

# AMS-ASI Analysis Meeting

**B/C/O  
and Si/P/S cosmic ray fluxes**

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A.D. 1308  
**unipg**

DIPARTIMENTO  
DI FISICA E GEOLOGIA

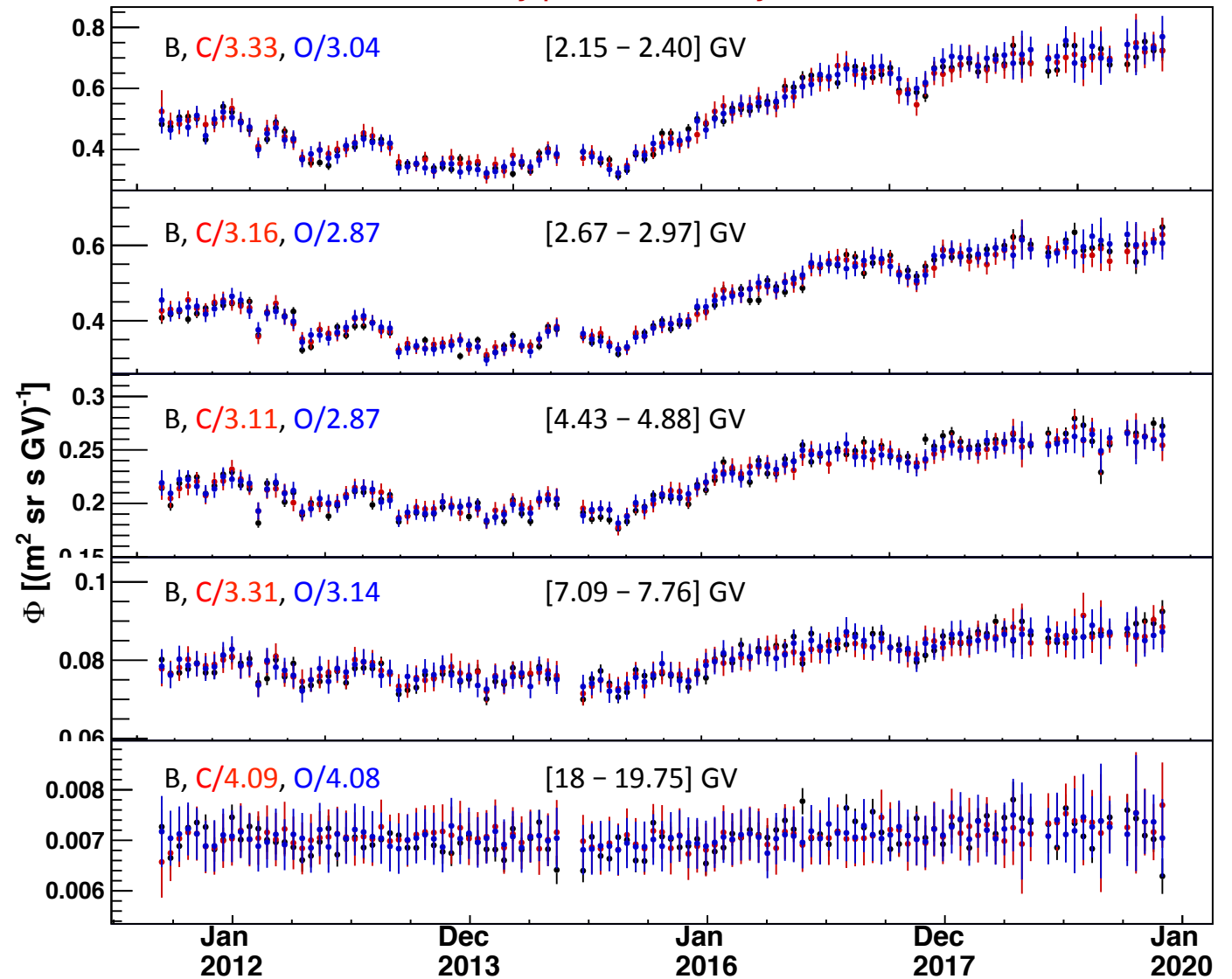
DIPARTIMENTO DI ECCELLENZA  
MUR 2023/2027



**Agenzia  
Spaziale  
Italiana**

- My PhD started on November 1st 2023 at Università degli Studi di Perugia;
- I'm working on **fluxes of cosmic rays nuclei**;
- I started from Federico Donnini's analysis on **Boron, Carbon and Oxygen** fluxes;
- The idea was to continue this analysis and keep it updated.

Monthly fluxes of B,C and O as a function of time  
Every point is 27 days of data

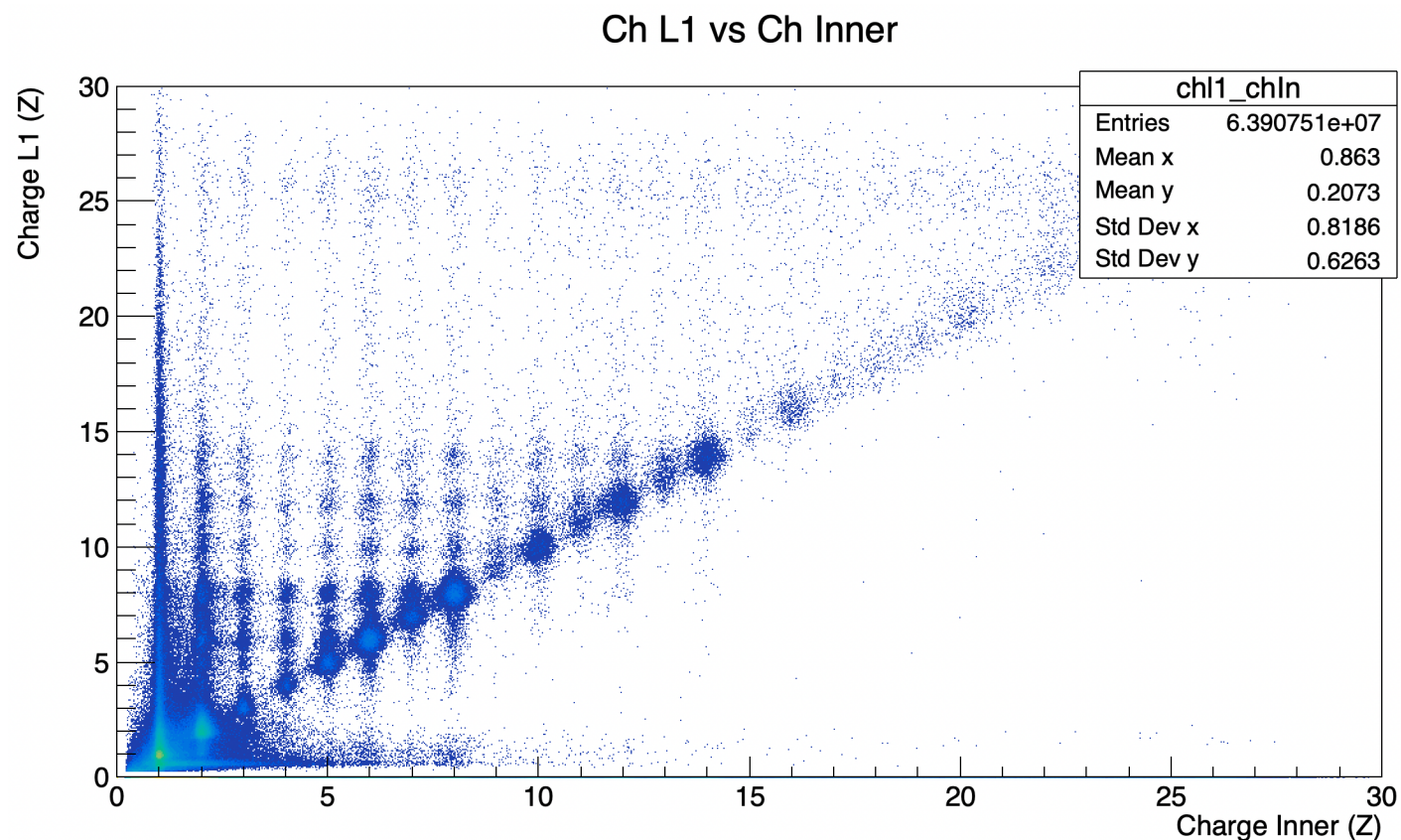


- I developed **my own code from scratch**, following both pgrm2 repo and Francesco Faldi proton's repo.

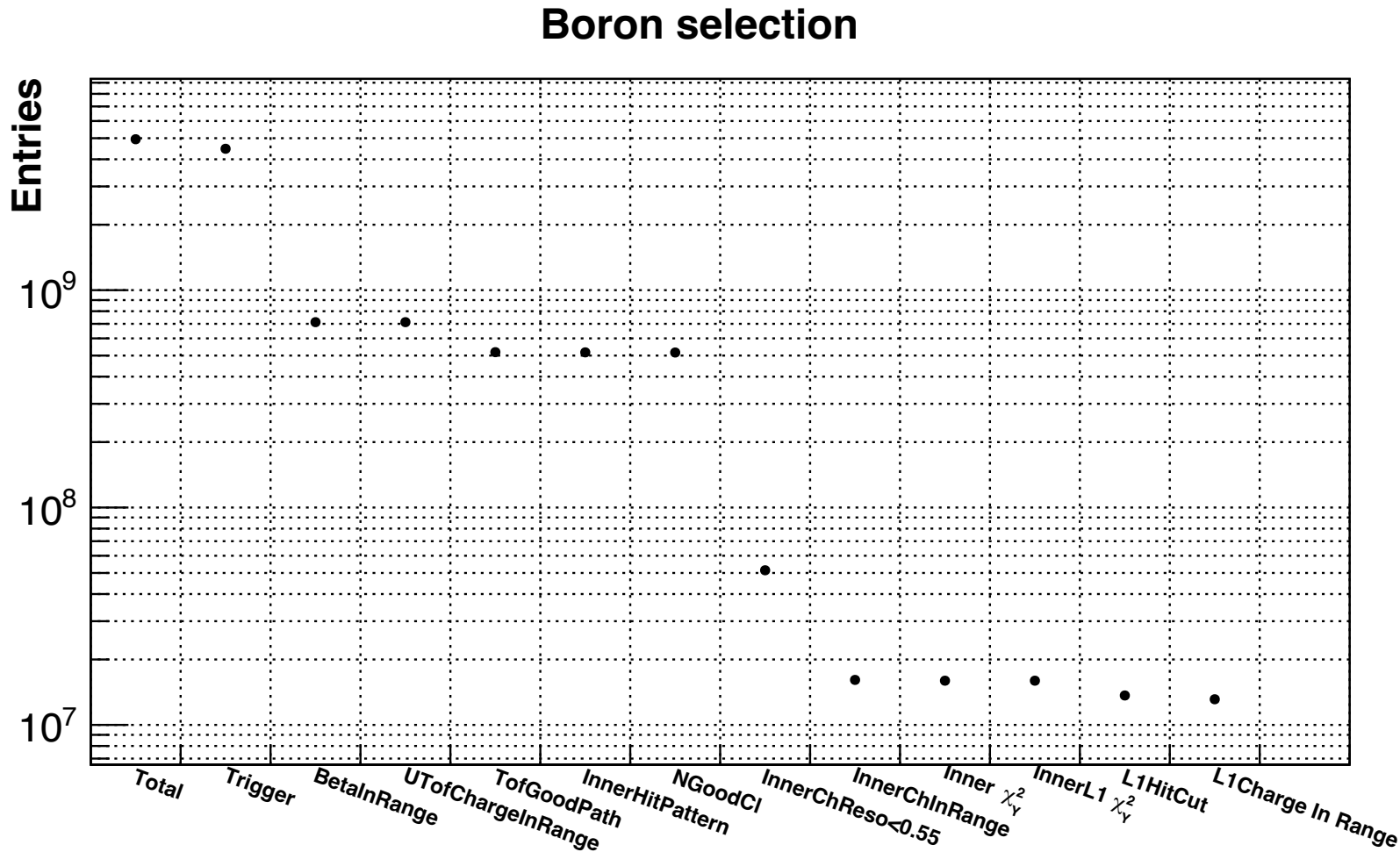


<https://github.com/ubaldialessio/lonsAnalysis>

- I started by learning both NAIA libraries and coding environment;
- At first I practiced by studying different quantities measured by different subdetectors, for example:

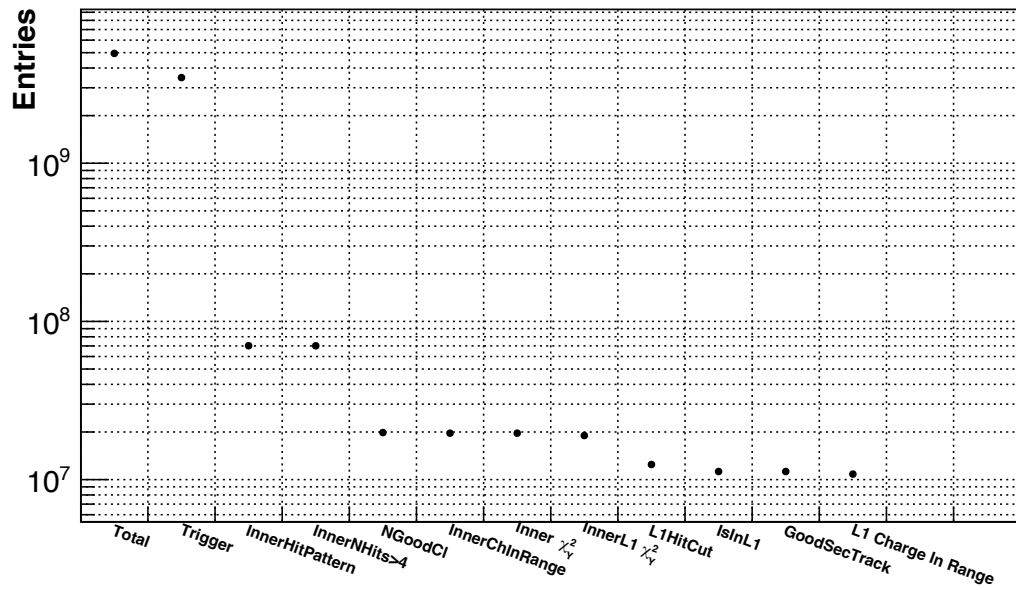


- I then started analyzing pass8 **Boron, Carbon and Oxygen** data;
- Now I'm focusing on the **Inner-L1** analysis;
- The selection is mostly the same as pgrm2:
  - Tof Charge  $\in [Z - 0.75, Z + 0.75]$ ;
  - I.T. Charge  $\in [Z - 0.3, Z + 0.7]$ ;
  - L1 Charge  $\in [0, Z + 0.8]$ ;

