

BIB studies

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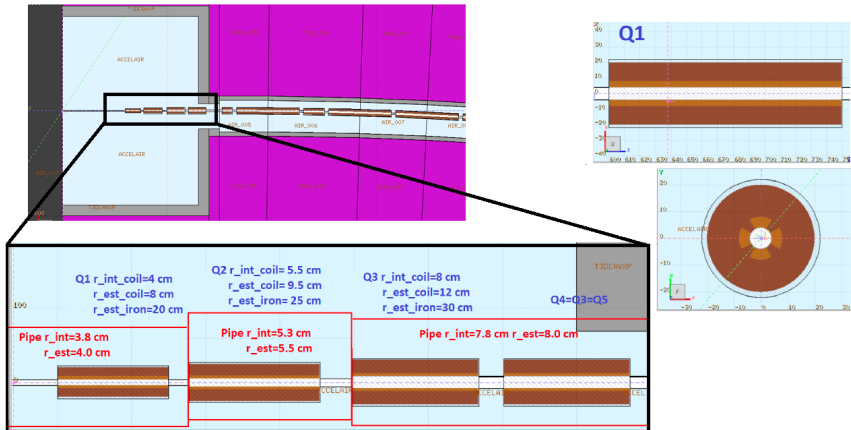
24 Novembre, 2020

OUTLINE

- Latest improvements to reproduce MAP results for BIB at 1.5 TeV CM using LineBuilder + Fluka:
 - magnets shape and dimensions
 - passive elements shape and material
- Preliminar BIB analysis with new configuration

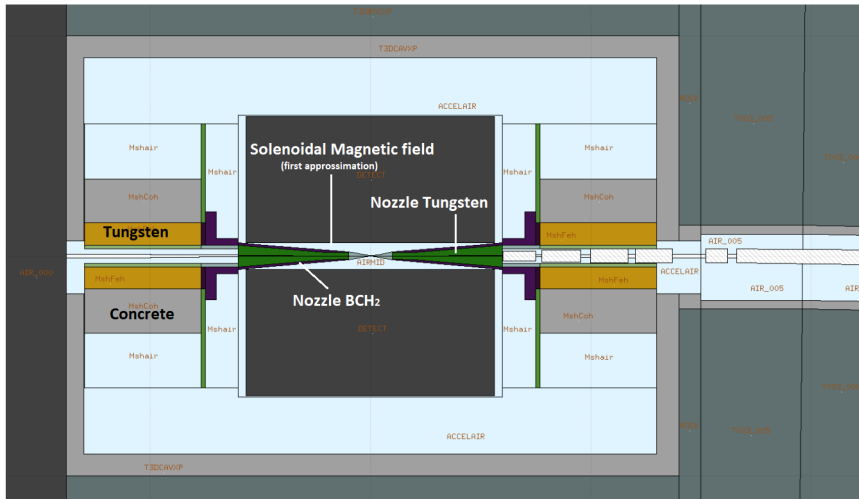
Infos from Alexahin et al. "Muon collider interaction region design"

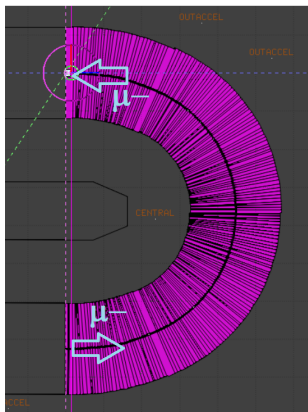
⇒ Beam Pipe aperture, coil transverse dimensions, materials...



PASSIVE ELEMENTS

- The crucial importance of **passive elements** in the I.R.
- First MDI geometry reconstructed to reproduce N.Mokhov's data





