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# The impact of materials and frames on trigger protons and recoil fragments

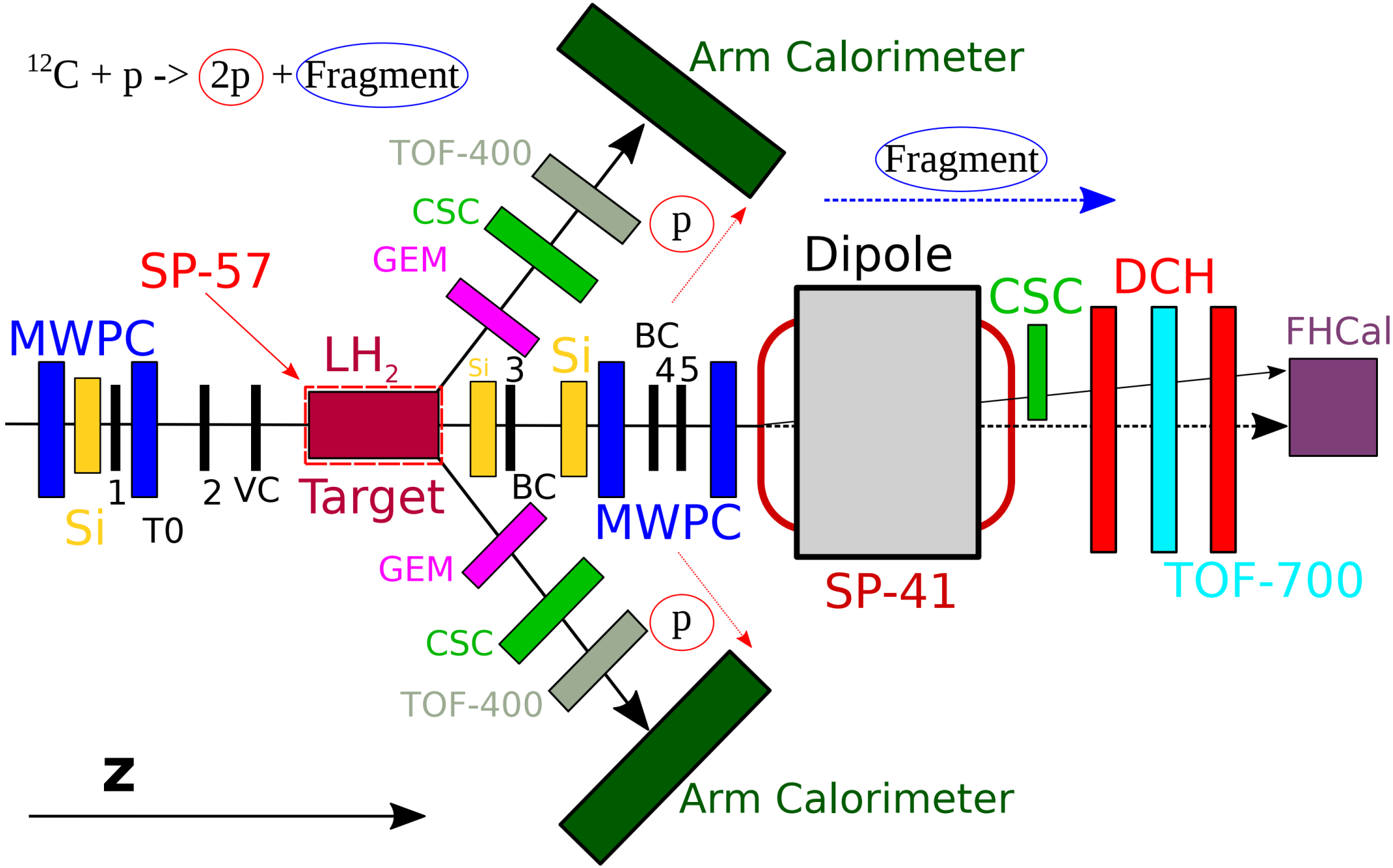
# (SRC Experiment)