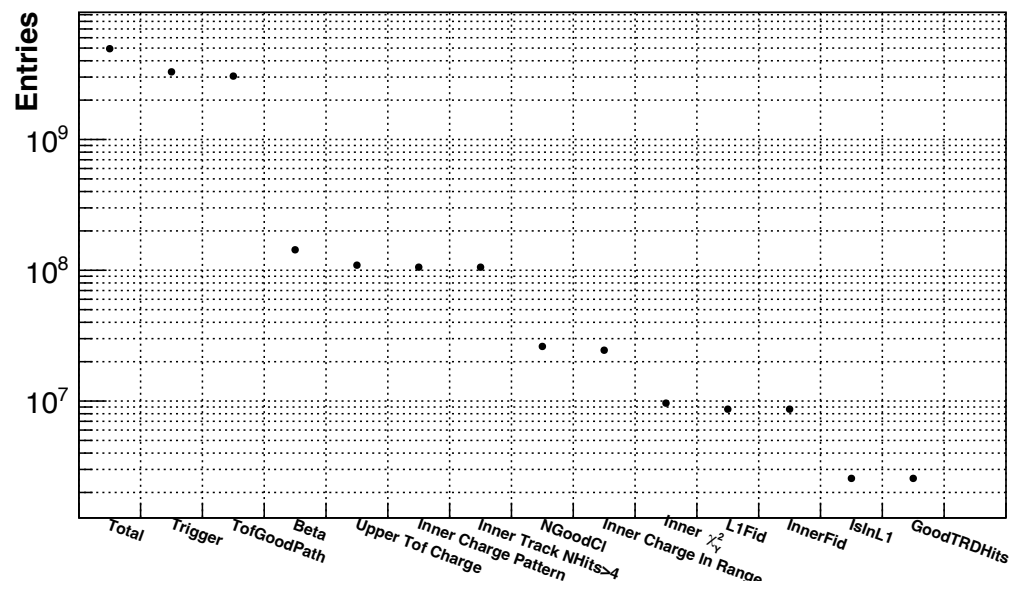


# My work – Boron efficiency selection hooks

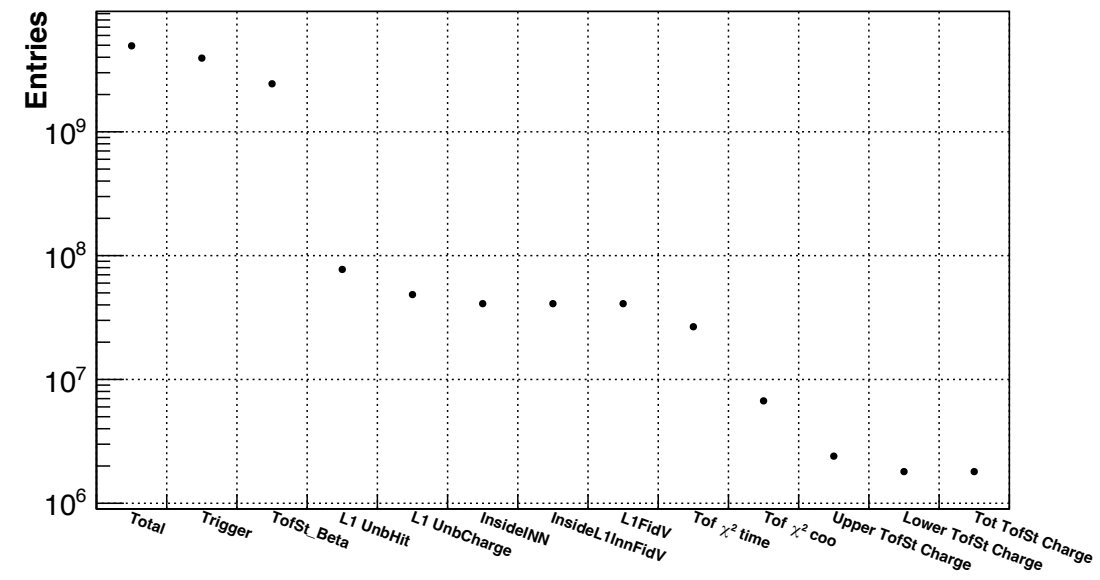
## Tof Selection



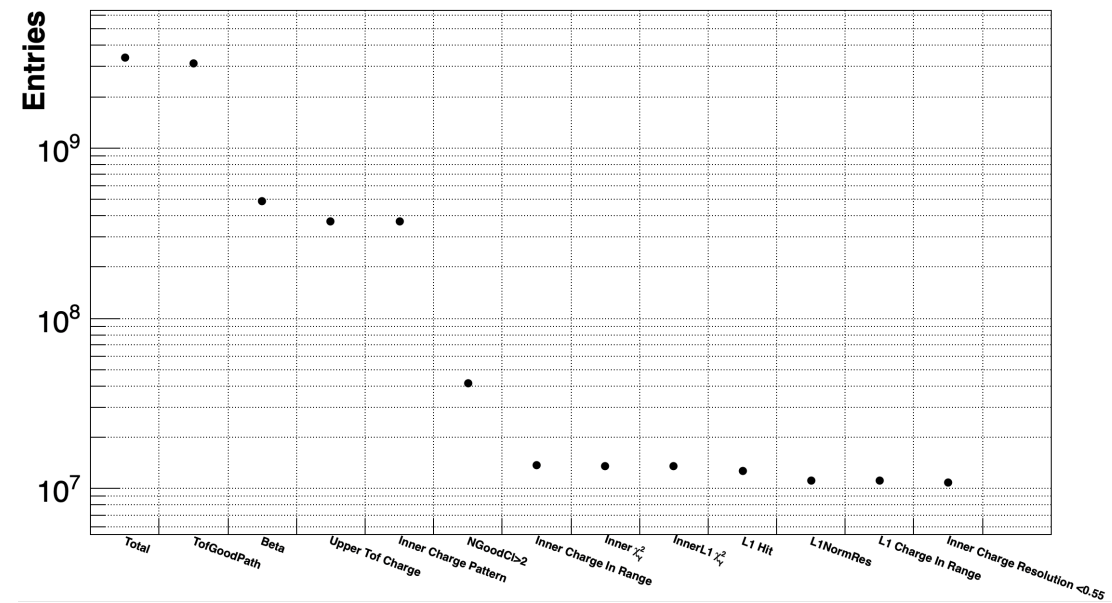
## L1 Selection



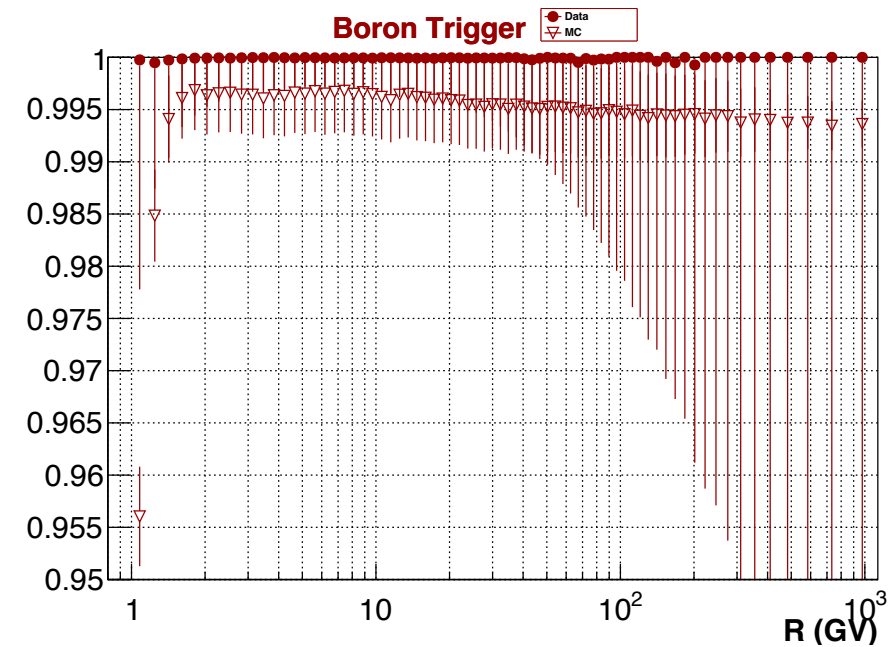
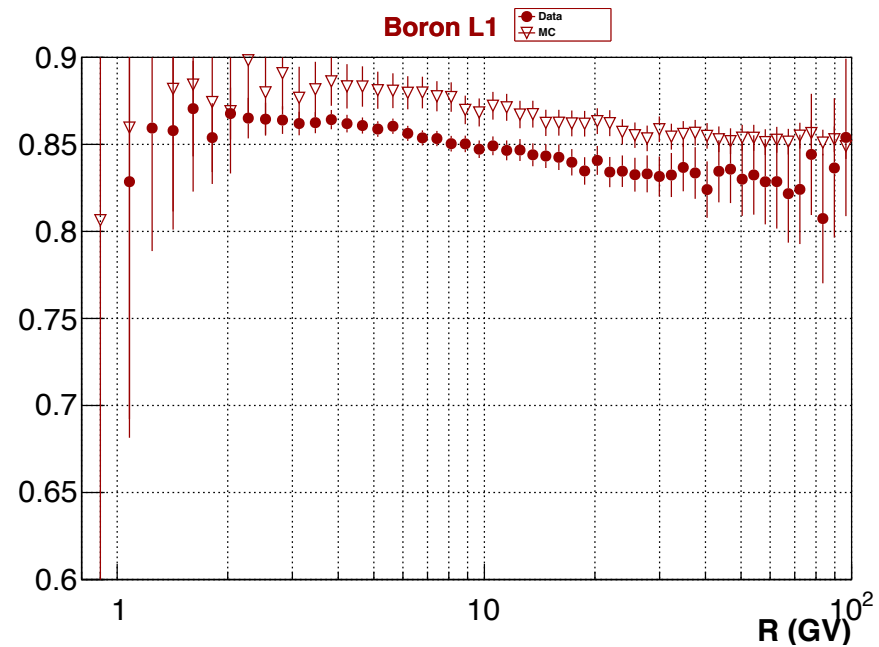
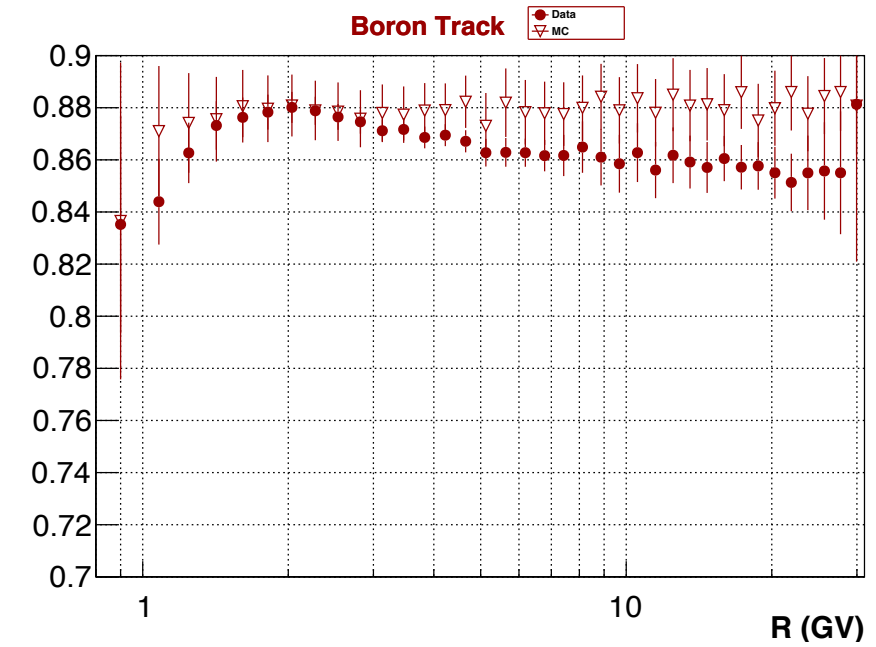
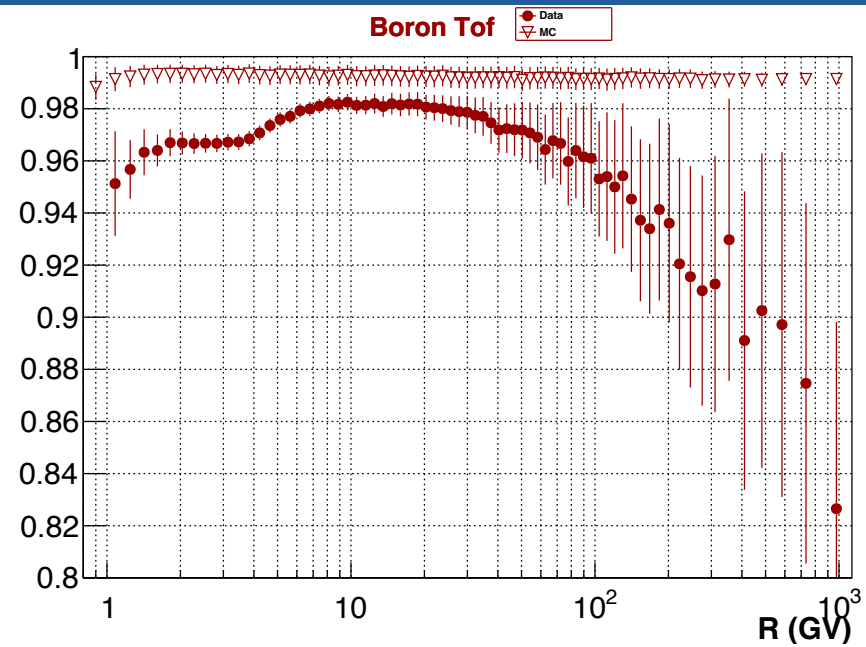
## Track Selection



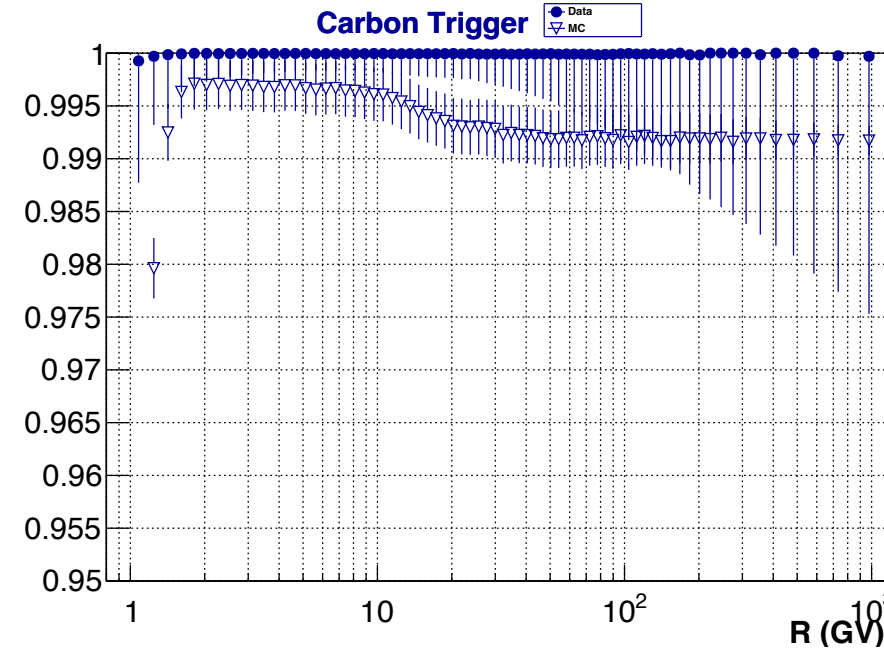
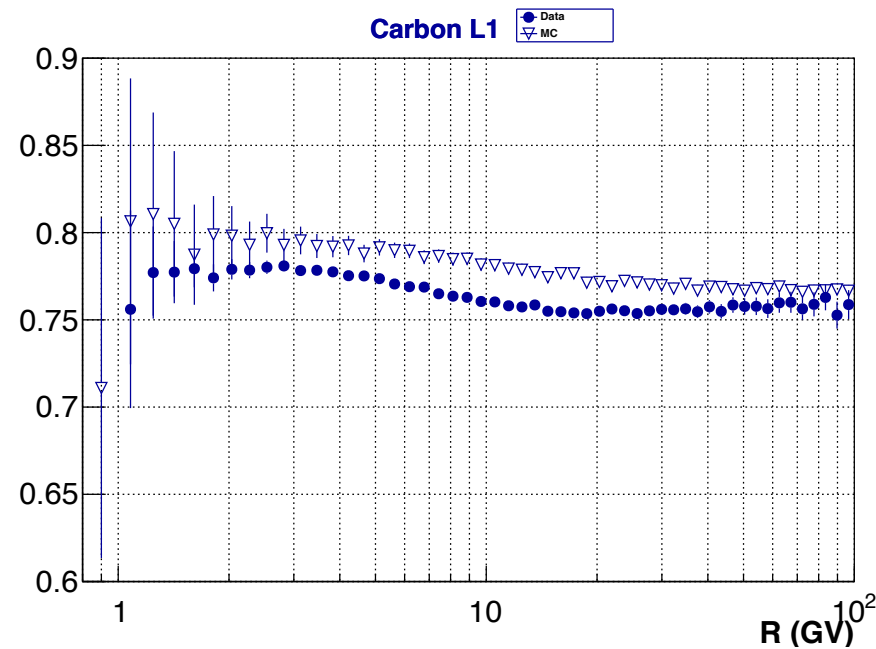
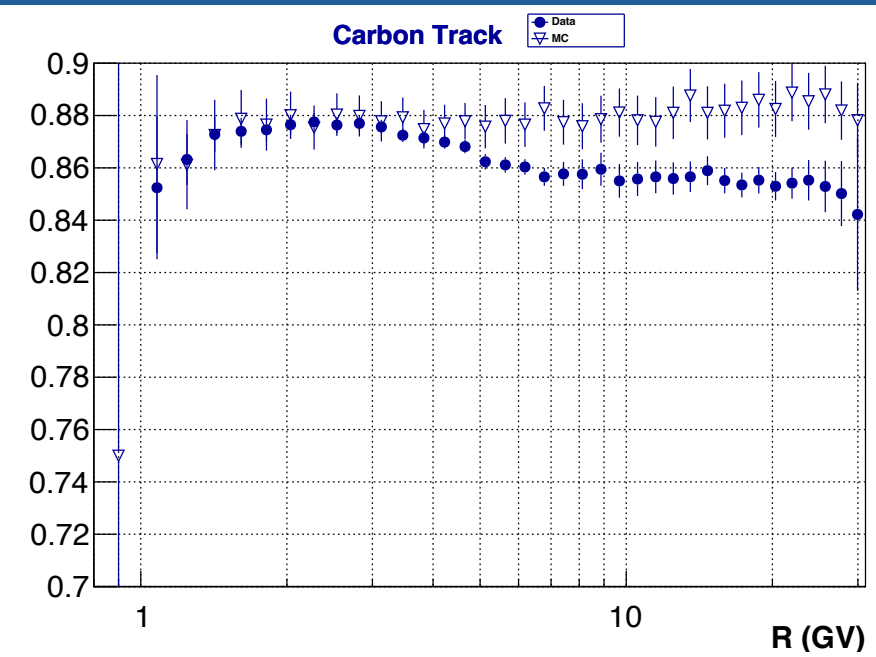
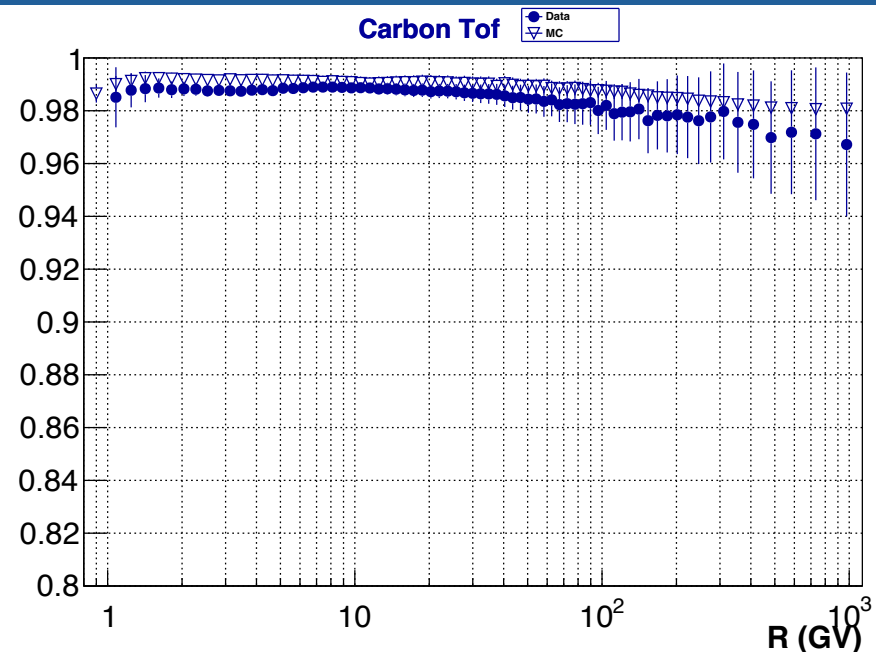
## Trigger Selection



