FOOT simulation: status & perspective

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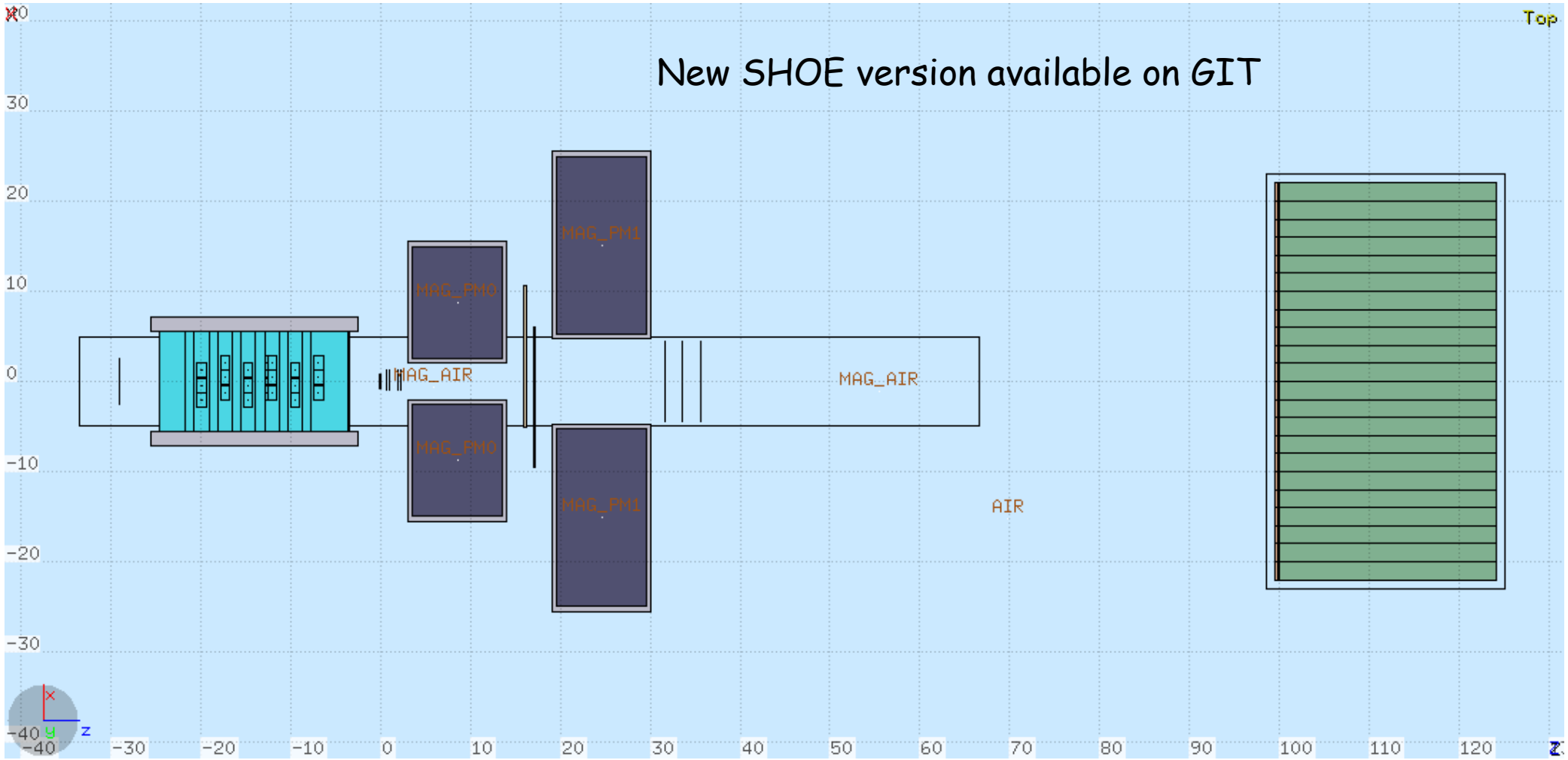
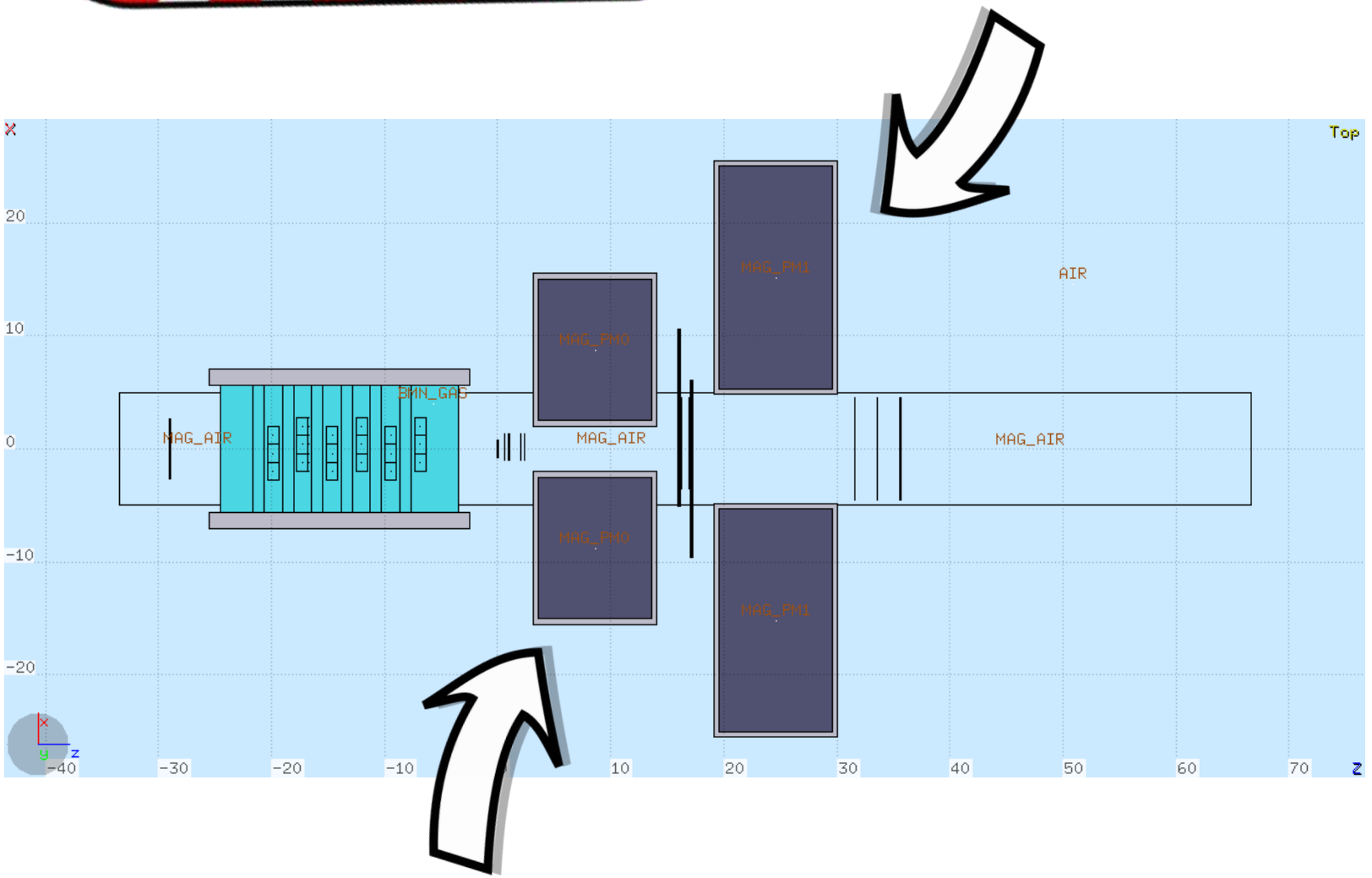
3-5/12/2018 General Meeting, Borgomale (CN)

