



Status of beam-induced background simulation

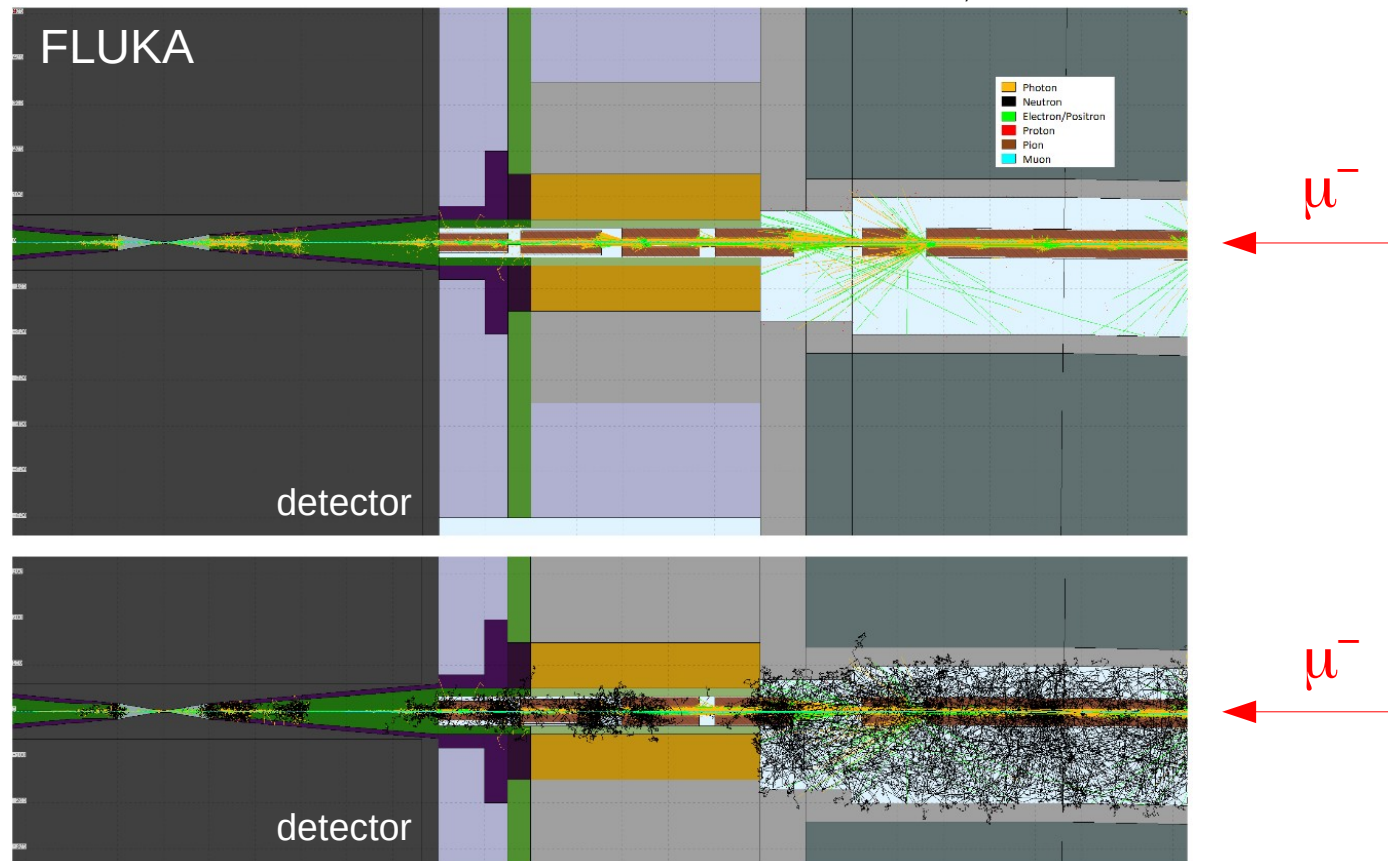
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- The particles generated in the interactions of the beam-muons decay products with the machine elements represent the dominant contribution to the machine background in the detector.