# My work – Boron efficiencies

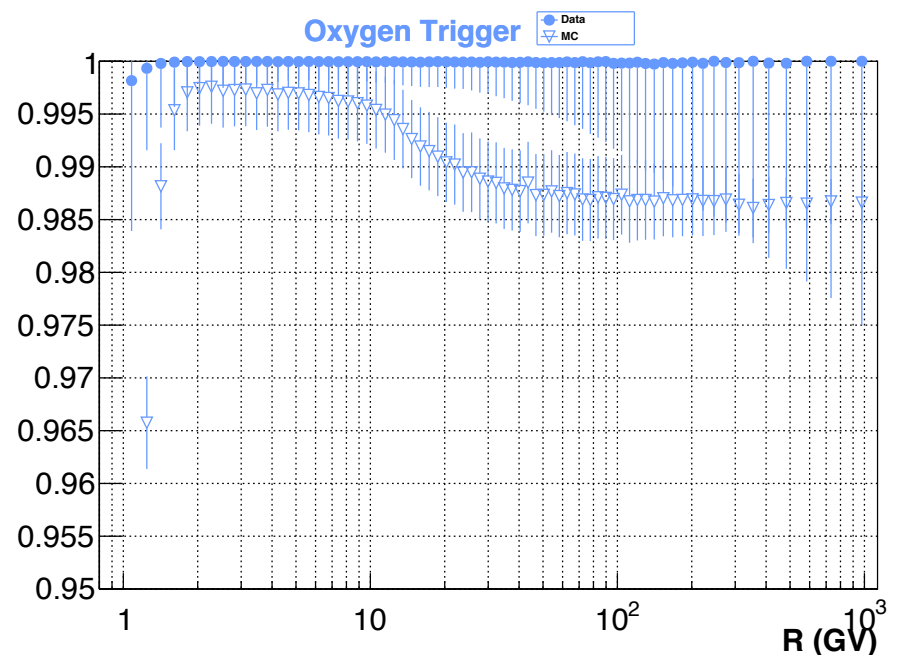
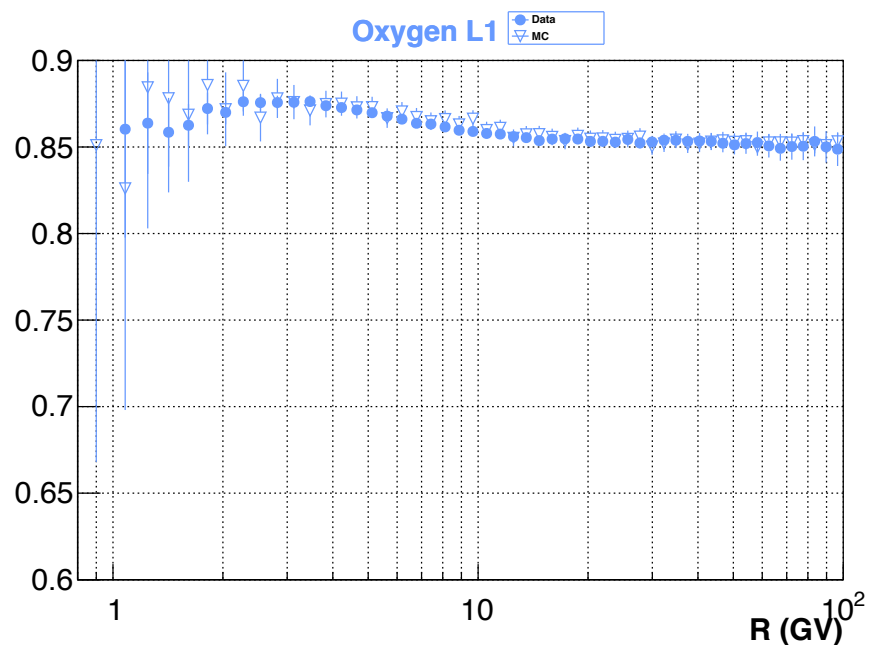
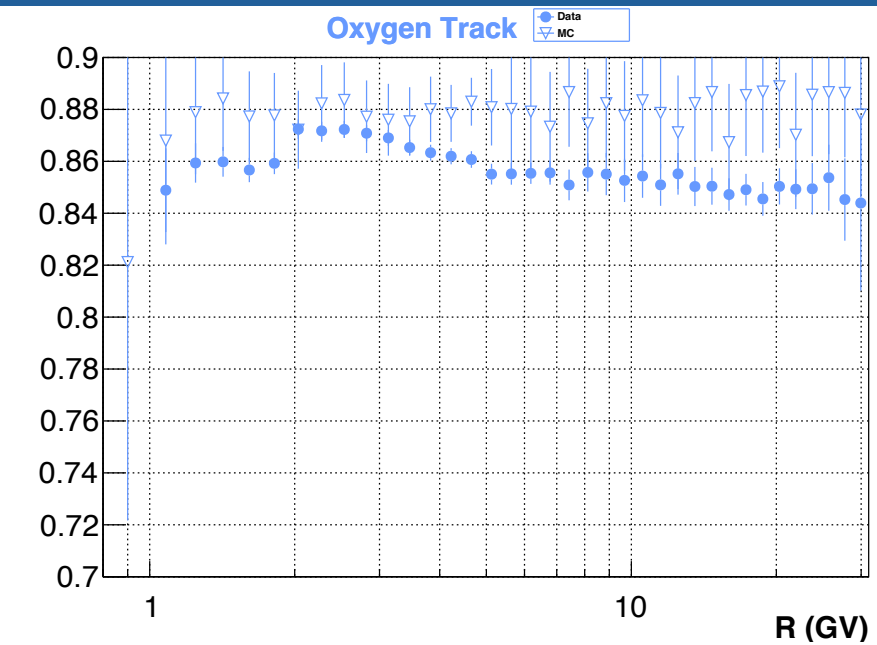
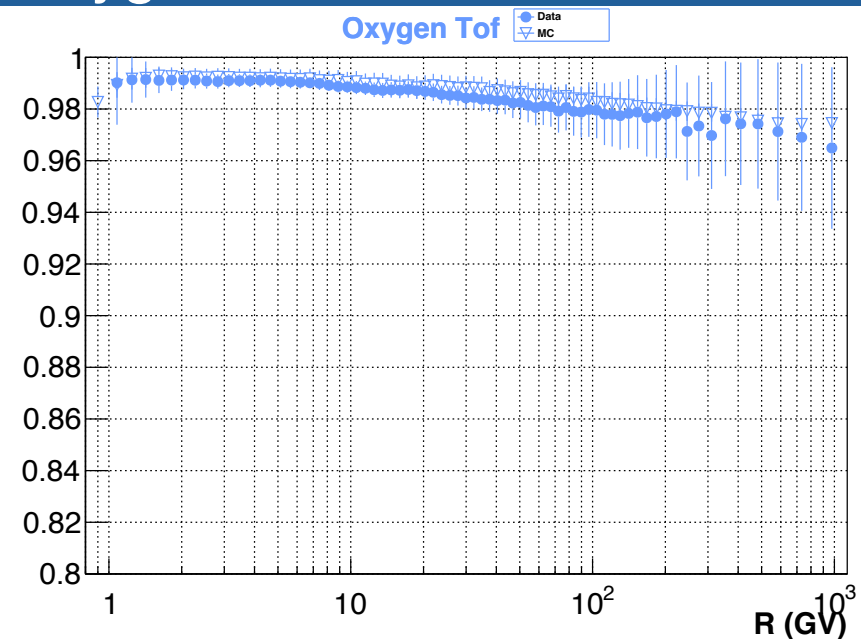