BM@N Collaboration Meeting

Parallel sessions: Detector Meeting

19th April 2021

# SRC RUN 2021: Experimental Setup



# Introduction

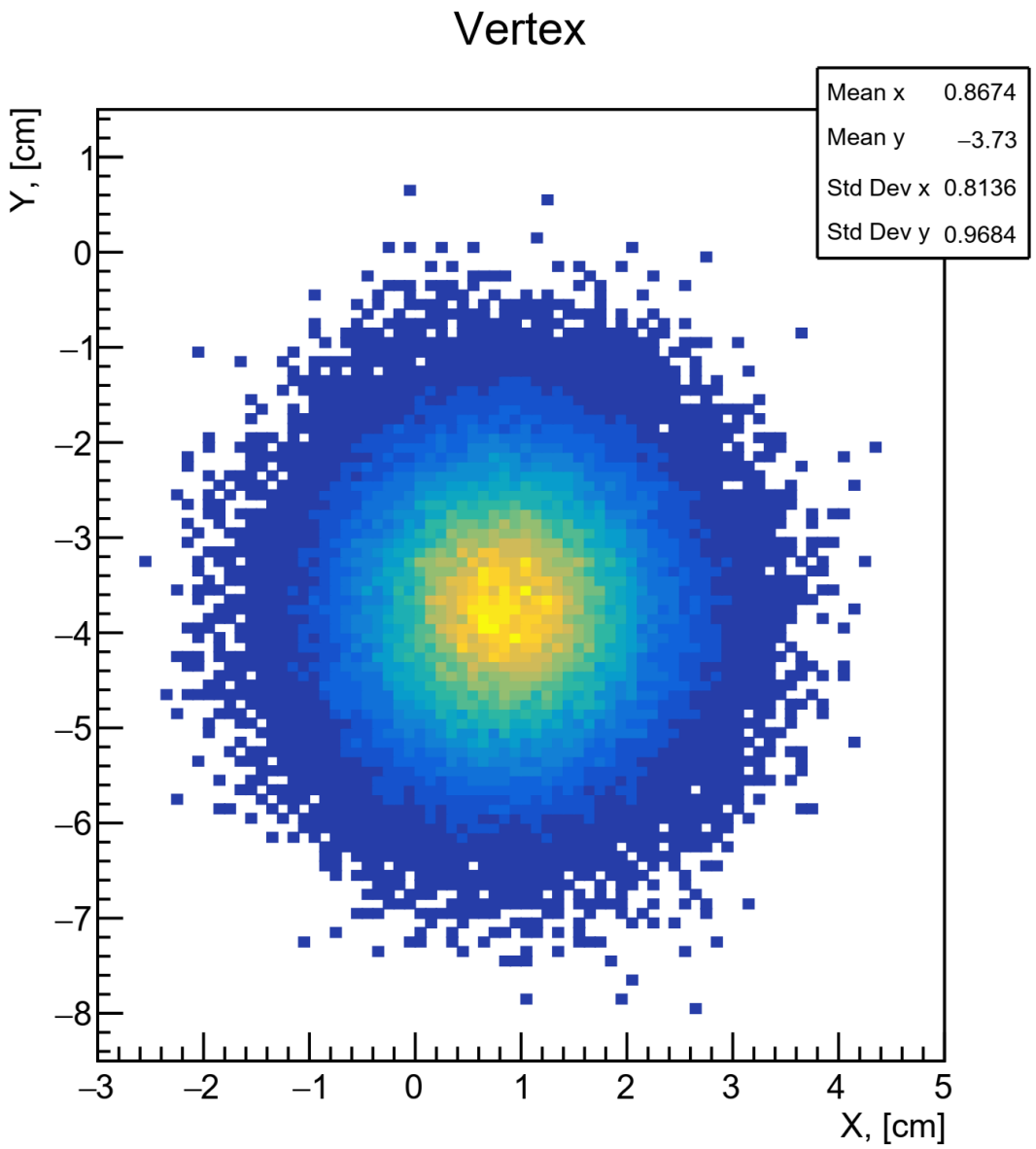
To the next SRC RUN:

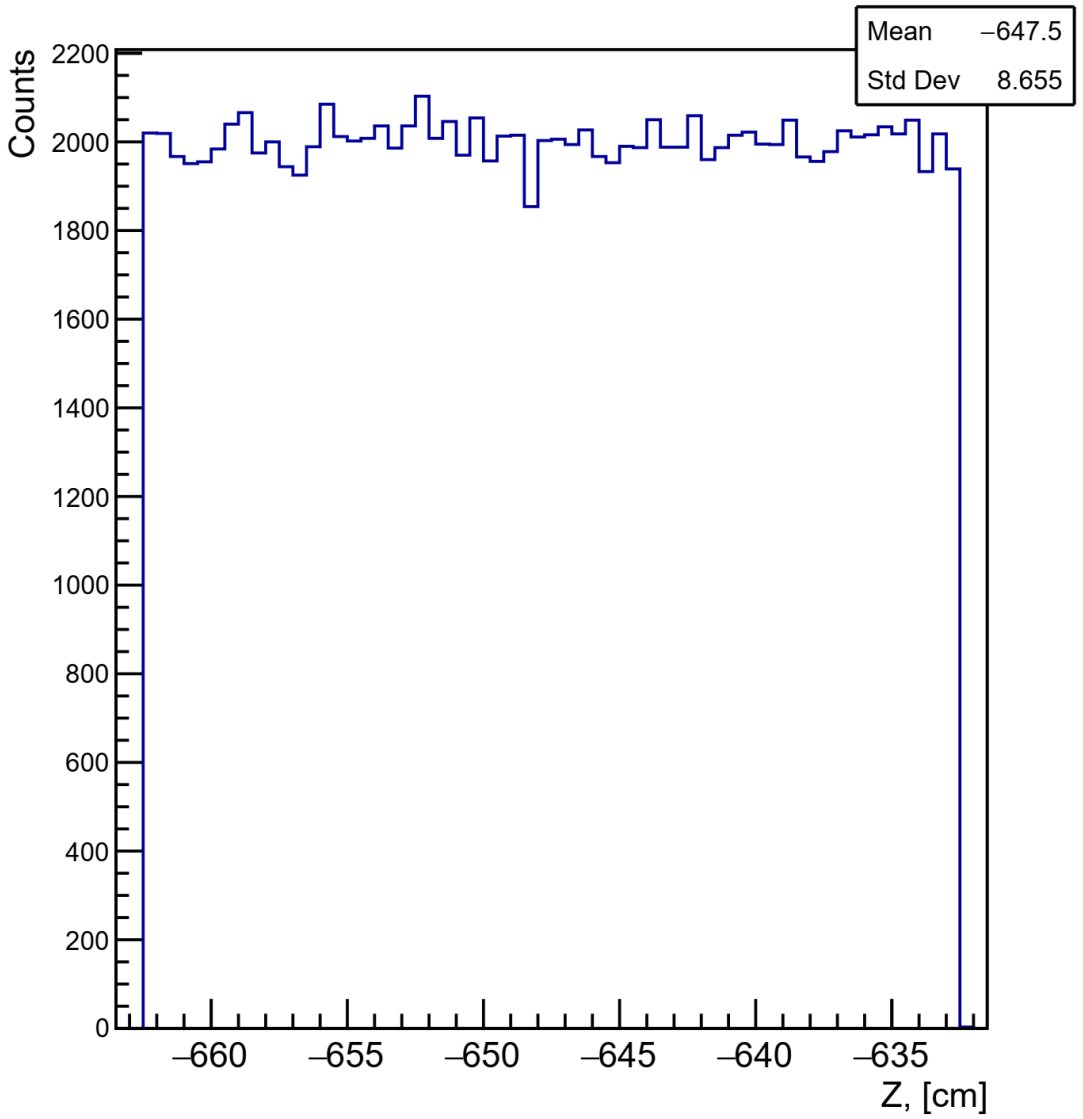
- event selection (p/pion sampling) -> Calorimeters will be added to the 2-arm Spectrometer
- time resolution -> TOF-400 and Calorimeter TOF

- It’s important to know what is impact of the detectors materials on the time resolution
- It’s very important to detect residual nuclear system -> the configuration downstream the analyzing magnet must be optimized to reconstruct fragments tracks and their momenta

