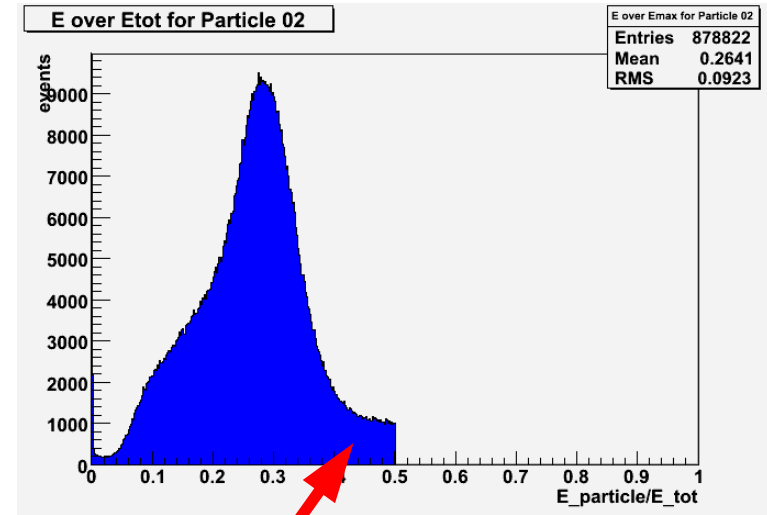
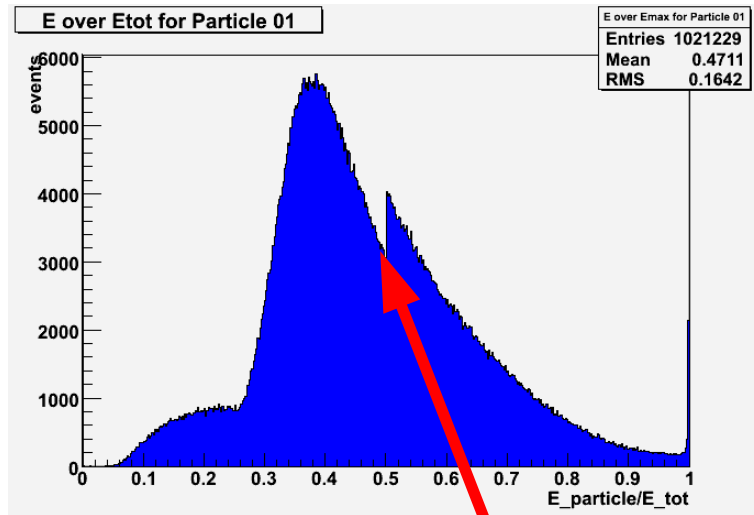


After removing all hits with less than 5 % of total energy

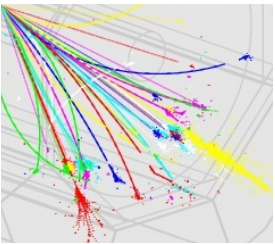
Why this peak at 4 ?



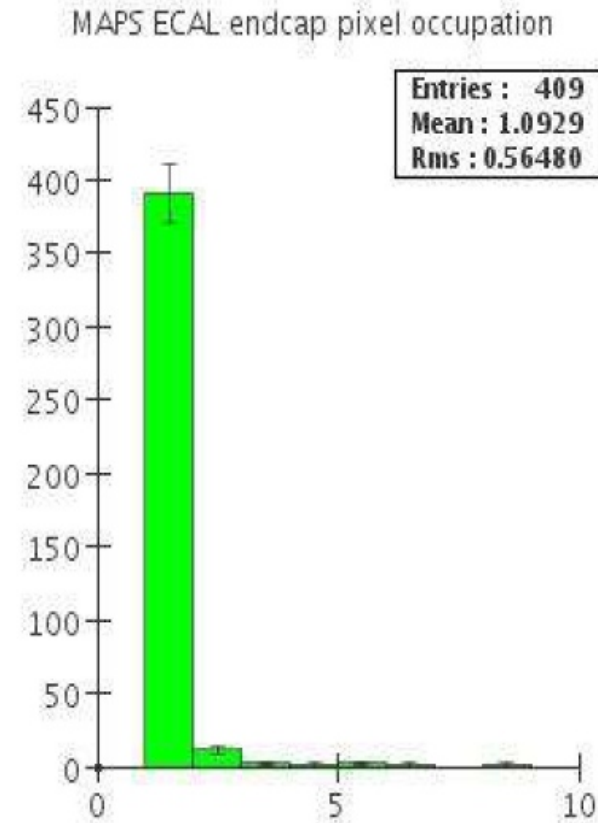
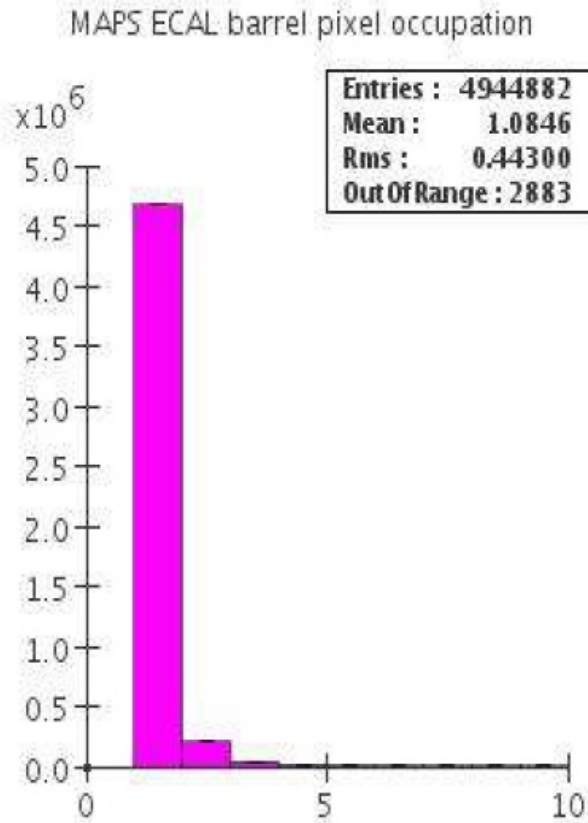
Looking at individual contributions