# My work – Carbon efficiencies

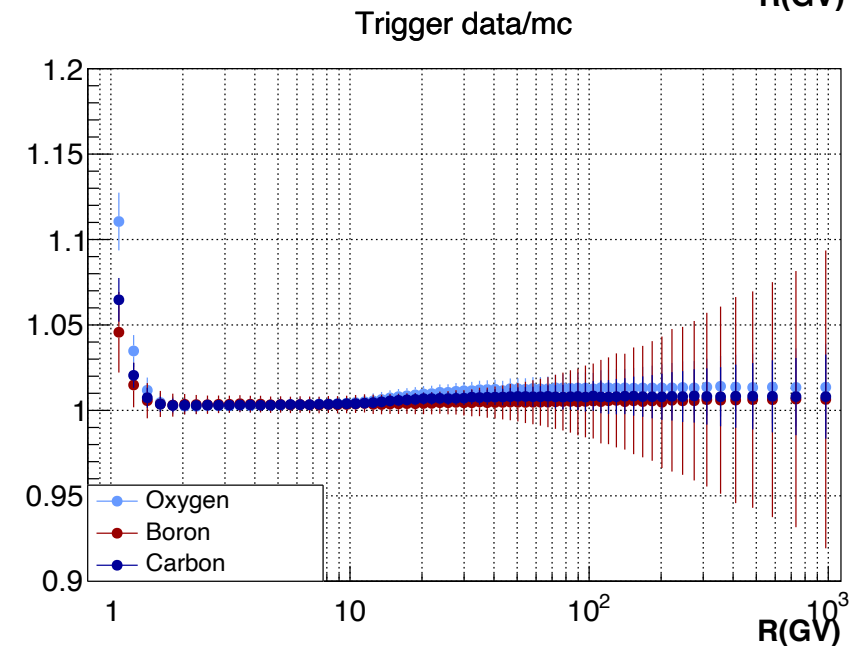
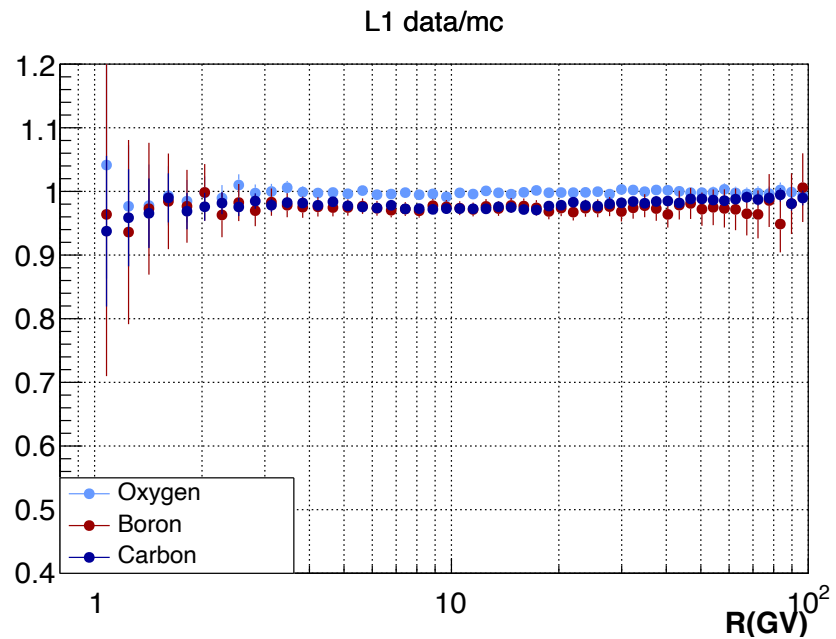
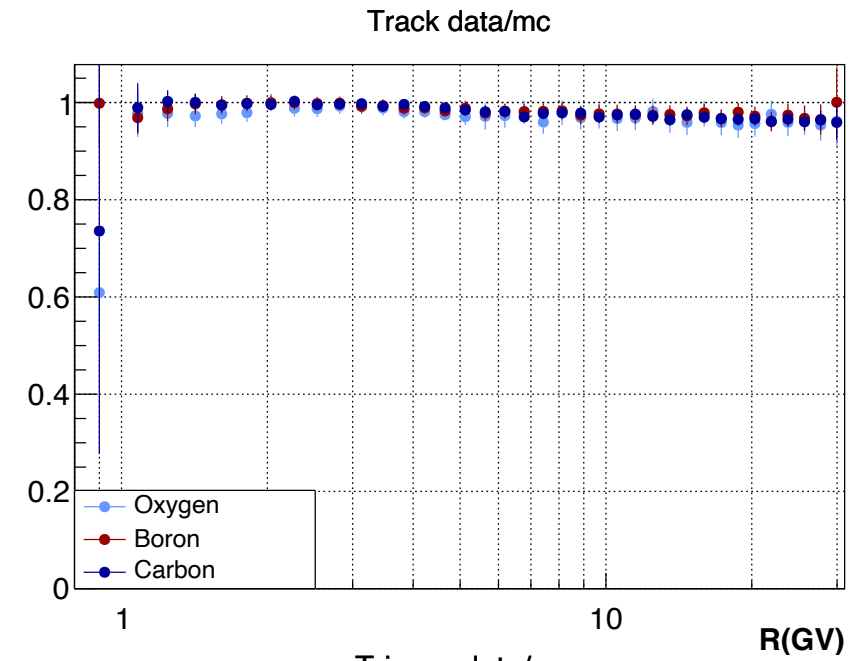
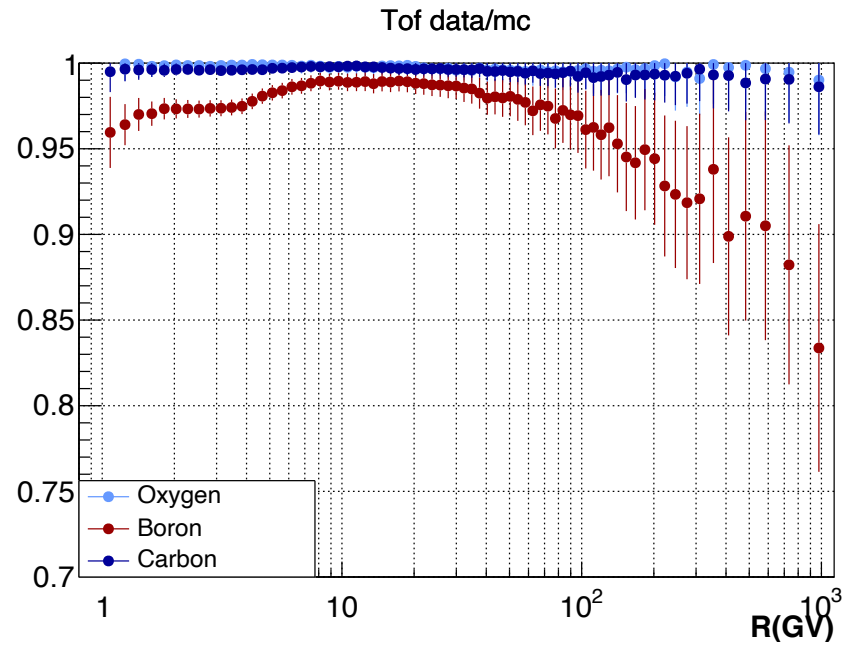