# Input data

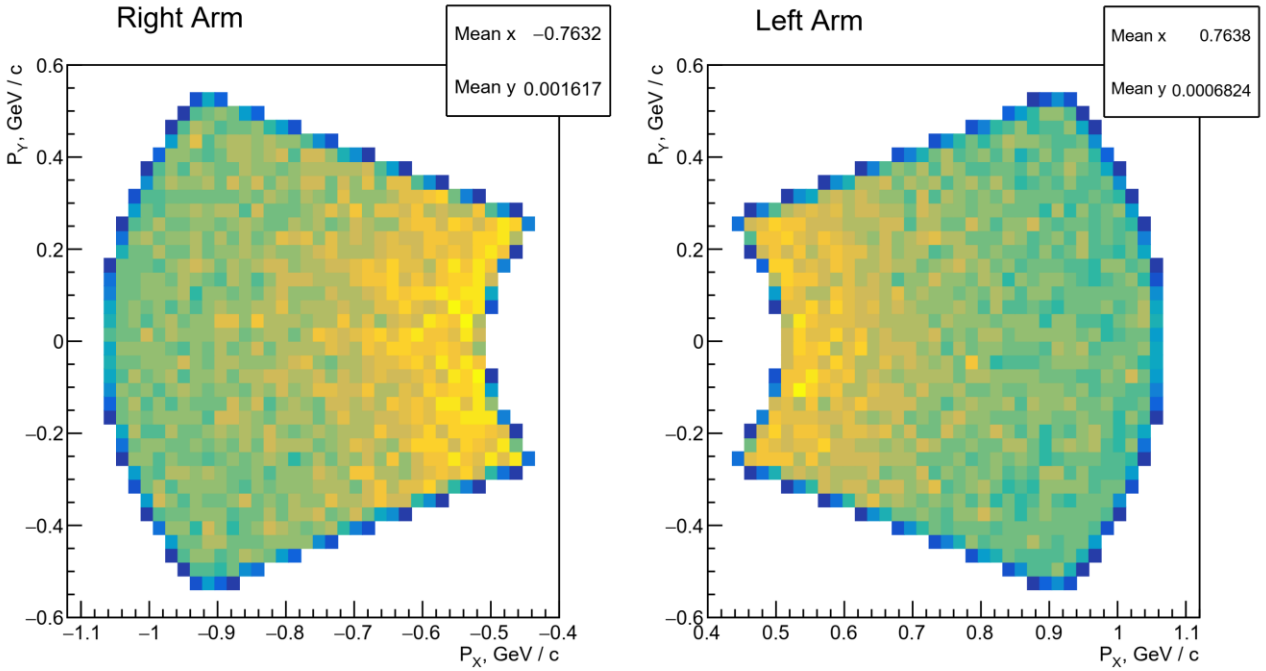
**Taken from the 2018 SRC RUN data**



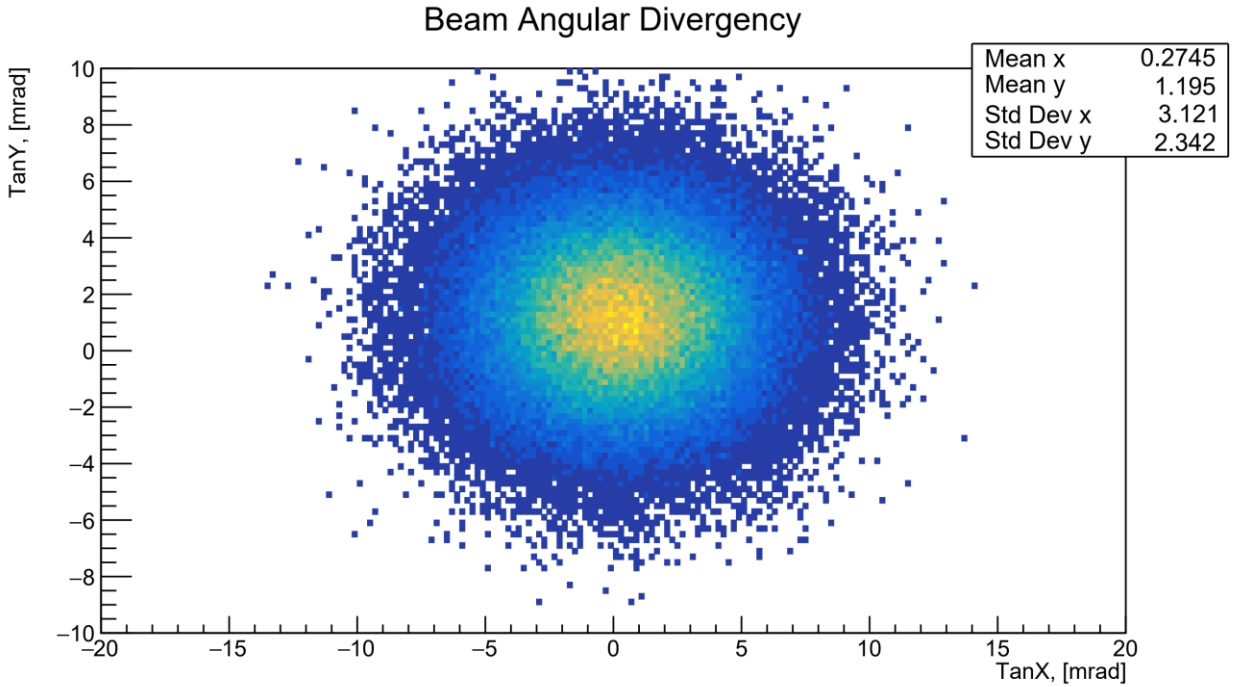
