

FLUKA simulation status

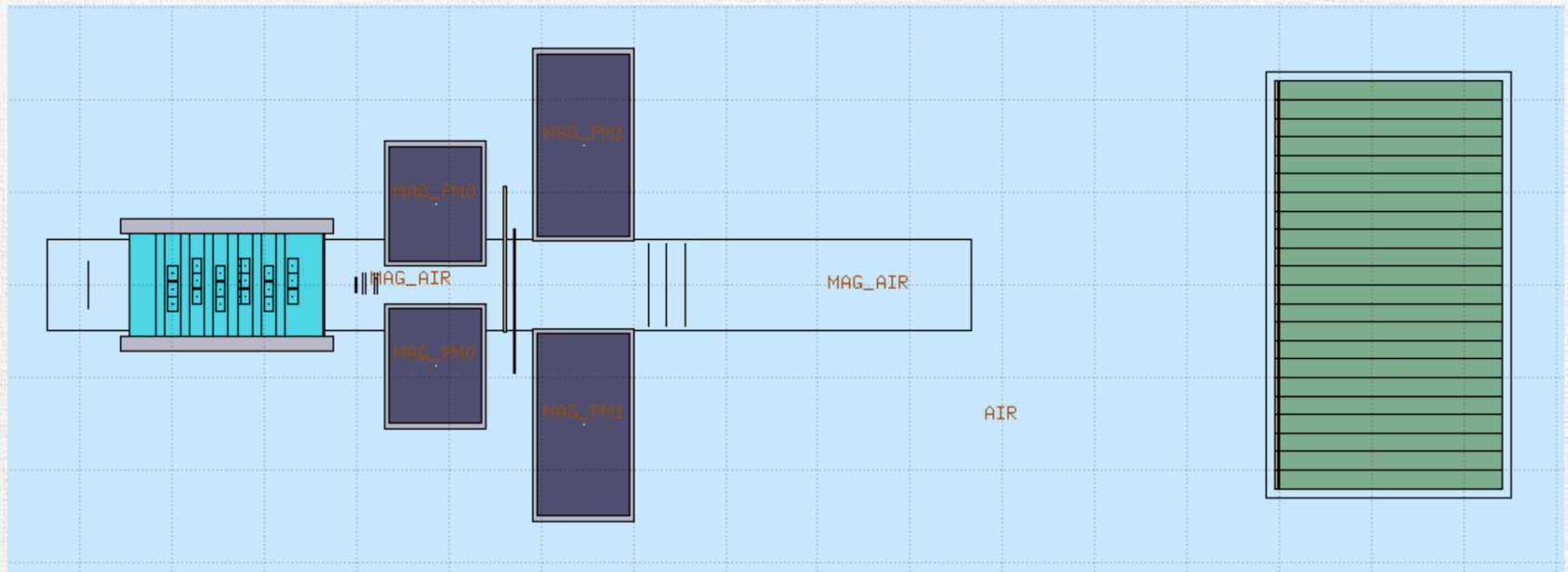
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6/06/2019



Previously... on FOOT: version V15

V15 presented in Borgomale



FLUKA simulations in newgeom branch (I)

- ⊛ FLUKA input and geometry files can be easily produced by running the `makegeo` executable, which can be found in `build/bin` after compiling the code.
- ⊛ In `Reconstruction/level0/geomaps` are located the detectors mapfiles containing dimensions, distances,... but also target and beam properties.
- ⊛ The GSI configuration files can be directly addressed to by means of the option `-exp GSI` (thanks to Christian).
- ⊛ Detectors can be switched on or off in the `FootGlobal.par` config file.

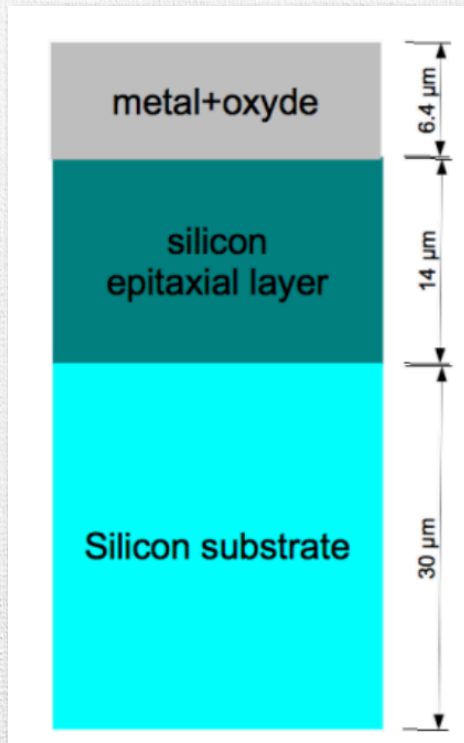
IncludeST:	y
IncludeBM:	y
IncludeTG:	y
IncludeVertex:	y
IncludeInnerTracker:	n