# My work – Oxygen efficiencies

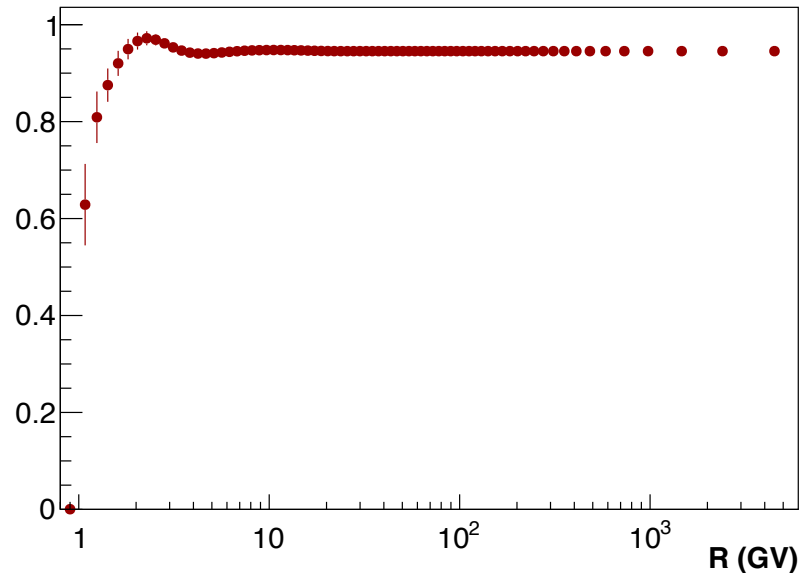




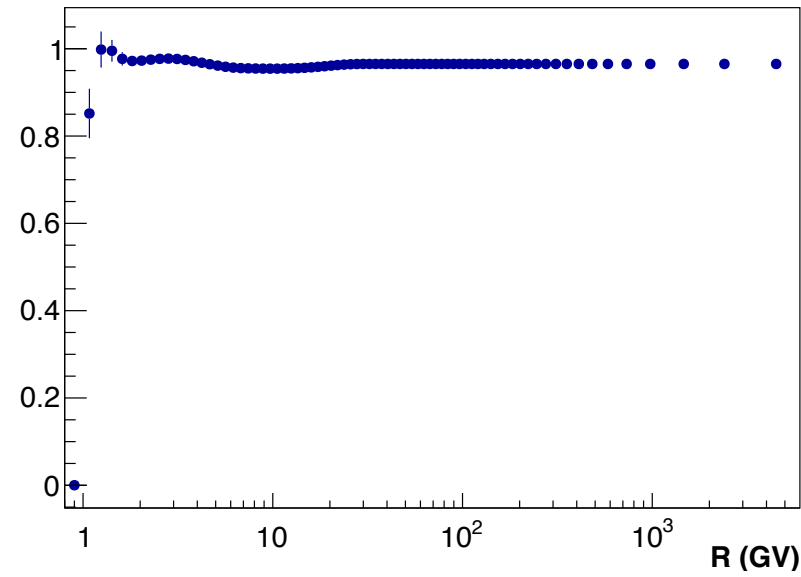


$$Acc_{corr} = \prod_i \frac{\varepsilon_i^{data}}{\varepsilon_i^{mc}}$$

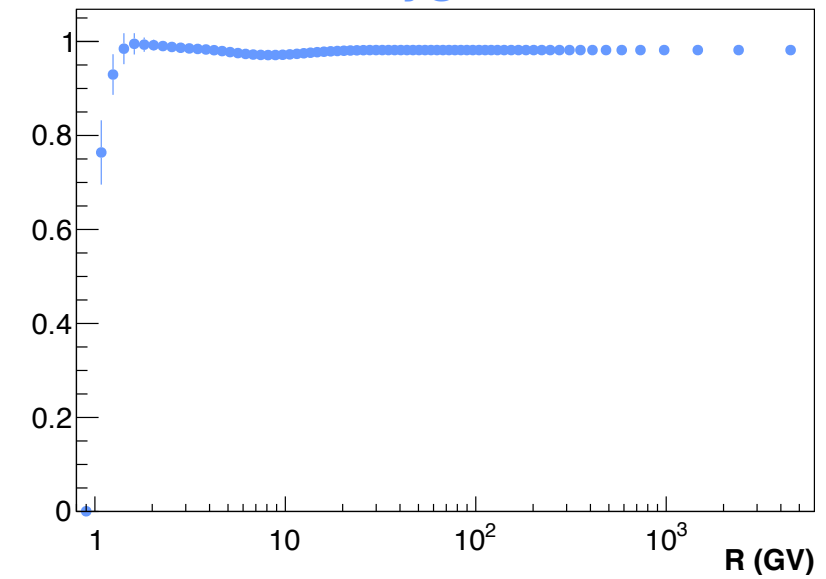
## Boron



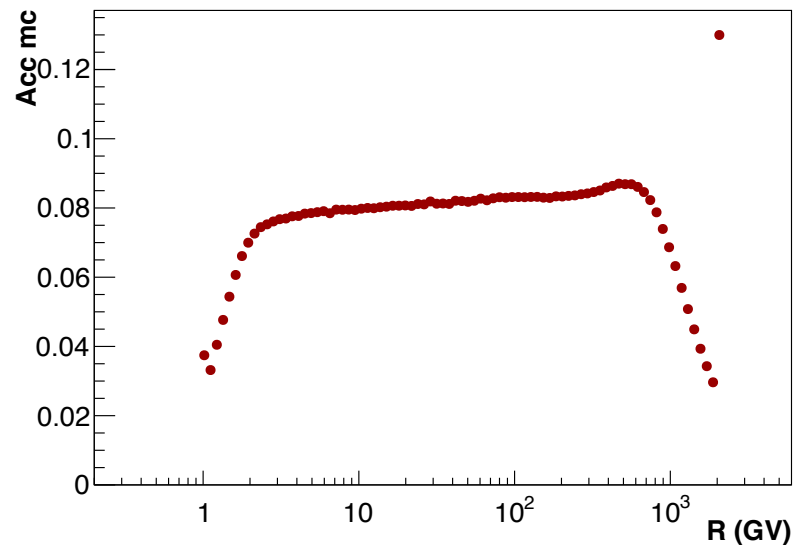
## Carbon



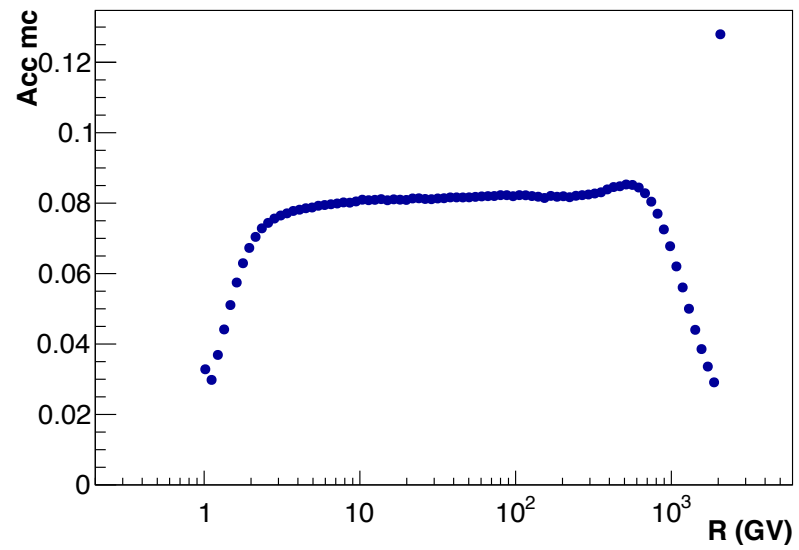
## Oxygen



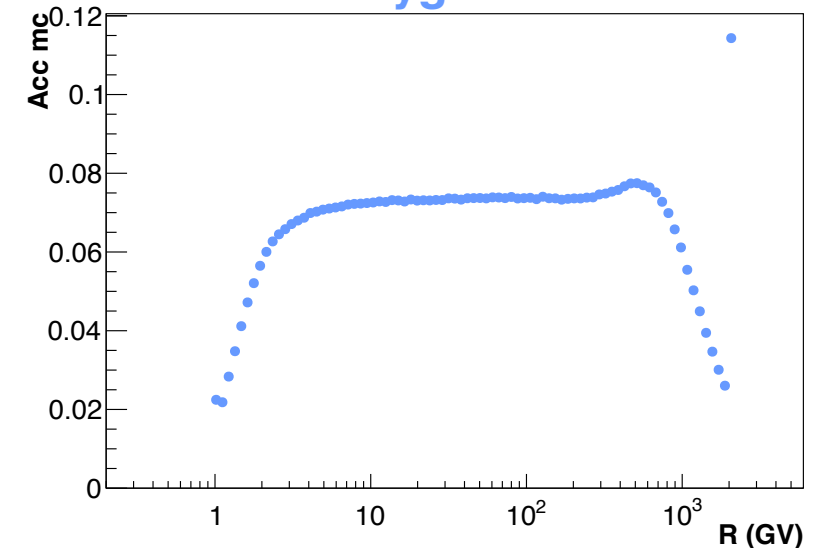
## Boron

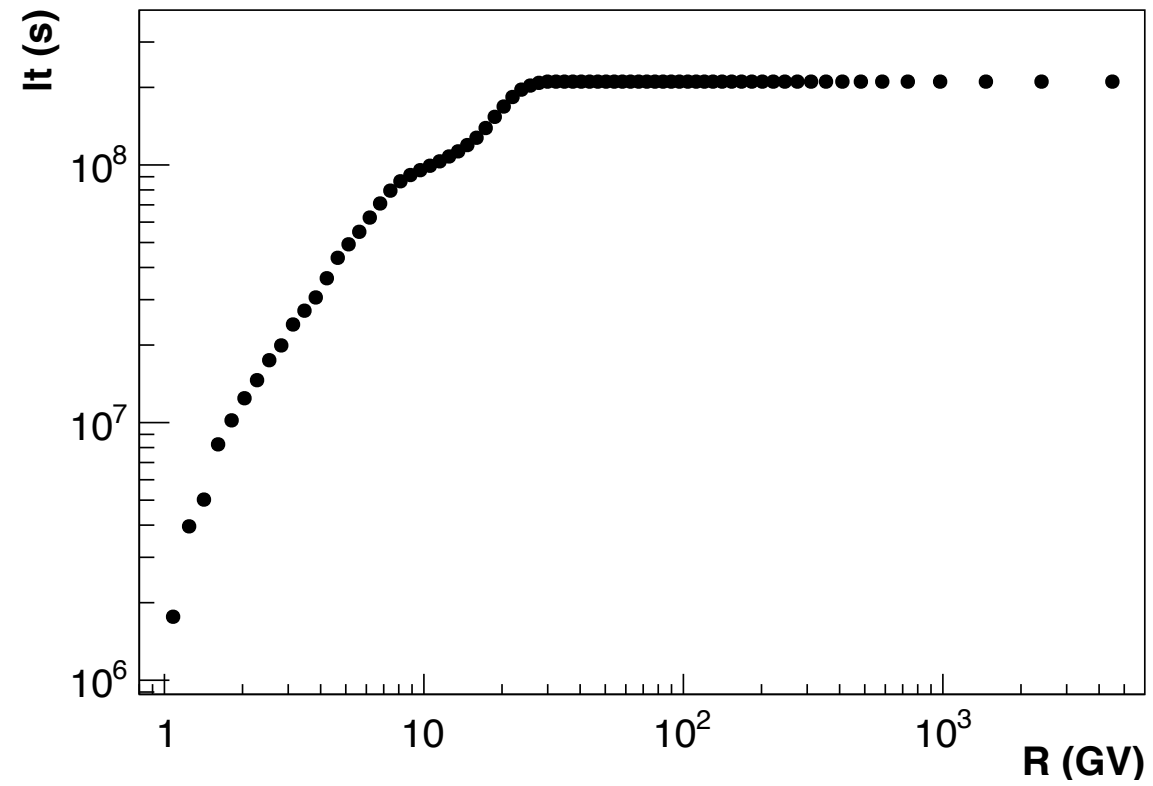


## Carbon



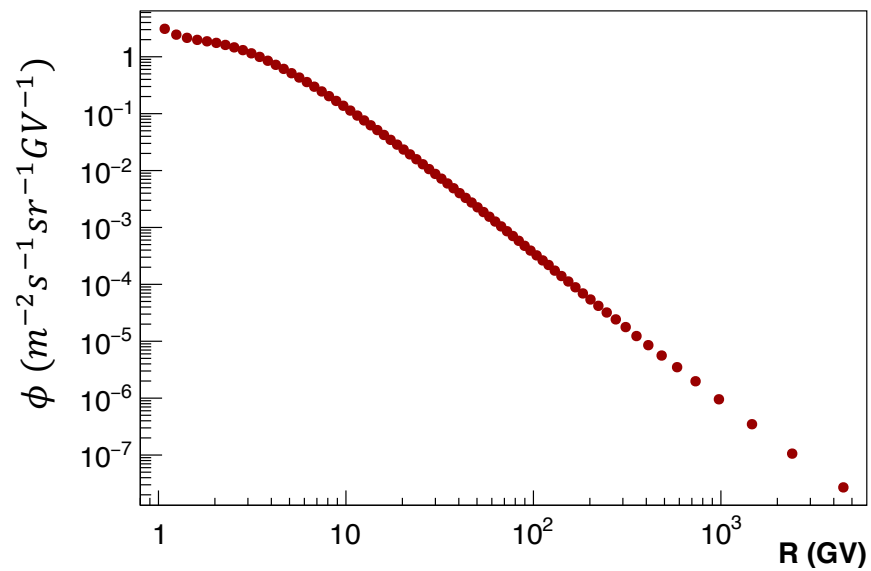
## Oxygen



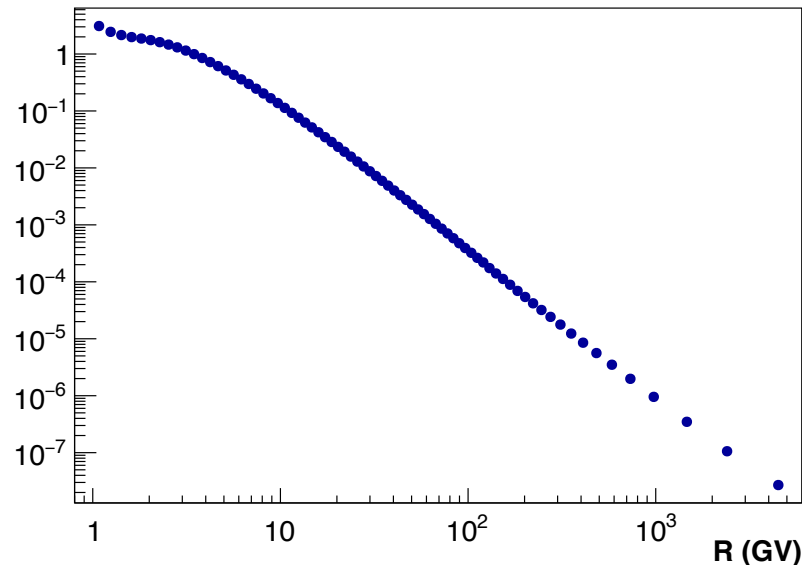