Toward a new version: V15



What's new?



- New magnets configuration:
  - 11 cm long
  - 5 cm distance
  - Mag1: R_{in}=2,5cm, R_{out}=15,5cm, B_{max}=13kG
  - Mag2: R_{in}=5,3cm, R_{out}=25,5cm, B_{max}=8,7kG
- New distances btw the detectors of the magnetic system.
- Magnetic area extended to the beam monitor and the start counter.
- New magnetic field map.

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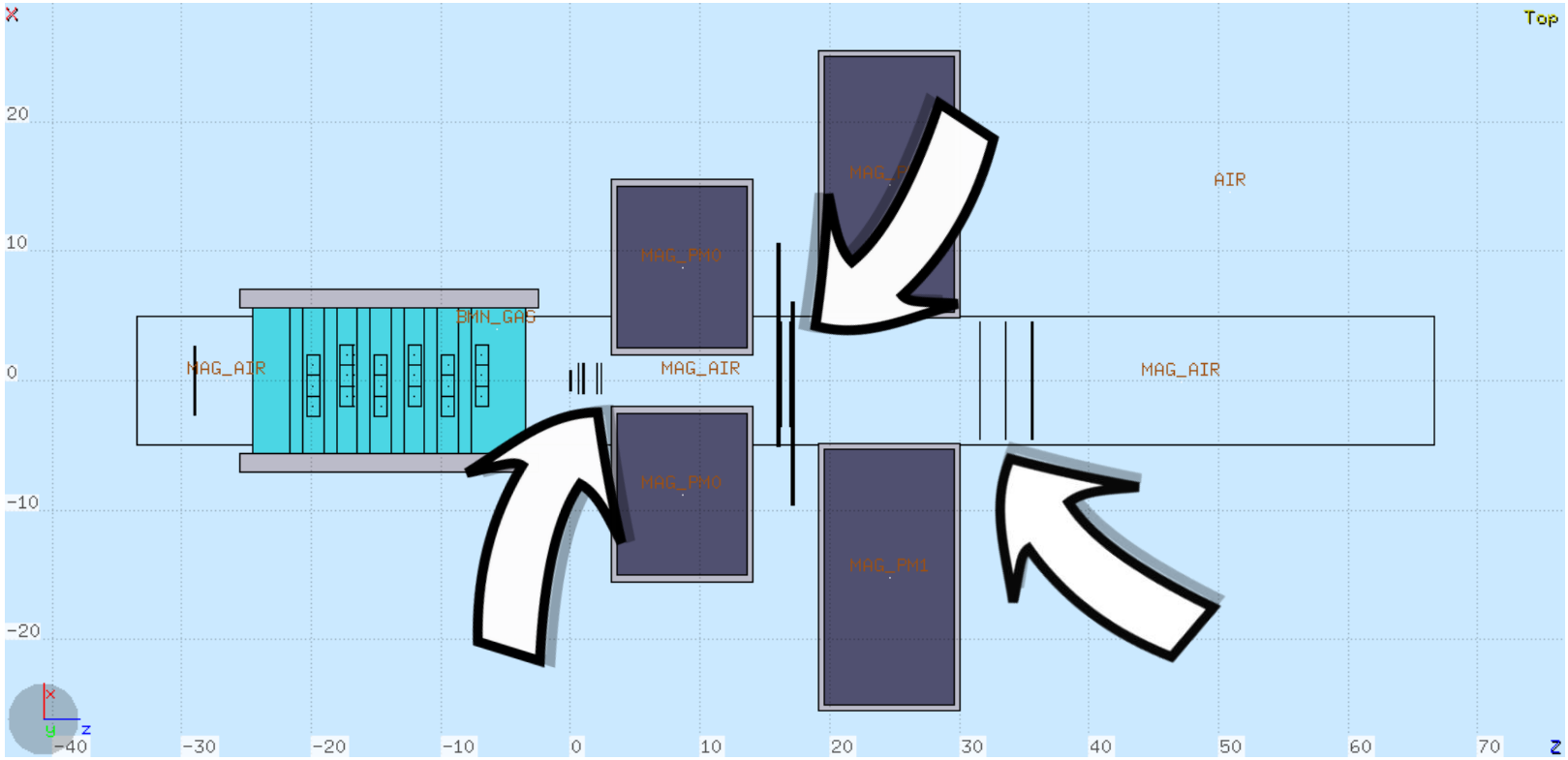

