

Babar: background simulation summary

- identify and mitigate background sources
- predict background levels versus machine setting

PEP design tool: MAD

Beam-gas interaction (brems and Coulomb): TURTLE

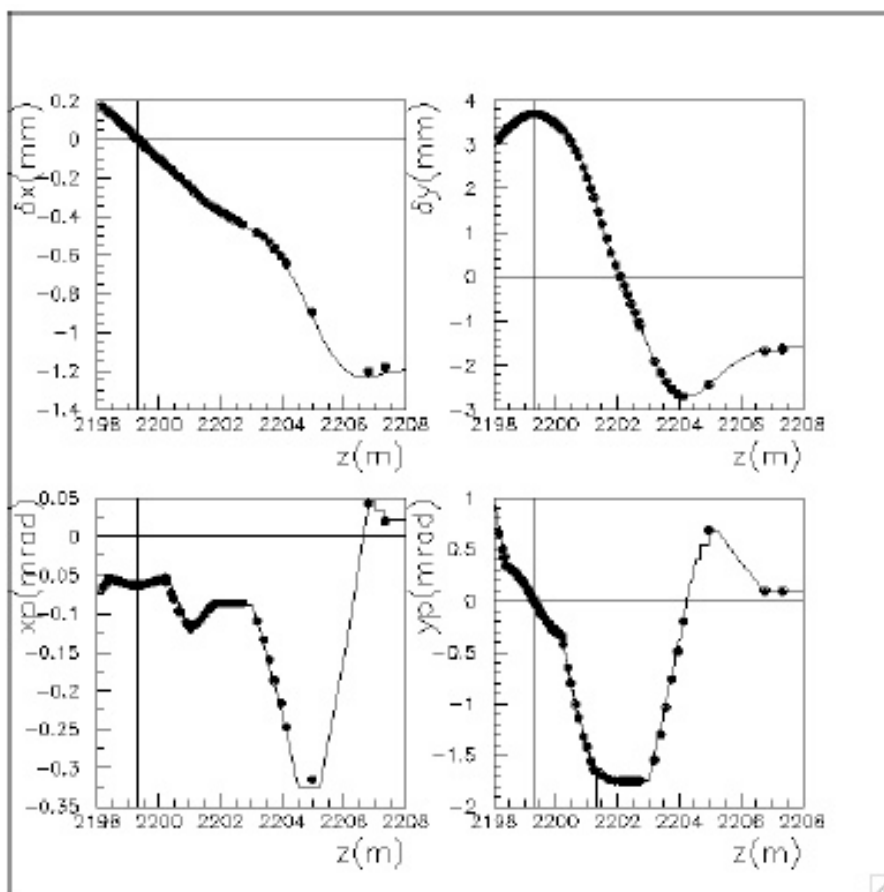
PEP beam line: GEANT

3 step validation (both beams):

- ✓ o TURTLE vs MAD: non-interacting rays
- ✓ o GEANT vs TURTLE: test GEANT optics (non-interacting rays)
- ✗ o GEANT vs DATA (single beam) with interacting rays

Validation: MAD vs TURTLE

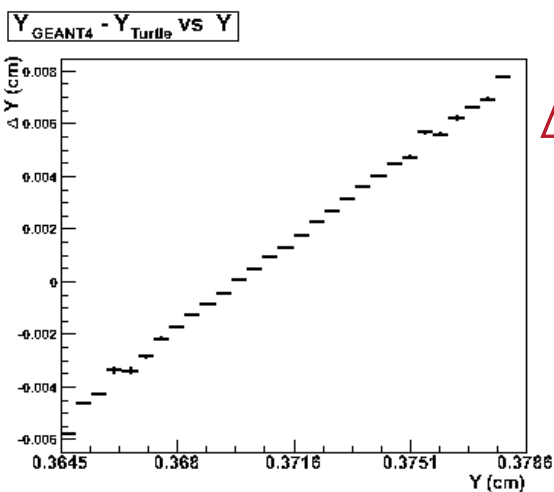
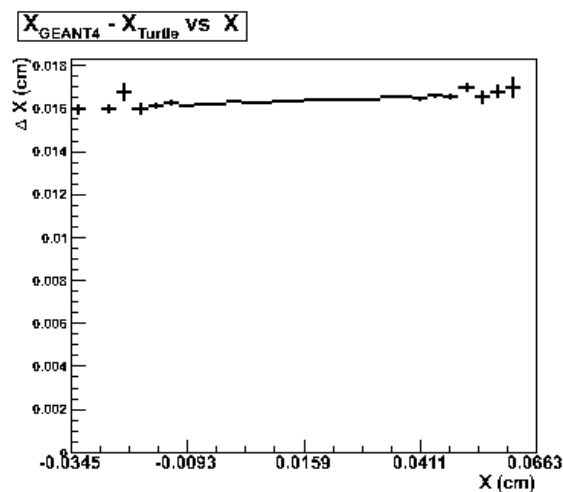
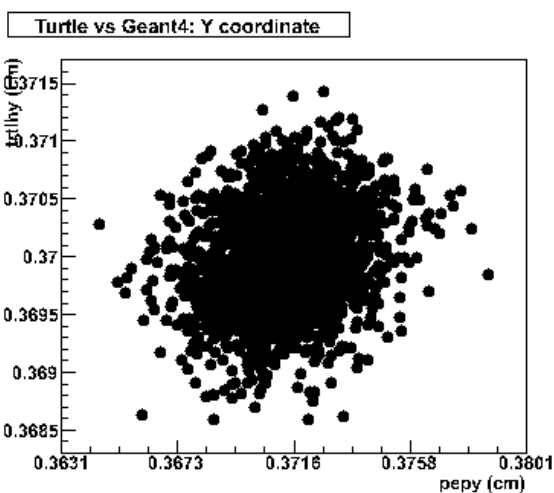
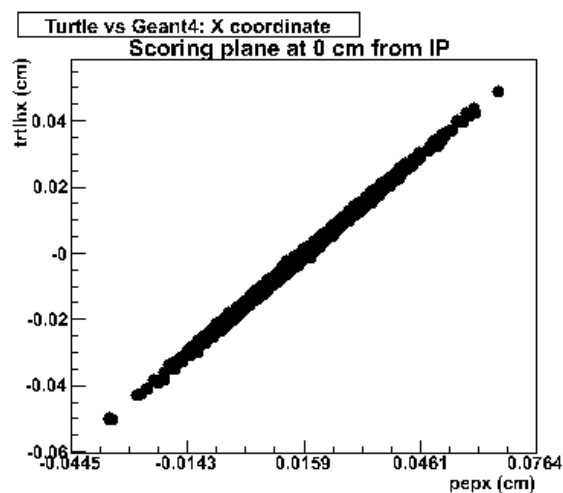
Years to make it working for the HER...