750 GeV muon beam from opposite IP bias of muon decay in last 100 m to enhance statistics

A DUMP output file is produced with all the relevant information

```
BIB analysis Carril & Pires - AnaBIB.com
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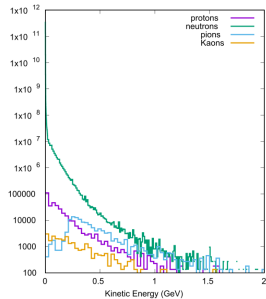
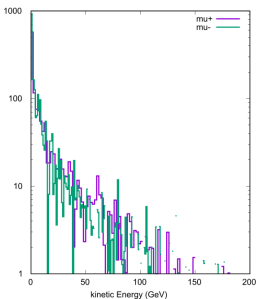
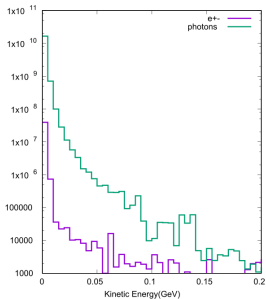
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[Navigation icons]

BIB Analysis Program
In [21]:
1 import math
2 import numpy as np
3 import pandas as pd
4 import matplotlib
5 import matplotlib.pyplot as plt
6 from scipy import stats
7 from scipy.stats import norm
8 from scipy.stats import kde
9 from matplotlib.patches import Ellipse
10 import matplotlib.transforms as Transforms
11 from scipy.special import erf
12 from matplotlib.colors import ListedColormap
13 import collections, numpy
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19 folder =
20 inputFile=folder+'part_mu_rfx_stream.dat'
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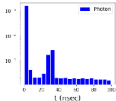
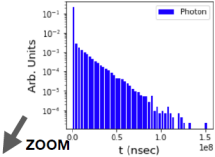
Number of particles: Each bunch crossing 2 10^2 muons/bunch

	Ours	Mokhov et al.
Electrons	$1.6 \cdot 10^5$	$1 \cdot 10^6$
Photons	$9 \cdot 10^7$	$1.8 \cdot 10^8$
Muons	$6 \cdot 10^3$	$8 \cdot 10^3$
Total chh	$1.6 \cdot 10^4$	$4.8 \cdot 10^4$
Neutrons	$7 \cdot 10^7$	$4 \cdot 10^7$

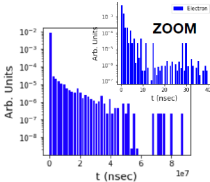
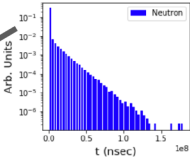
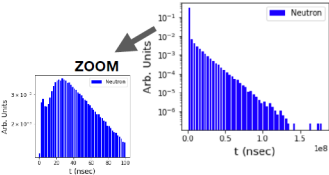
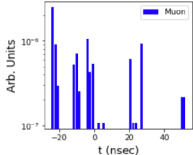
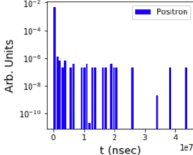
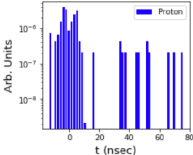
Energy distribution



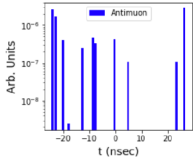
Time distribution



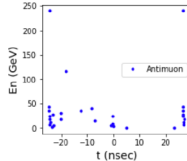
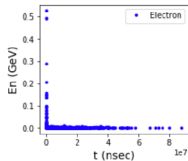
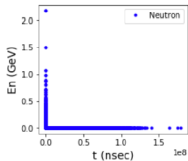
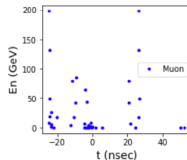
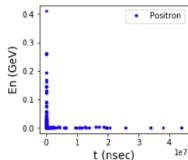
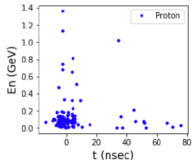
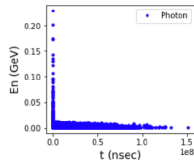
ZOOM



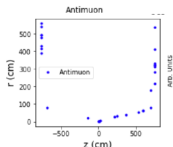
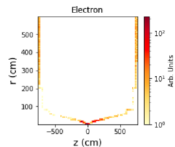
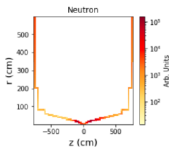
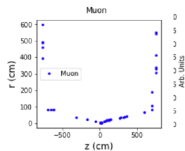
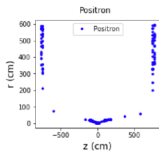
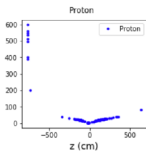
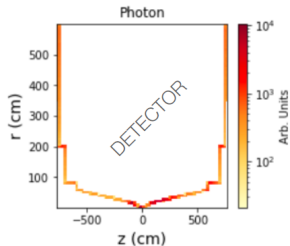
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Time vs Energy distribution



Entrance point in the detector



TO DO LIST

- Further work on accuracy of magnetic elements, pipe and passive elements in particular @ IR
- More accurate BIB analysis
- Comparison of BIB @ 125 GeV and 1.5 TeV CM