Simulation needs for the SuperB Drift Chamber

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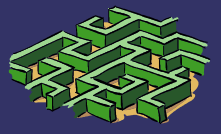
Background simulation in the DCH

Single cell drift chamber à la *BABAR* appears the most natural choice

- Performances in term of terms of momentum and dE/dx resolution have met design requirements
- Physics is the same in SuperB

However, detector occupancy is predicted much higher

- Luminosity x 100
- Backgrounds?



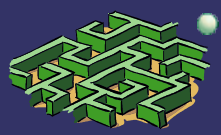
Background simulation in the DCH

Deleterious effects of high particle fluxes and increased occupancy include

- Increasing the event size and read-out time
- Affecting the trigger performance
- Deteriorating the track fit
  - adding hits which do not belong to the track
  - spoiling the time info of a really hit cell

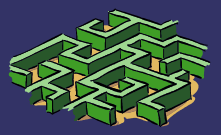
Measures to contrast these effects include

- Adding masks/shaping the chamber active volume in order to avoid exceedingly crowded regions
  - Shortening the detector response time (now ~1μs)
    - using smaller cells
    - using a faster gas mixture

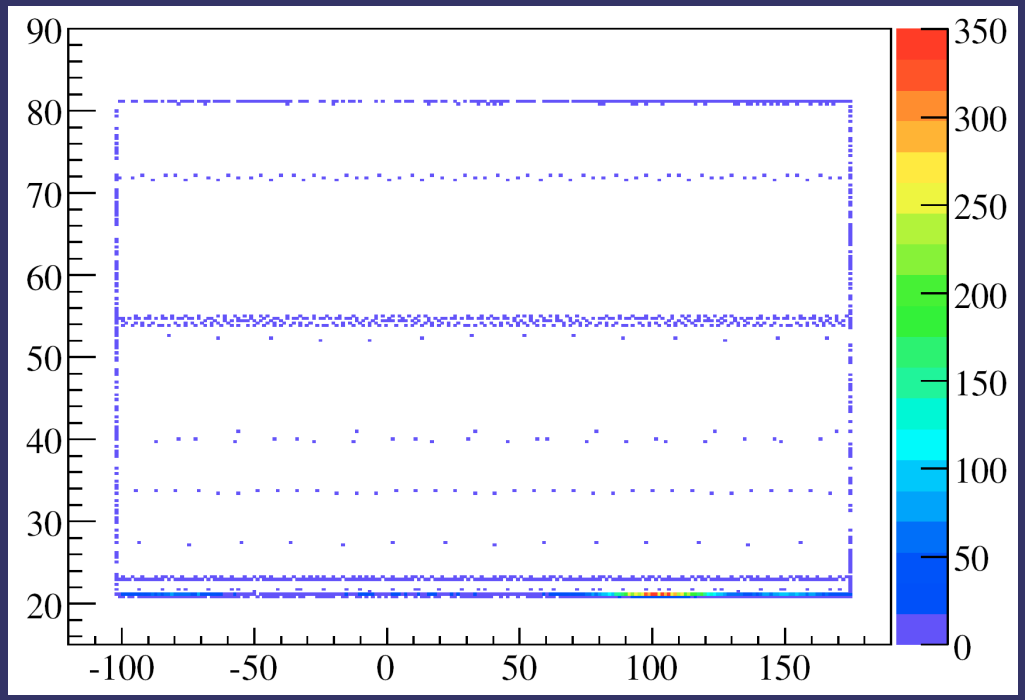


Background simulation in the DCH

- In order to study the impact of background, the background hits must be included in the reconstruction.
- This can only be done using a full simulation of all relevant processes.
- Ideally, we would like to have the ability to add spurious hit to signal MC.
- We need to know the rate and the distribution in (z,R) of the background.
- This will depend on the accurate description of the detector, and of the machine elements.



Background simulation in the DCH



An example of what has been available e.g. for the CDR.

The figure shows the entry point of electrons and photons in the DCH.

The plot was obtained with BBBREM generator of radiative Bhabhas + full simulation, and corresponds to an occupancy in the DCH of about 7%.