Beam orbits at IP: comparison MAD/Turtle:
Looks perfect!

Validation: TURTLE vs GEANT4

Huge work... but it looked very good

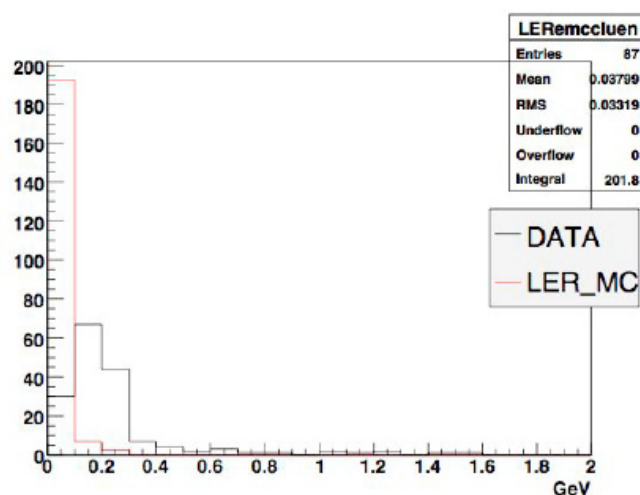


$\Delta x < 200 \text{ } \mu\text{m}$ $\Delta y < 100 \text{ } \mu\text{m}$

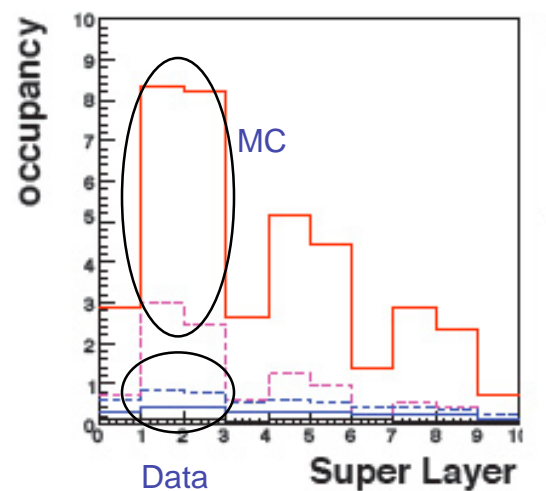
Validation: GEANT4 vs Data

Never been successful...

EMC Clusters distribution



DCH Occupancy



Large discrepancies between data and MC... for both LER and HER

Simulation effort stopped at that point...

Validation: GEANT4 vs Data

However, LER comparison looked much better on the SVT though

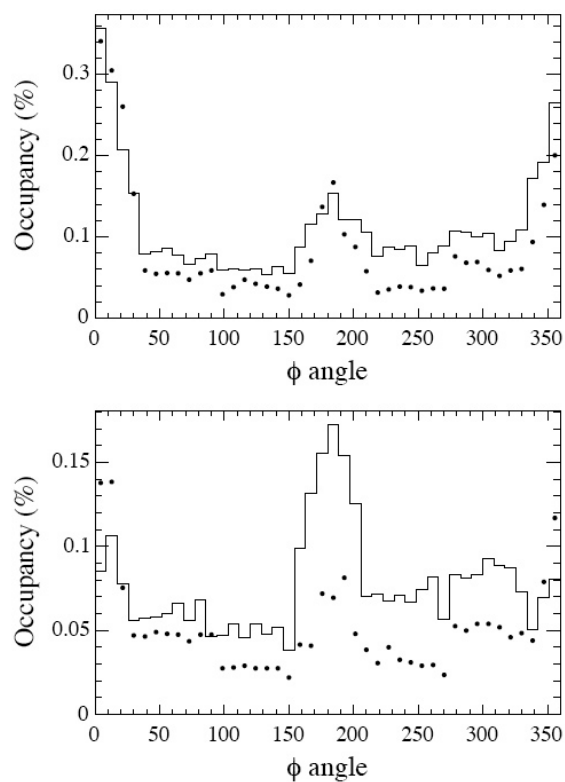


Figure 1: Single-beam SVT ϕ chip occupancies measured with a $1\text{A } e^+$ beam (solid circles) and predicted by G4 (histograms) for layer 1 (top) and layer 2 (bottom). The simulation assumes a 1 nTorr pressure around the ring.