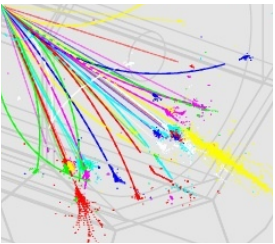


Cut-off?₁₀



Results from J. Lilley

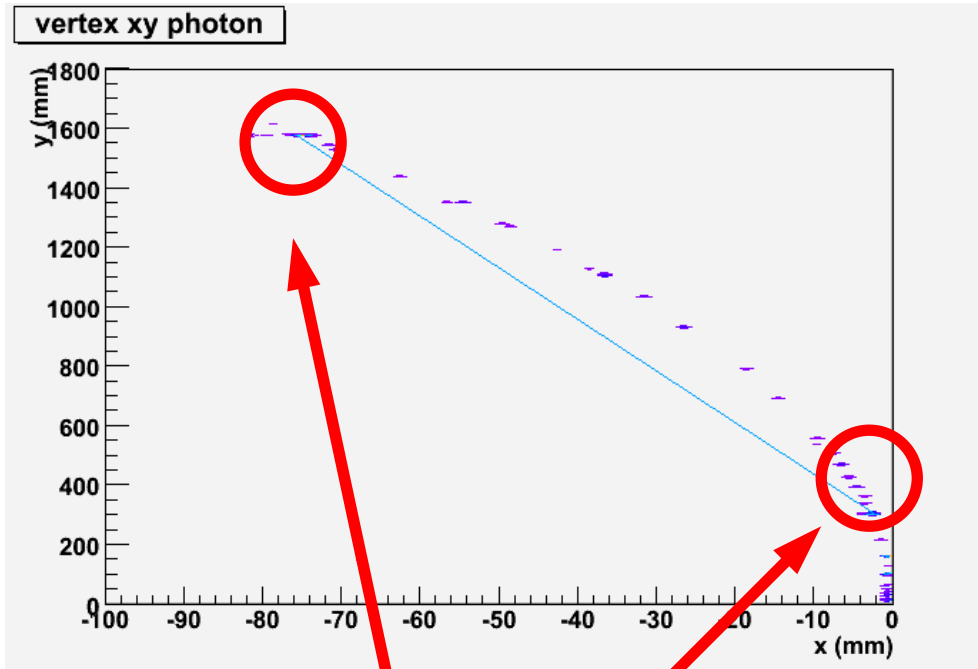
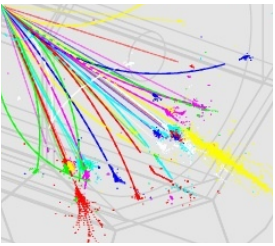




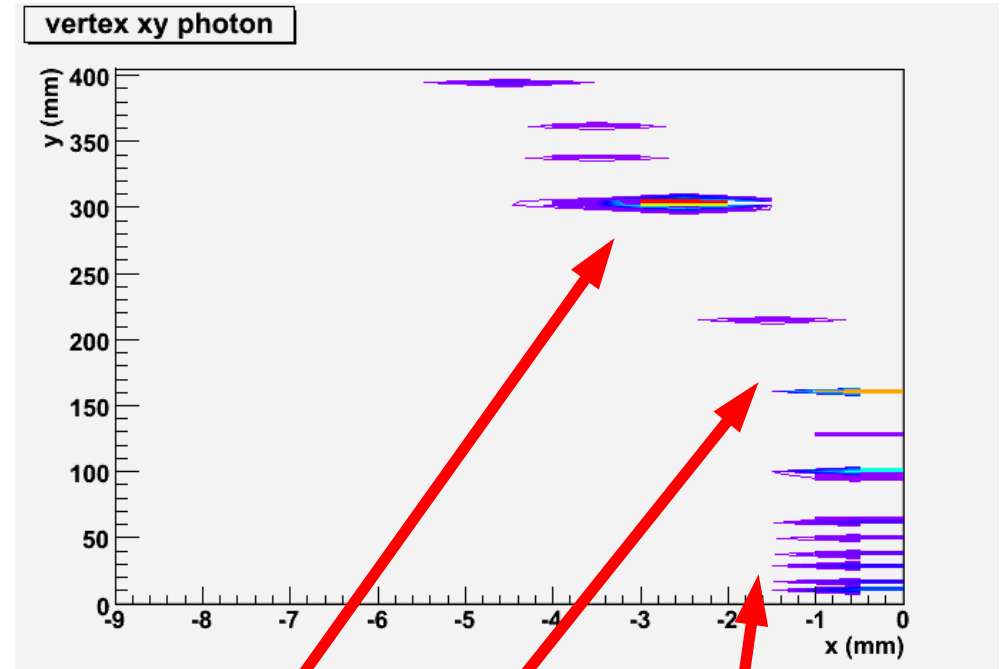
So what is happening ?

- Bug ?
- Some GEANT effect
- This should be cross-checked ?

Photon Map



TPC cage



TPC

SIT ?

Vertex

Marcel Stanitzki