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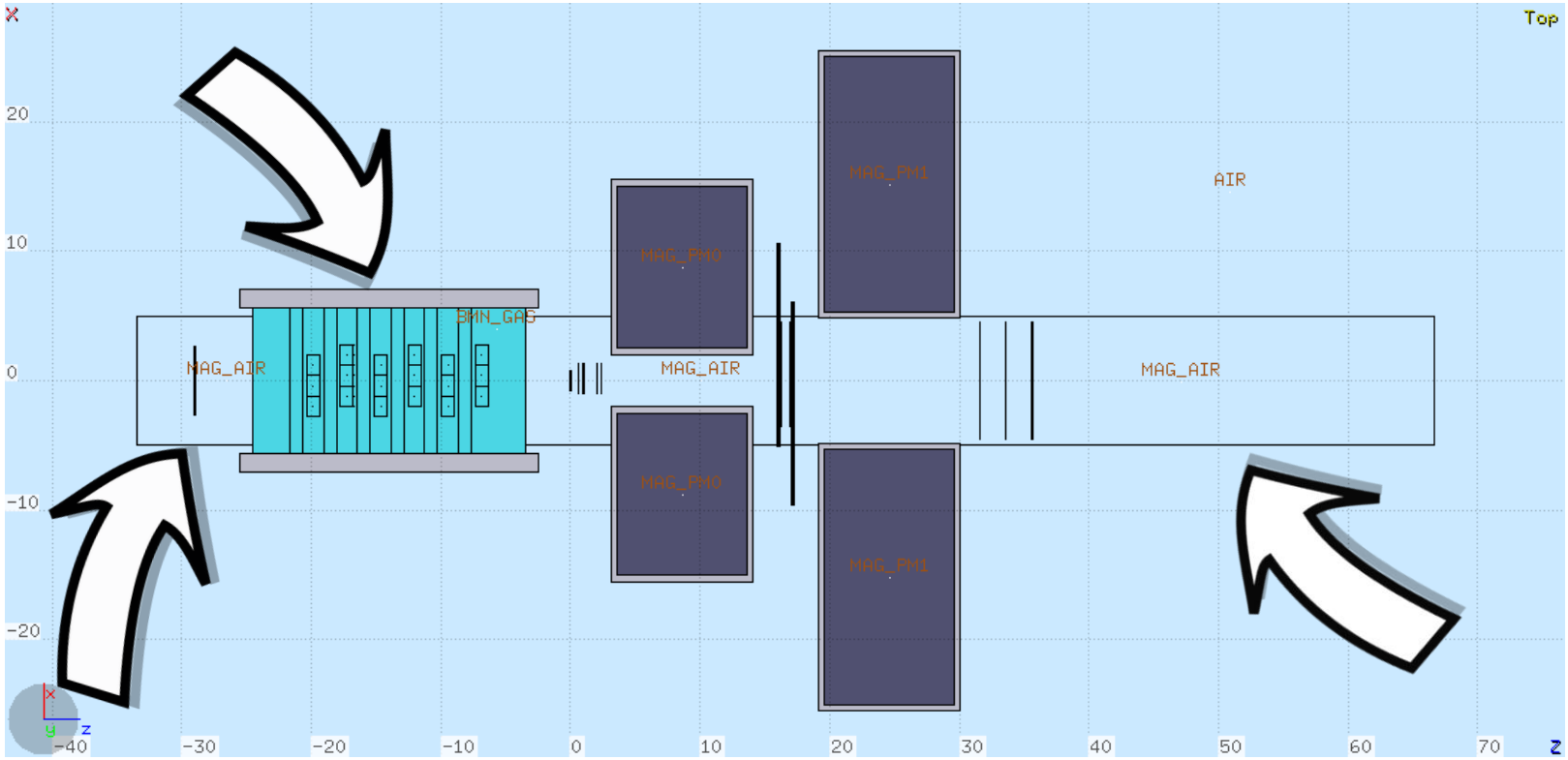