# Input data

## Trigger Protons




**To cover the arms acceptance**

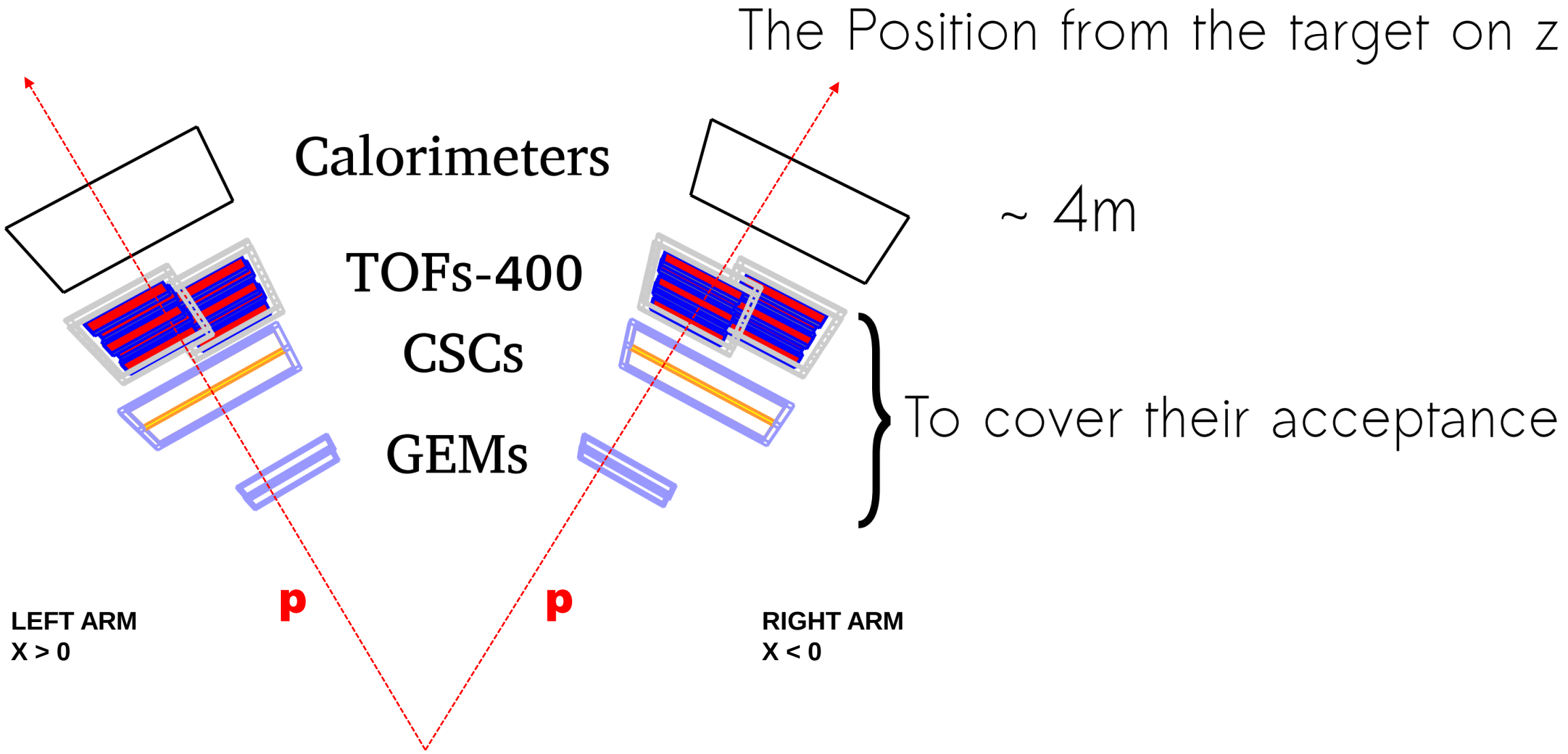
