Generic Biasing examples status

Parallel 3B -Basic and Extended Examples

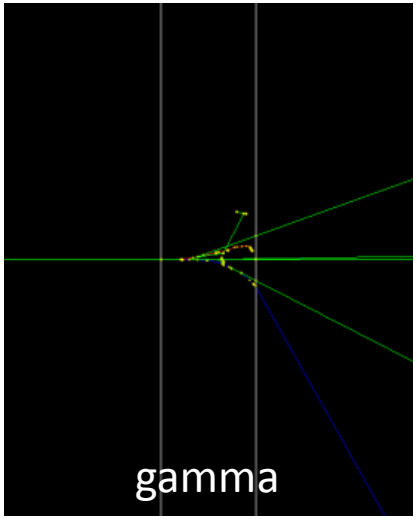
Fermilab Geant4 Collaboration Meeting
29th September 2015

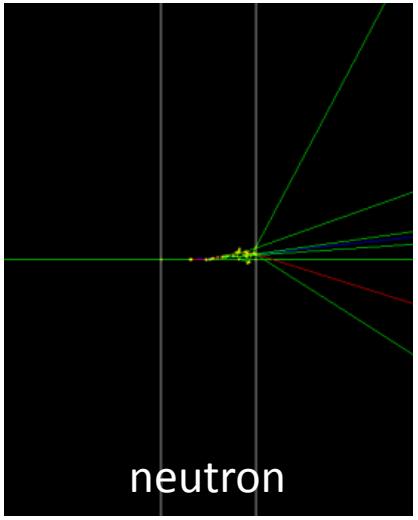
Marc Verderi
LLR/Ecole polytechnique

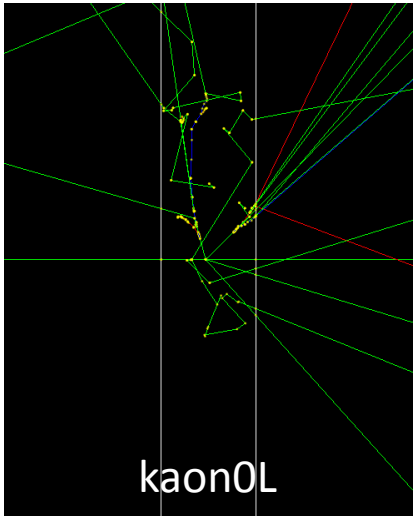
GB01 & GB02

- GB01 and GB02 were existing at last CM time.
  - Were introduced in 10.0.
  - + serious correction for GB01 in 10.1

- GB01:
  - Illustrates biasing of process cross-section.
- GB02:
  - Illustrates a force collision scheme similar to MCNP's one.
  - "Genericity" allows however to apply the scheme to more particle types:

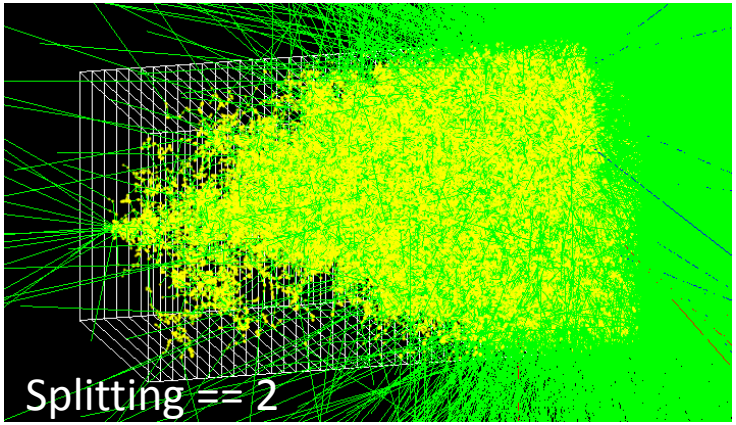


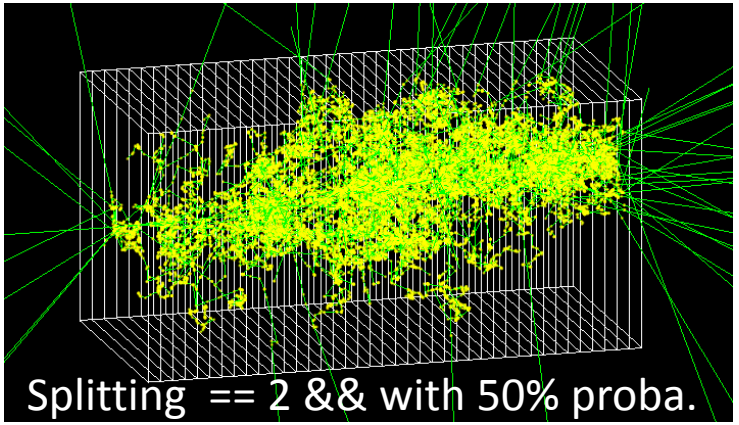




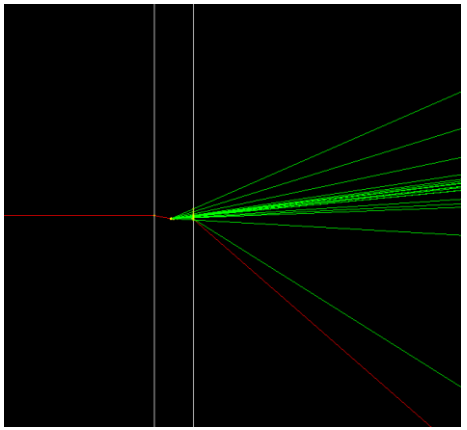
GB03 & GB04

- GB03 and G04 introduced in November 2014, for 10.1.
- Re-implement existing options, to verify generic classes provide intended functionality.
- GB03:
  - Illustrates a geometry-based biasing (with importance associated to volumes).
  - Includes “(re?)invented” option to simply tackle over-splitting.





- GB04:
  - An example re-implementing Bremsstrahlung splitting
    - It is an example of final state biasing.
  - Comes with specific commands:
    - /GB04/biasing/setSplittingFactor [N splitting]
    - /GB04/biasing/biasPrimaryOnly [true/false]
    - /GB04/biasing/biasOnlyOnce [true/false]



Next ?

- Consider adding simple examples:
  - More introductory than the GB01/GB02
    - Yep, would have been better to have those first…
  - To force or change cross-section of only one process

- Consider illustrating “implicit absorption” option:
  - An option which makes that particles don’t “die”
    - Used at low E for neutrons and photons
    - Also known as implicit capture, or survival biasing.
    - Exists in MCNP, FLUKA.
  - What happens:
    - Absorption part (σ_{total} - $\sigma_{scattering}$) of physics is turned off.
    - Statistical weight account for the absence of absorption.
  - Several points need to be clarified though before going to implementation.