$$\text{Flux} = \frac{\text{counts}}{lt \cdot R \cdot A_{mc} \cdot Acc_{corr}}$$

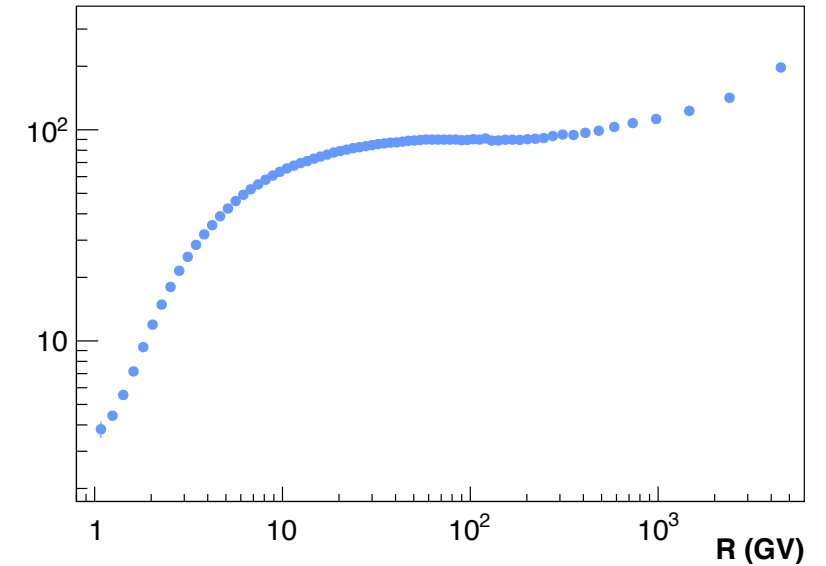
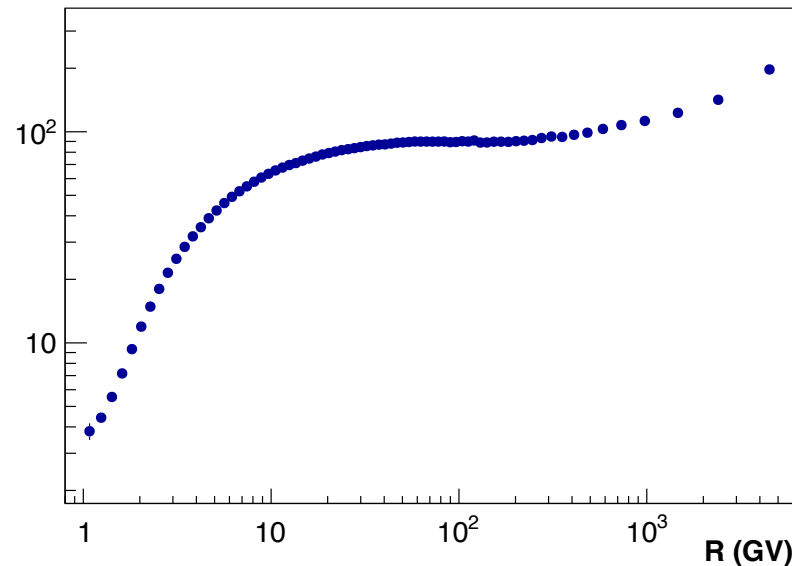
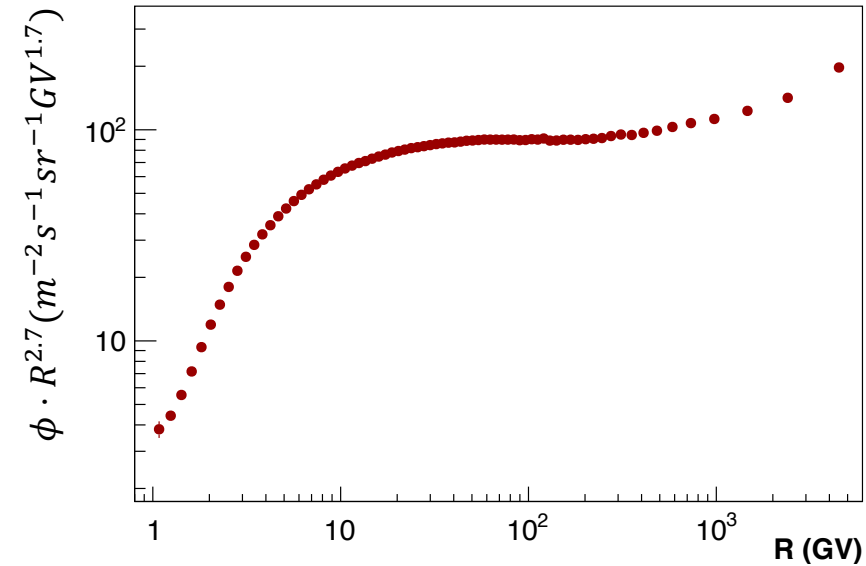
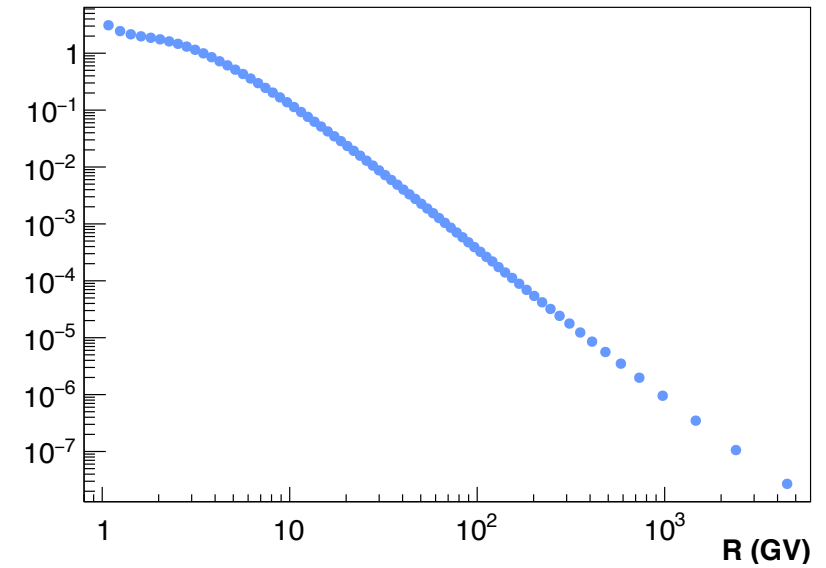
## Boron



## Carbon



## Oxygen

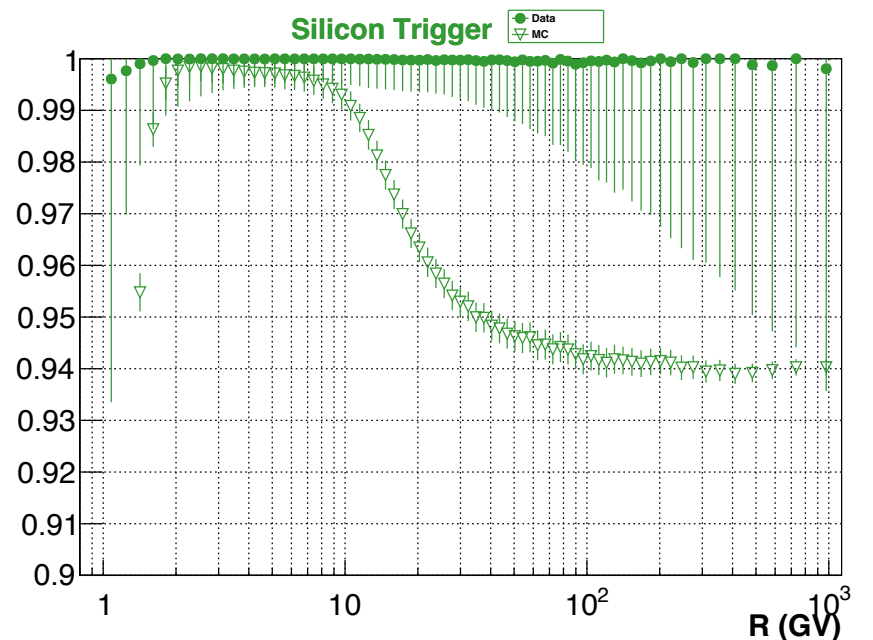
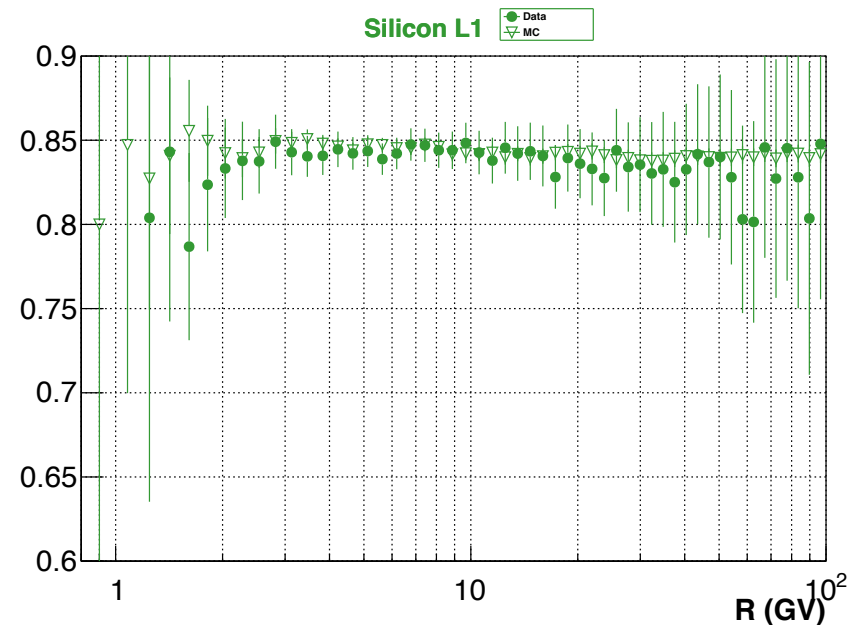
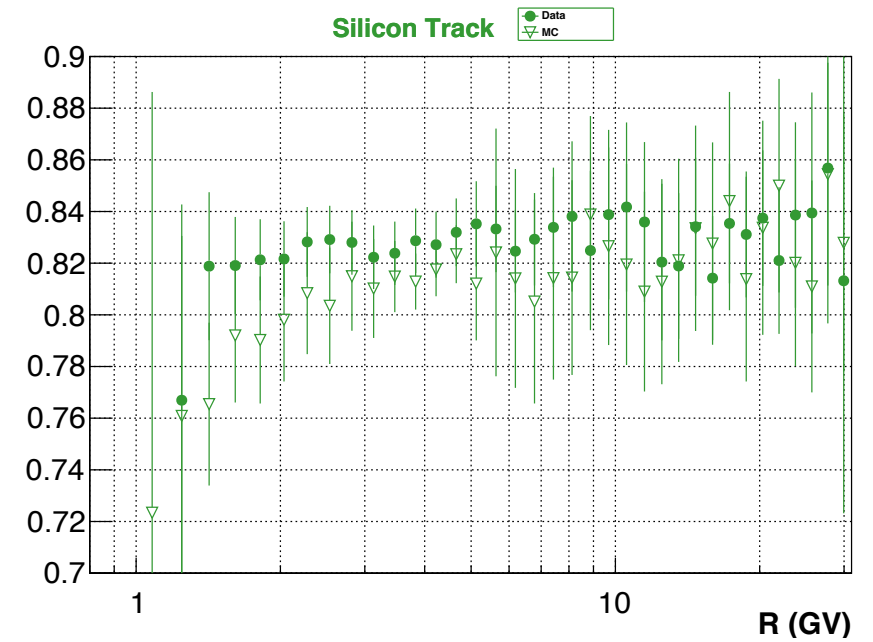
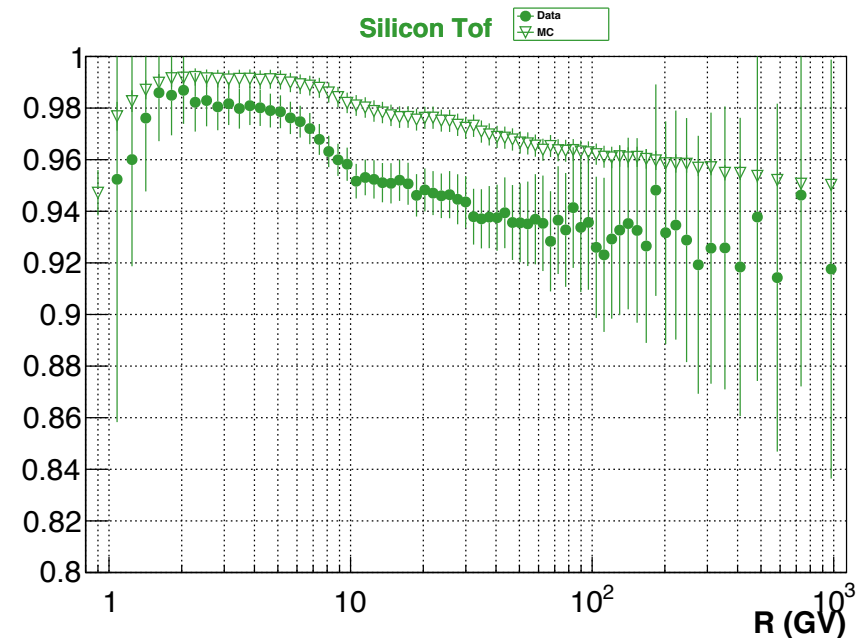


To do:

- **Contamination**
- **Unfolding**
- **Errors evaluation**
- Any suggestion
- **Check everything again**