## Fragments



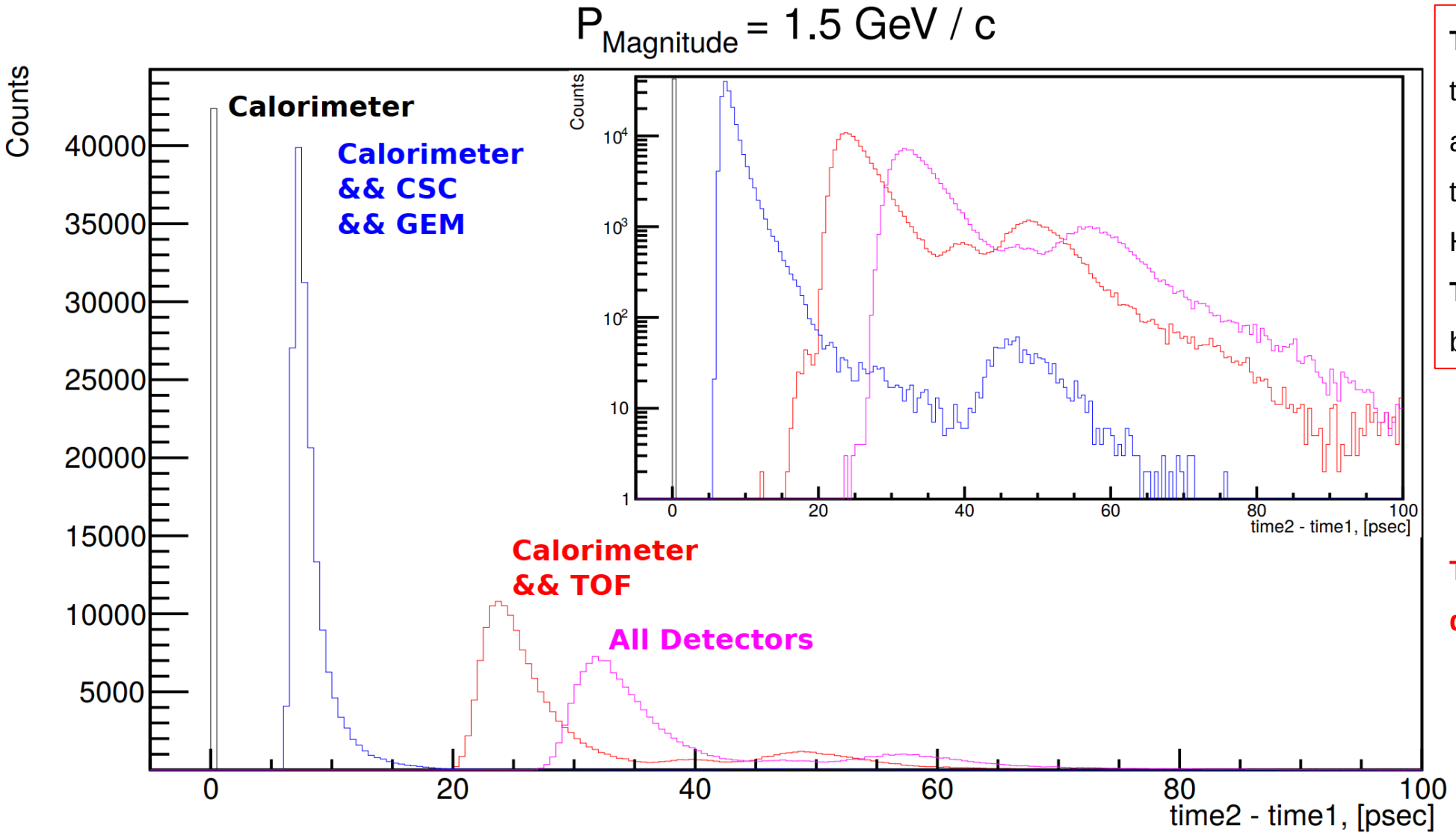

**Taken from the 2018 SRC RUN data**

# Trigger protons

# Two-arm spectrometer