F. Collamati *et al.*, [arXiv:2105.09116](https://arxiv.org/abs/2105.09116)

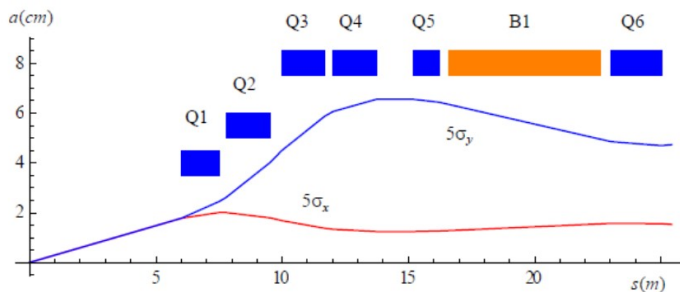


Ingredients of the BIB generation

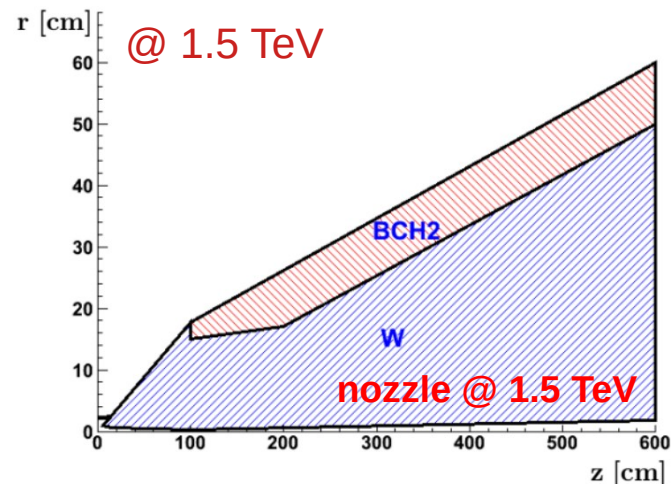
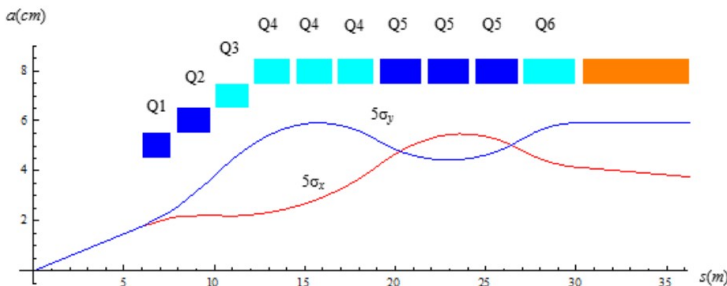
- A detailed design of the machine and the interaction region.

- A detailed design of the machine-detector interface.