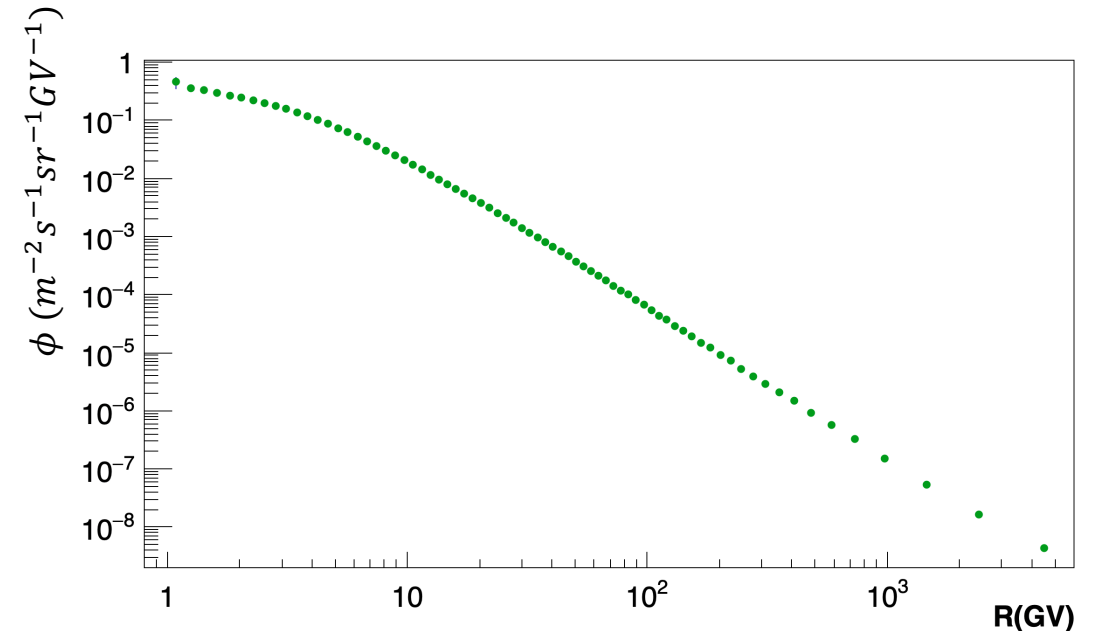
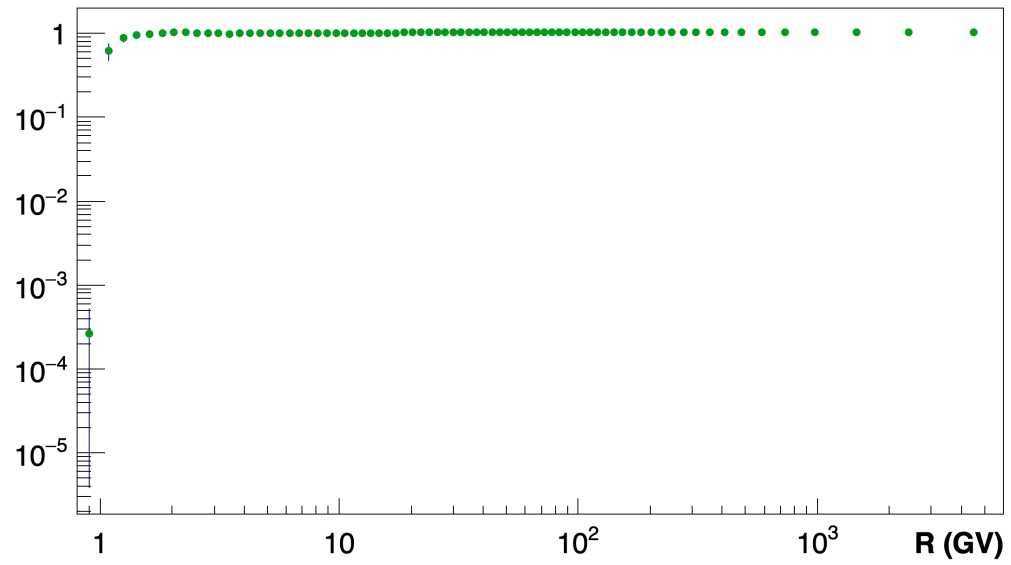
- Once i will be able to correctly evaluate the fluxes, **the idea** is to analyze **Phosphorus (Z=15)**;
- Is a secondary cosmic ray not yet published by the collaboration;
- The analysis requires a correct evaluation of the fluxes of the two neighboring nuclei, **Silicon (Z=14)** and **Sulfur (Z=16)**.

# My work – Silicon (just a look)

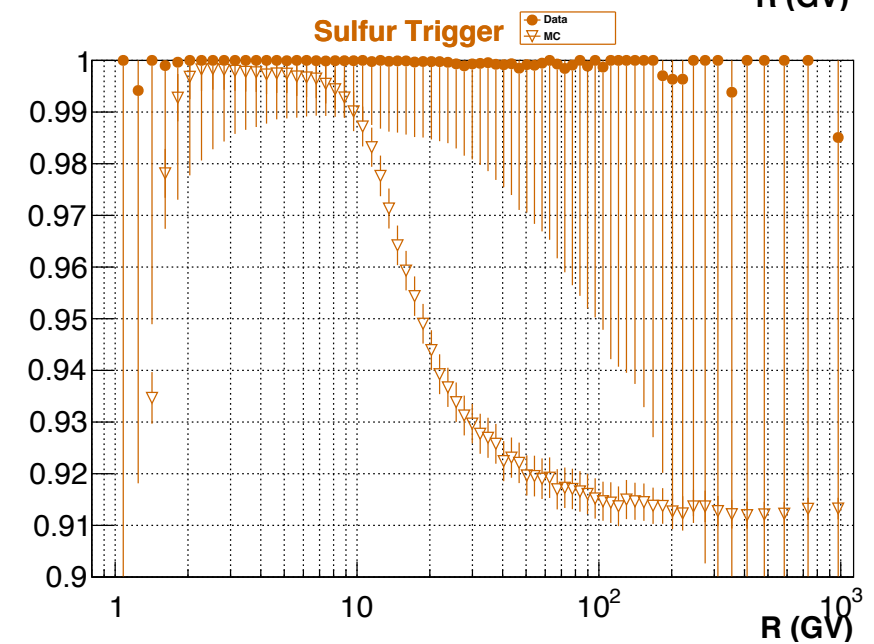
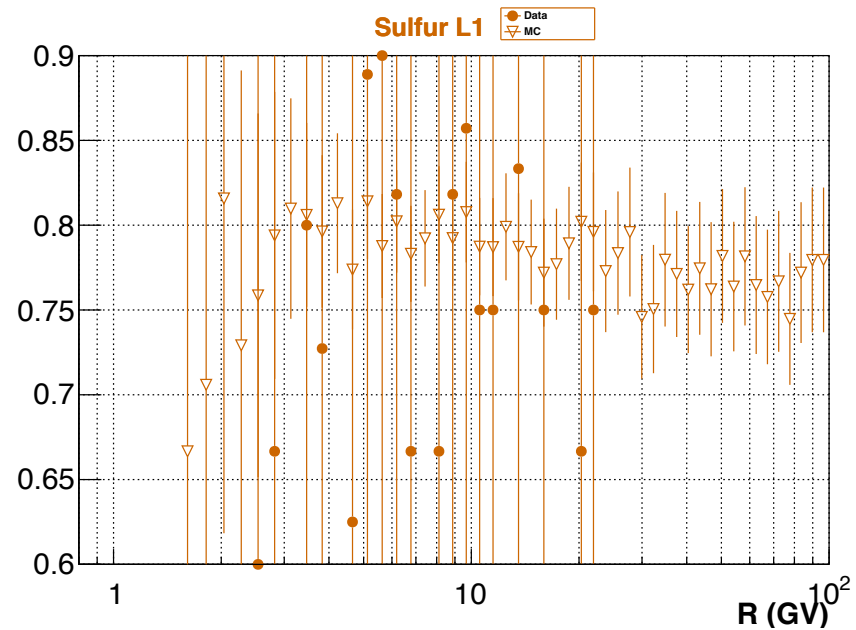
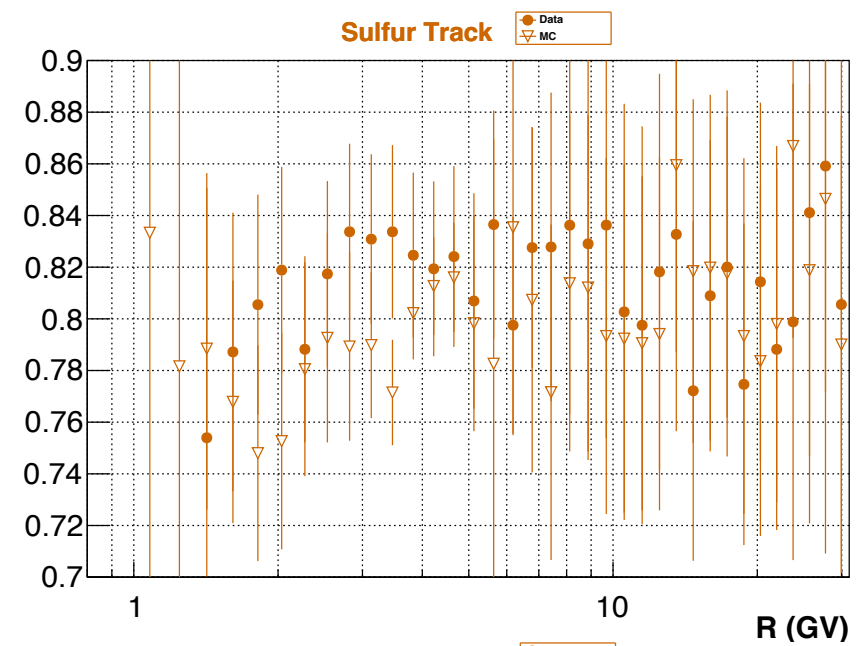
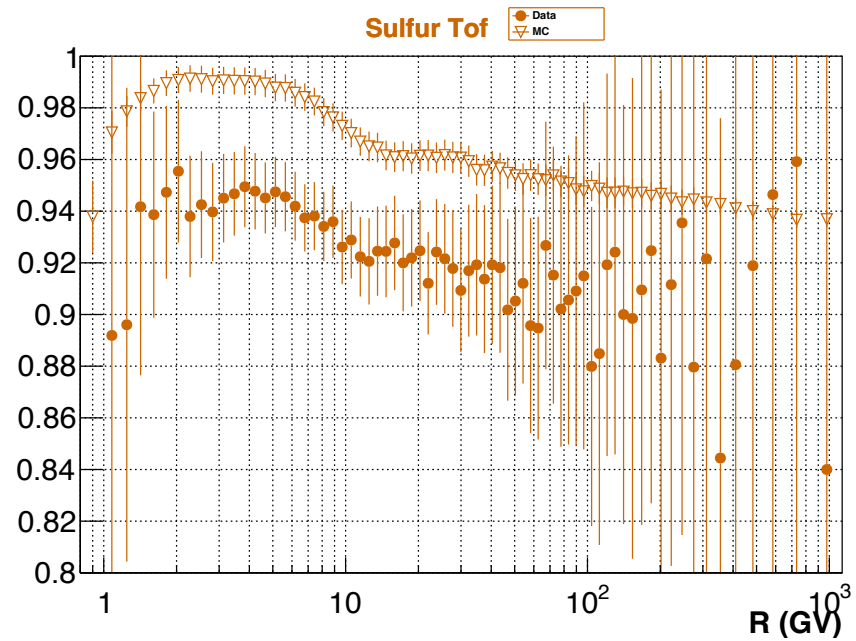




## Acceptance corrections



# My work – Sulfur (just a look)



End