- ⊛ Methods coded in the `TA*parGeo` classes and used to produce FLUKA input files are quite different from the ones in the V15 version (root and FLUKA geo are now coded separately).



FLUKA simulations in newgeom branch (II)

- ⊗ Digitization of VTX, ITR and MSD removed from the simulation: it is now managed by the shoe classes (the code to perform MSD digitization is still in progress).
- ⊗ Detectors not included in the GSI setup: work in progress to put them in the FLUKA simulation.

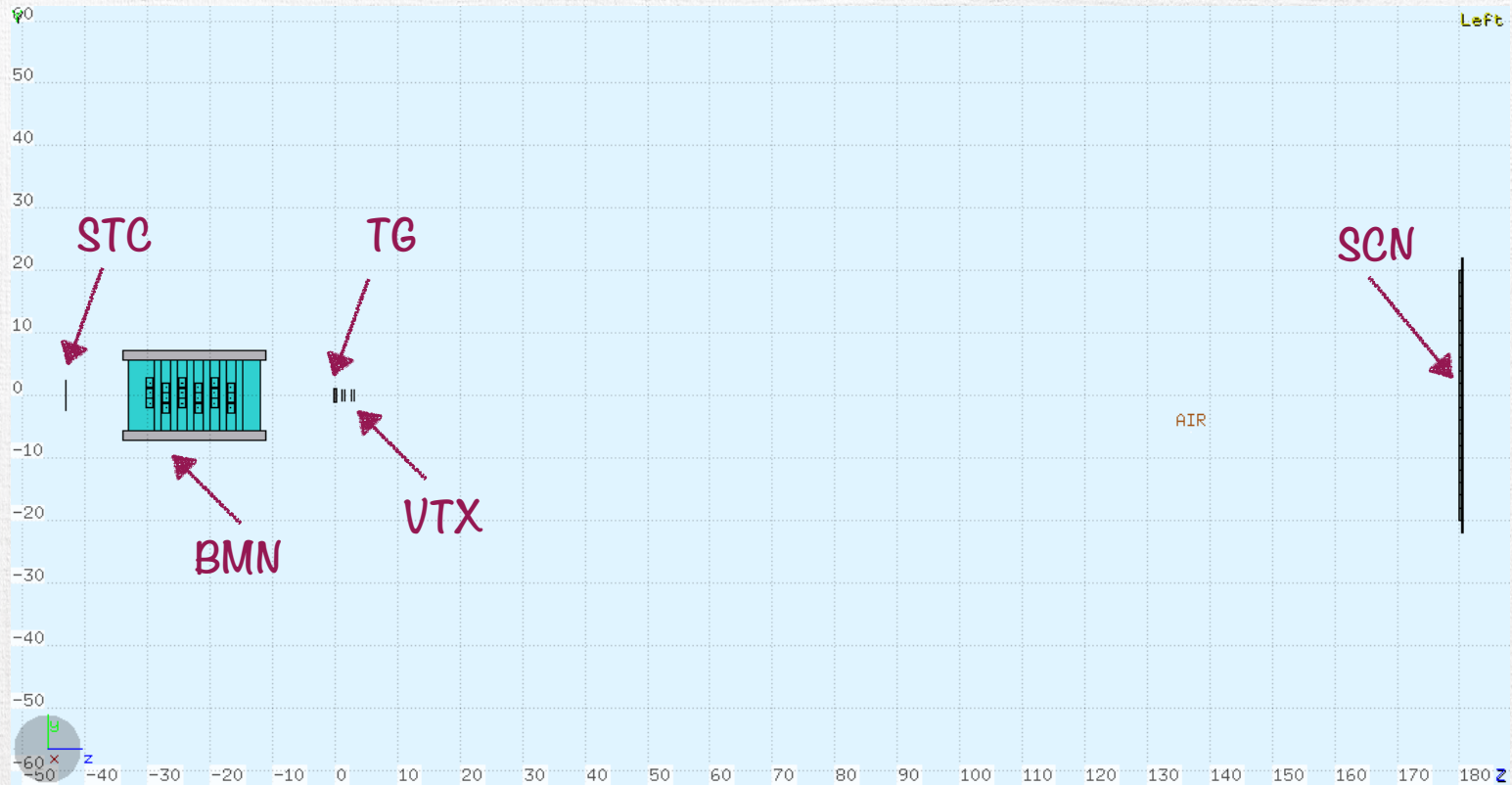


⊗ MIMOSA28 structure have been introduced: energy deposit is recorded only in the 14 μm thick epitaxial layer.

⊗ Rotation of some detectors (for example VTX rotation as in GSI setup) implemented (rotation not implemented and possibly required by the mapfiles give you warning when running the makegeo).



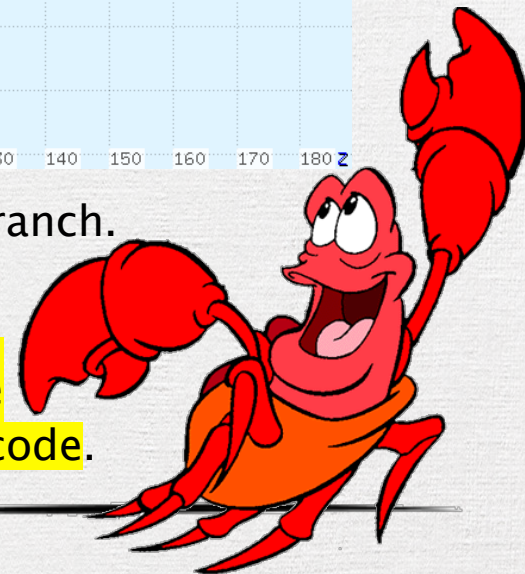
GS12019 simulation



FLUKA GSI2019 geometry is implemented in the newgeom branch.

Detectors included: STC, BMN, VTX, SCN.

To the detector experts: **please check** the correctness of the **your detector dimensions, position, etc implemented in the code.**



Provisional GSI simulated data

In the GSI server some provisional simulation (not yet true geometry in MC) can be found at

`/lustre/nyx/bio/gbattist/GSI_Apr2019`

^{16}O beam at 200 and 400 MeV/n impinging on Carbon target have been simulated:

☼ 16O_C_200_1.root

☼ 16O_C_200_2.root

☼ 16O_C_400_1.root

☼ 16O_C_400_2.root

Each of them has been produced with 10^7 primaries.

These simulation have been preliminary analyzed by Roberto.



Latest GSI simulated data

More recently, simulation with the true geometry have been produced and can be found at

[/lustre/nyx/bio/gbattist/newgeomSim/](#)

^{16}O beam at 200 and 400 MeV/n impinging on Carbon target have been simulated:

☼ 16O_C_200_1.root

☼ 16O_C_200_2.root

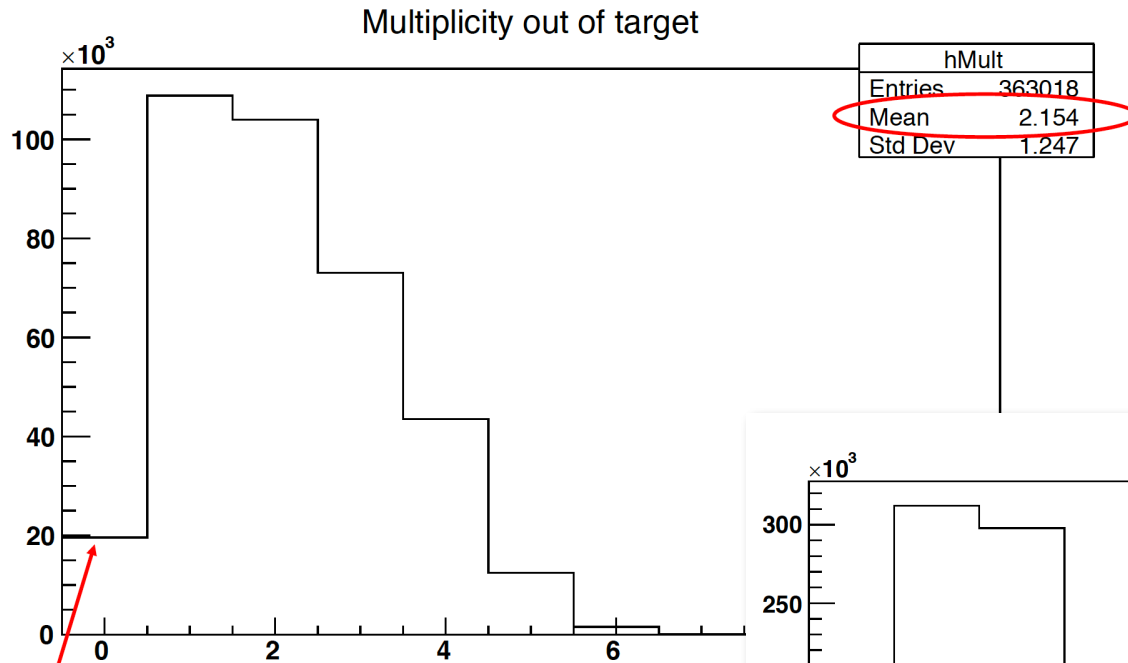
☼ 16O_C_400_1.root

☼ 16O_C_400_2.root

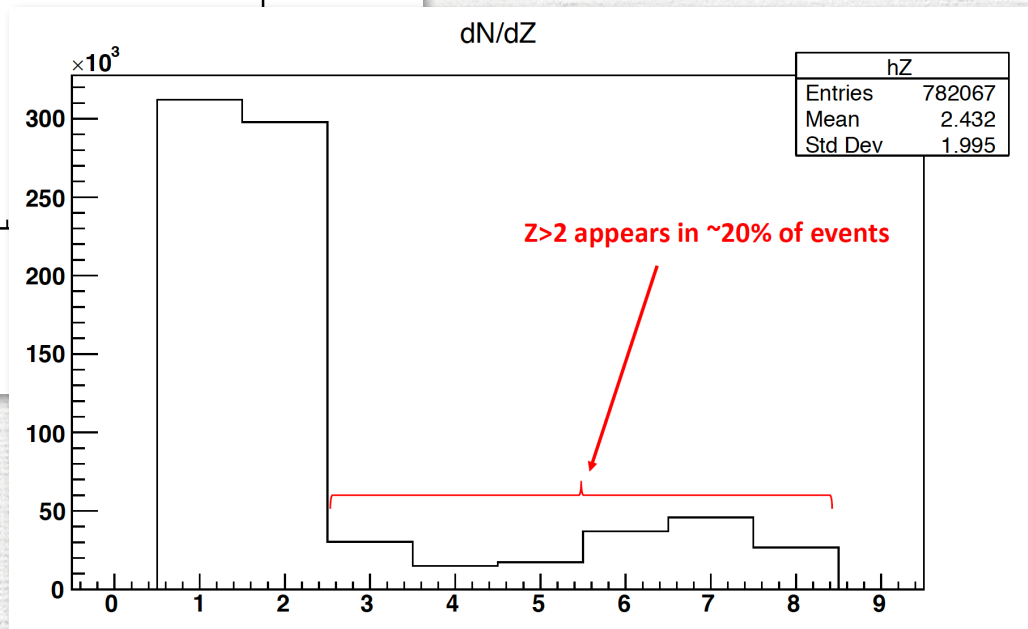
Each of them has been produced with 10^7 primaries.



Interaction rate of 400 MeV/n ^{16}O with C



Events out of acceptance cone
5.4% of 3.6% \sim 2/1000



Next steps

- ⊛ At present, only GSI detectors are implemented in FLUKA: we started working to implement also MSD (with [Riccardo Ridolfi](#)) and calorimeter (with [Lorenzo Scavarda](#)).
- ⊛ The same work has to be done for ITR (active and passive materials) and dipoles.
- ⊛ Once every other detector of the FOOT setup will be correctly implemented, new simulations will be run and distributed to the collaboration.
- ⊛ Full FOOT simulation will include also the simulation of the magnetic field and the dipoles.
- ⊛ Detailed documentation about how to run the FLUKA simulations is in preparation and will be published in the TWiki page.



Thank you