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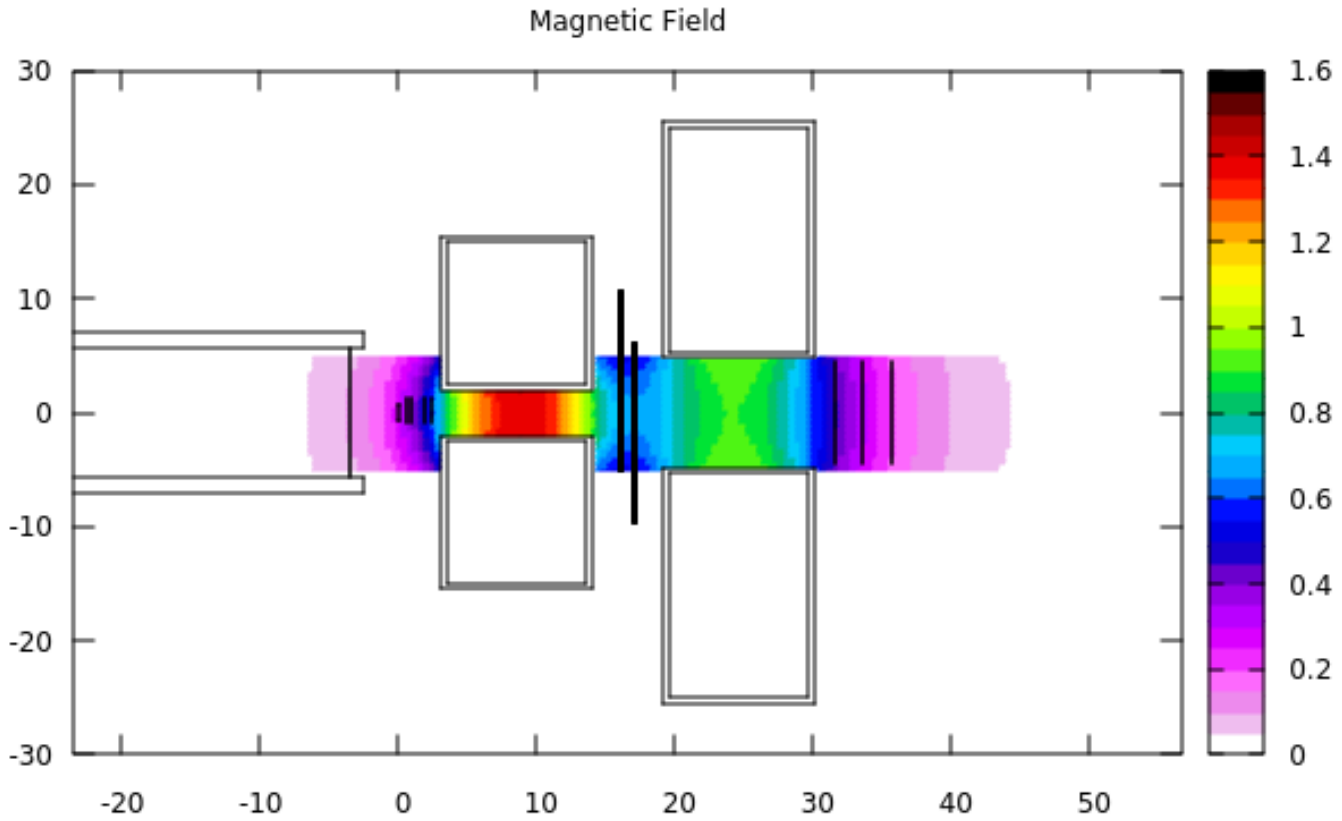

