WG on simulations: some introductory remarks

W. Scandale

28 April 2009

What for ? Why now ?

- ❑ Is the UA9 layout sound and close to the optimum ?
- ❑ Do we have a clear view of the experimental priorities ?
- ❑ Are we ready to handle short and sparse shifts in the most effective manner?

Organizational issues

- ❑ a small committee to call the meetings, prepare the agenda, write minutes
  - ✓ Bob, Andrei, Marco (many thanks)
- ❑ 3 WG reflecting the ground interest, each with a coordinator reporting the progress

WG's goals - 2

- Impact parameter and extracted beam profile
  - ✓ Optimal diffusive regime of the beam halo
    - Parametric simulation as a function of the damper voltage and octupole strength
    - Impact parameter versus impact angle
    - Impact parameter versus crystal position (6σ position is an appropriate choice?)
    - Beam lifetime (+ crystal position dependence)
    - Diffusion speed (+ crystal position dependence)
  - ✓ Measuring the impact parameter/angle and profiles
    - Impact parameter distribution at the crystal (w/wo cerenkov detector)
    - Impact parameter distribution at the RP1 (inner and outer pots) (w/wo crystal)
    - Impact parameter distribution at the TAL (is the Cerenkov of any use ?)
    - Impact angle through betatron phase relations ?

WG's goals - 2

- Loss localization
  - ✓ Crystal versus amorphous primary
    - Baseline loss maps
    - Differences in loss map
    - Optimal ring locations to identify loss difference
    - Optimal detectors and optimal sensitivity (are the UA9 detectors of any use ?)
  - ✓ Are we able to detect anelastic or diffractive interactions?
    - Proton-crystal interactions with energy loss
    - Proto-tungsten interaction with energy loss
    - Loss map of these off-momentum particles
    - Can-we detect some off-momentum loss with the scintillators close to Q521 ?
    - Better instruments ? sensitivity ?

WG's goals - 3

- Machine
  - ✓ Stability of the CO
    - Any prescription in case we have fluctuations ? (up to 200 µm)
  - ✓ Tune, chromaticity
    - Sensitivity in diffusive mode
  - ✓ Beam lifetime
    - Effect of residual gas (negligible ?)
  - ✓ Align the UA9 movable devises with beam loss
    - Suggest the optimal procedure and the possible pitfalls
  - ✓ Align the crystal to the beam
    - Expected loss map
    - Expected signals in the UA9 detectors
    - Suggest the optimal procedure (non-reproducibility of the goniometer orintation)

WG's goals - 4

- collimation efficiency
- Using beam lifetime
  - ✓ Particle incoming into the crystal
    - Check if all the lost particle hit the crystal
  - ✓ Particles incoming into the TAL
    - Check if the cerenkov will give a correct estimate
- Using the two Cerenkov
  - ✓ Particle incoming into the crystal
    - Is the cerenkov giving a correct estimate (sensitivity to the alignment + multipass)
  - ✓ Particles incoming into the TAL
    - Check if the cerenkov will give a correct estimate

I did it on purpose

- Ignore possible difference of strip vs quasimosaic crystals
- No plans to use RP2 information yet
- No plans to use the IHEP tank yet

All this is for a later iteration