Status of event biasing & fast simulation

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From plenary talk in Lund

see Marc’s talk

Under development:
1. Implicit Capture - survival biasing
2. DXTRAN

Other items:
3. Geometry importance biasing for several particle types

This is almost certainly an enhanced feature which is in the plan of work for this year within the Biasing Working group. We will also endeavour to see if it can be better resolved using the Generic Biasing approach.

4. Extension of the generic biasing for AtRest
5. Validation
Additional items (our last meetings)

(that I am aware of ...)

1. Work on fast simulation
   - Igor’s and Marc’s work on code modernisation
     - extended output of GFlash example (histograms, ...)
   - my contribution to parametrisation

2. Ongoing work on validation tools for biasing (started by CERN summer student — Kyungseop), to be continued

3. Use of generic biasing tools by ALICE - slide from Alberto

4. Discussed today:
   - occurrence biasing for charged particles, using rejection technique (Woodcock tracking) to calculate weights - Marc and Laurent
   - Forced collisions (of particular type) - NA62
   - ...
Hadronic Model per Region

- Geant4 physics list is defined globally, not per region
- Sometimes users would like to use a reference physics list, e.g. FTFP_BERT, but replacing a hadronic physics model in a region with a more precise model
  - Recent request from ALICE: to be able to use INCLXX in the Tracker region, while using BERT elsewhere
    - INCLXX describes better the production of light ions by primary pions and nucleons interacting in the beam pipe and silicon tracker
    - The overhead in CPU time for ALICE of using FTFP_INCLXX instead of FTFP_BERT if about a factor of 2
- An elegant and efficient solution is provided by the “Generic Biasing” capability of Geant4
  - It naturally allows a treatment per-region and per-particle
  - No “occurrence” biasing, only “final-state operation” biasing
    - Kept the natural cross sections, but changed final-state hadronic model
    - It is “biasing” but with weight = 1.0 (as in analogous simulations)