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Geometry managment in SHOE

- The include file of parameters, foot_geo.h is going to be substituted **parameters ASCII files**, one for each detector (still, detector experts should control them and give us imput to modify/correct those file). This simplifies the software developers' life (no need to recompile each time, …)
- Dedicated **SHOE's classes** manage both the **ROOT and FLUKA geometry** of beam monitor (*Yun*), vertex, intermediate tracker, microstrips, scintillator and calorimeter (*Lorenzo*). Still missing the geo class for start counter **(-> needed for March TB)** and magnets.
- At present, the **mapping** of the MIMOSA chips and of the microstrips is performed at FLUKA level. Together with the reconstruction expert, we decided to remove the mapping in FLUKA and move this procedure in the recostruction step. Mapping methods inherited from FIRST will be available for VTX and ITR (*Christian Fink*) and adapted for MSD (*Christian and Riccardo Ridolfi*).

Dedicated simulations

- At present, the available ntuples are obtained from triggered simulations: only «fragmentation in target events» are recorded. This reduces significantly the output files dimensions (data reported in tab for 10^5 primaries).

Trigger	e^- and γ thresholds	Registered events	Mean CPU time per primary [s]	ASCII output file size [Mb]	ROOT output file size [Mb]
Inelastic interaction in target	1 GeV	1126	1.140E-02	169	42
No trigger	1 GeV	1×10^5	1.256E-02	5221	1344

- A non-triggered simulation have recently been run to study the **trigger** to be adopted in data acquisition (see *Giacomo Traini*'s talk).
- The simulations dedicated to the study of the performances of the **emulsions setup** are currently carried on by Alessandra Pastore (see *Giuliana Galati*'s talk).

Today available Simulated data

In Tier3 at:

/gpfs_data/local/foot/Simulation/V15

16O_C2H4_200_1.root

16O_C2H4_200_2.root

16O_C2H4_200_3.root

16O_C2H4_200_4.root

16O_C2H4_200_5.root

Each file corresponds to 5 10^7 primaries (in total 2.5 10^8 primaries) of ^{16}O with C_2H_4 target at 200 MeV/u, using the usual software trigger requiring at least one inelastic interaction in target.

Available Simulated data today

Again in Tier3 at:

/gpfs_data/local/foot/Simulation/V15

16O_C2H4_gsi_1.root

16O_C2H4_gsi_2.root

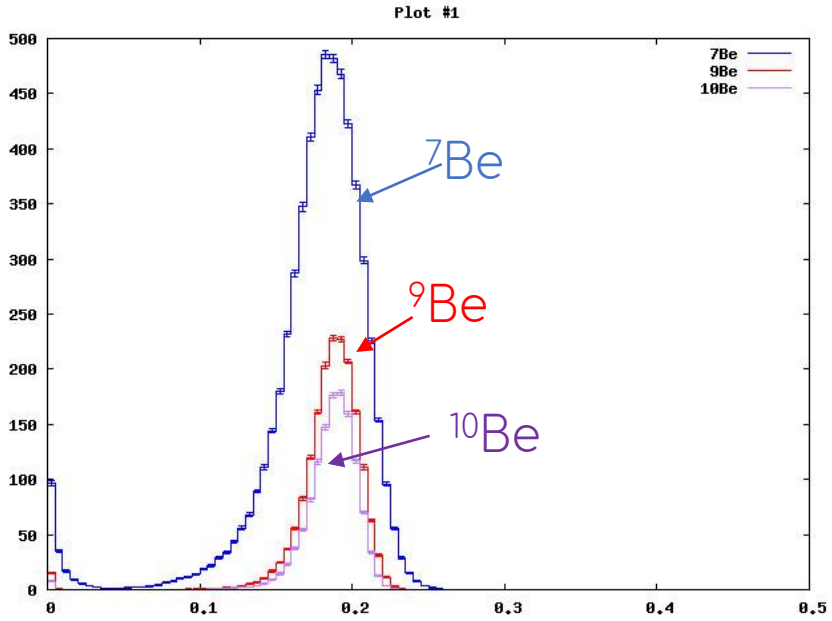
This is an attempt to study the possible physics obtainable at the next data taking at GSI with O beams under the hypothesys of having just vertex and 1 layer of TOF-dE/dx scintillators, no B-field (*see Giuseppe's talk*).