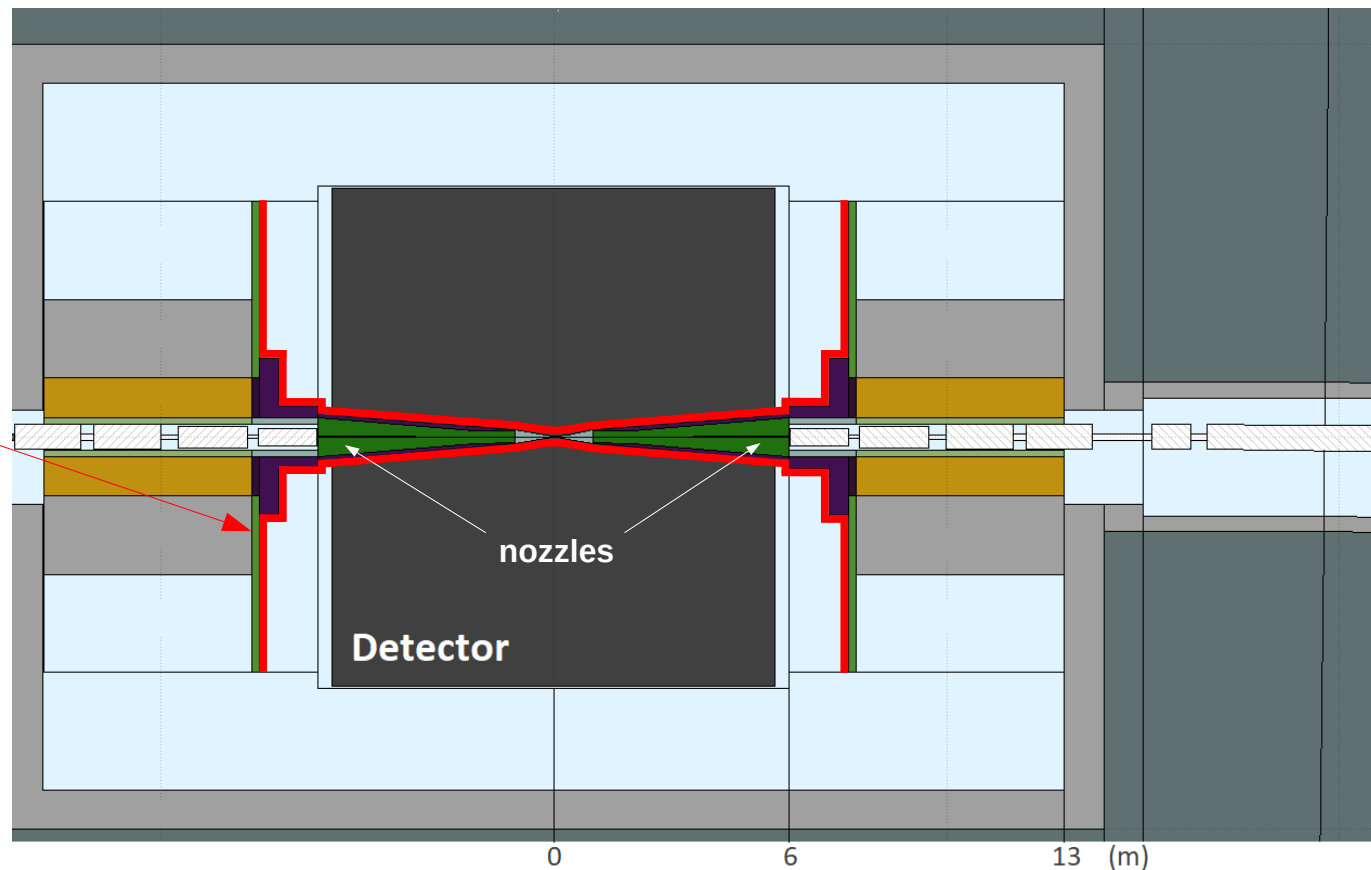
@ 1.5 TeV



@ 3 TeV



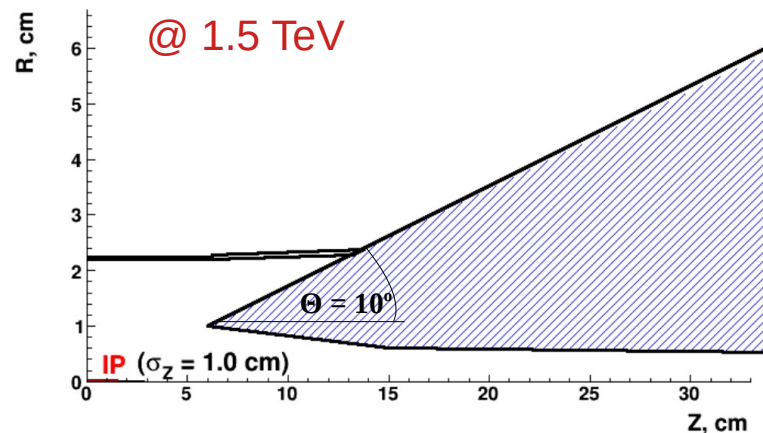
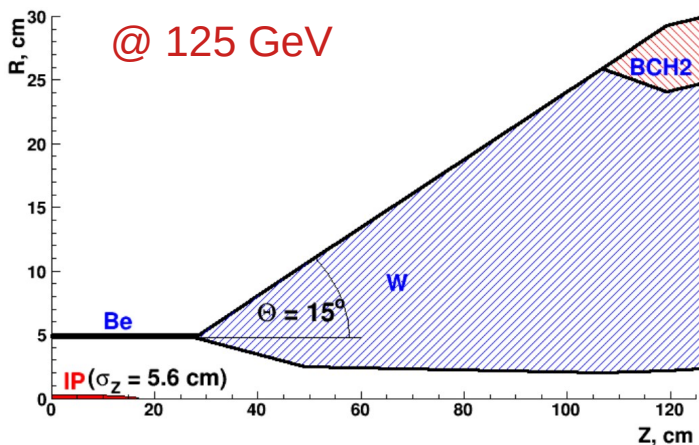
- A list of $O(10^8)$ particles (i.e. four-momenta, point and time of origin) at the detector envelop.



- Available machines (from MAP):
 - ▶ $\sqrt{s} = 125 \text{ GeV}, 1.5 \text{ TeV}, 3 \text{ TeV}$;
 - ▶ $\sqrt{s} = 6 \text{ TeV}$ under revision.
- Available MDI's (from MAP):
 - ▶ $\sqrt{s} = 125 \text{ GeV}$ and 1.5 TeV .
- **1.5 TeV** and **3 TeV** colliders implemented in **FLUKA**
(F. Collamati, C. Curatolo, D. Lucchesi, A. Mereghetti, P. Sala).
- Reproduced and cross-checked MARS15 results at 1.5 TeV.
- First preliminary results at 3 TeV (with 1.5-TeV MDI).

Next steps

- In the short term:
 - ▶ design/optimization of the MDI at 3 TeV:
 - ◆ iterative process, computationally demanding.
- Example of MAP's MDI at 125 GeV vs 1.5 TeV:



- So far, MAP's model adopted (generation of BIB full bunch crossings), an approach not easily scalable;
- Move to new paradigm?
 - ▶ library of muon decays as a function of z_{decay} ?
 - ▶ some parametric simulation?
 - ▶ ... ?