Each file corresponds to 10^7 primaries of ^{16}O with C_2H_4 target at 200 MeV/u, using the usual software trigger requiring at least one inealstic interaction in target.

Additional activities

- Extraction of predicted cross sections directly from MC (without Detector simulation) to compare with results from reconstruction of simulated data (*see Roberto's talk*).

Es.:
dσ/dE
For Be production in
^{16}O collisions
against ^{12}C target

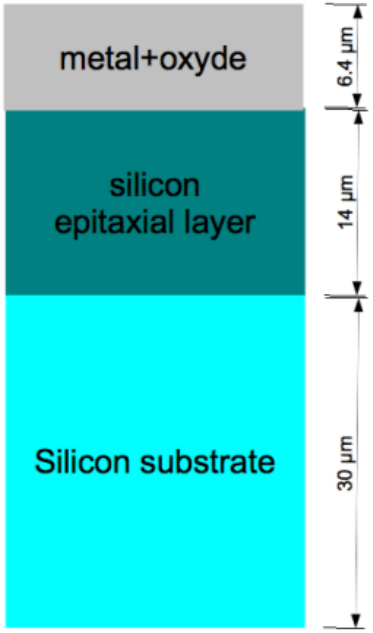


- Dedicated study of Scintillator test in Pisa (*Aafke*)

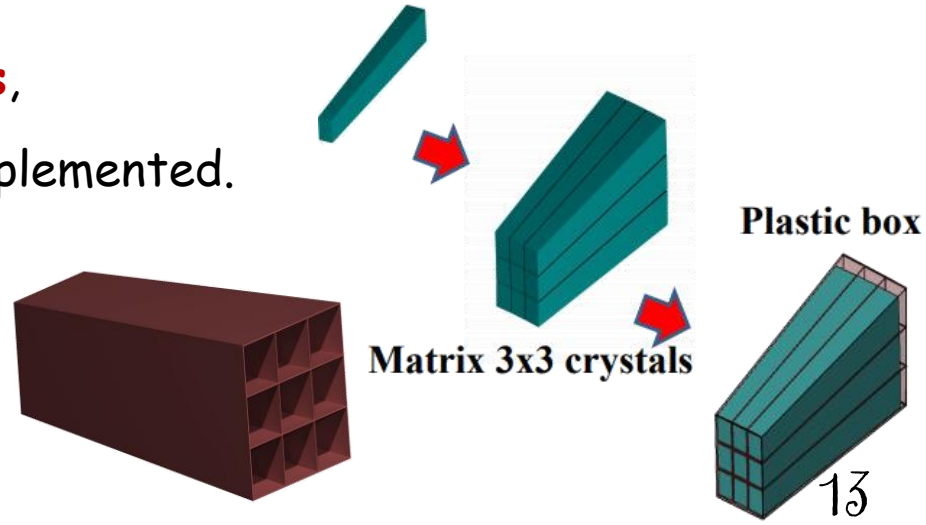
New possibilities for the Production Factory

- We are learning to use the Linux cluster at GSI.
- Different compiler version available. High flexibility.
- It allows to run hundreds of jobs in parallel and high speed with batch queing.

Dear Santa, this Christmas we'd like... (I)



- At present, MIMOSA28 chips are simulated as silicon blocks. However, 3 layers can be identified and will be implemented in the simulation. Only the energy deposited in the epitaxial layer will be recorded (for clustering).
- FLUKA mapping of VTX, ITR and MSD will be soon removed and substituted.
- The real geometry of calorimeter crystals (**truncated pyramids**, development of new ad hoc FLUKA body → when?) is not yet implemented. Neither the plastic box module.



Dear Santa, this Christmas we'd like... (II)

- We need **feedback from detector experts** to modify/correct the new parameters file with the exact dimesions, positions, ecc.
- The simulation **Twiki** page is out of date and must be updated.
- Simulations dedicated to the next March TB might be useful -> we need instructions about setups, detectors to be used, positions, etc.

Christmas

TEST BEAM IS COMING