configuration



# The impact of arm detectors on calorimeter time resolution

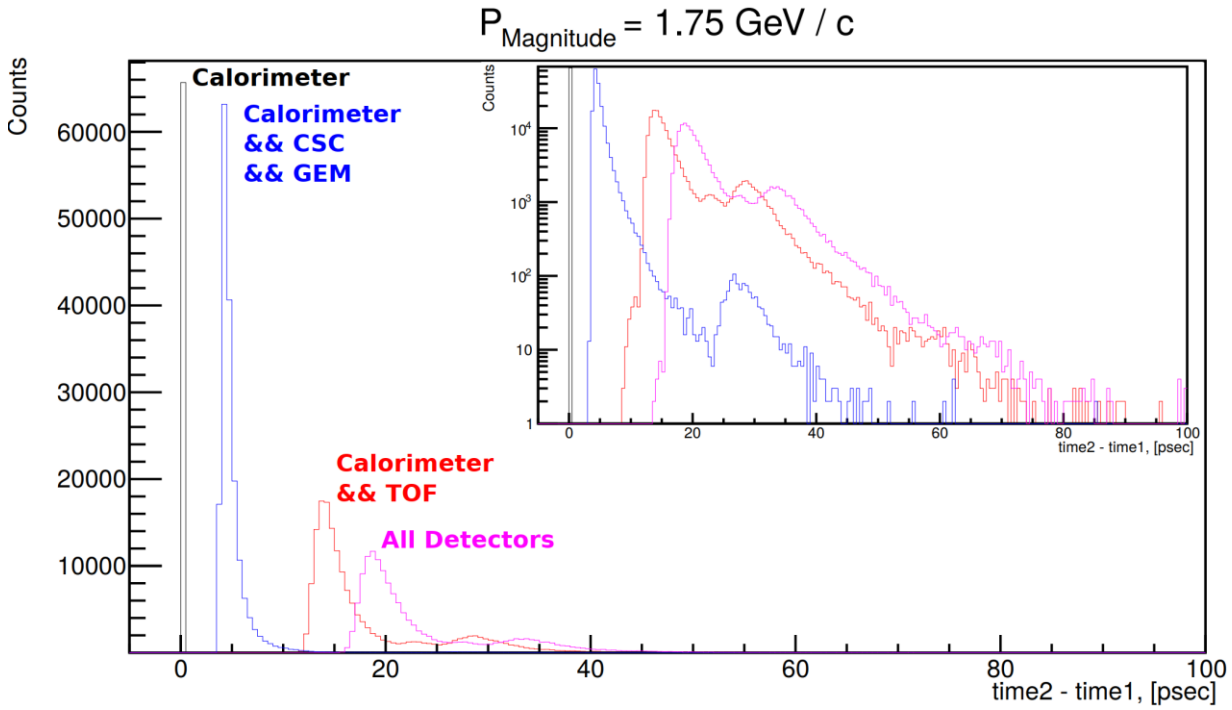


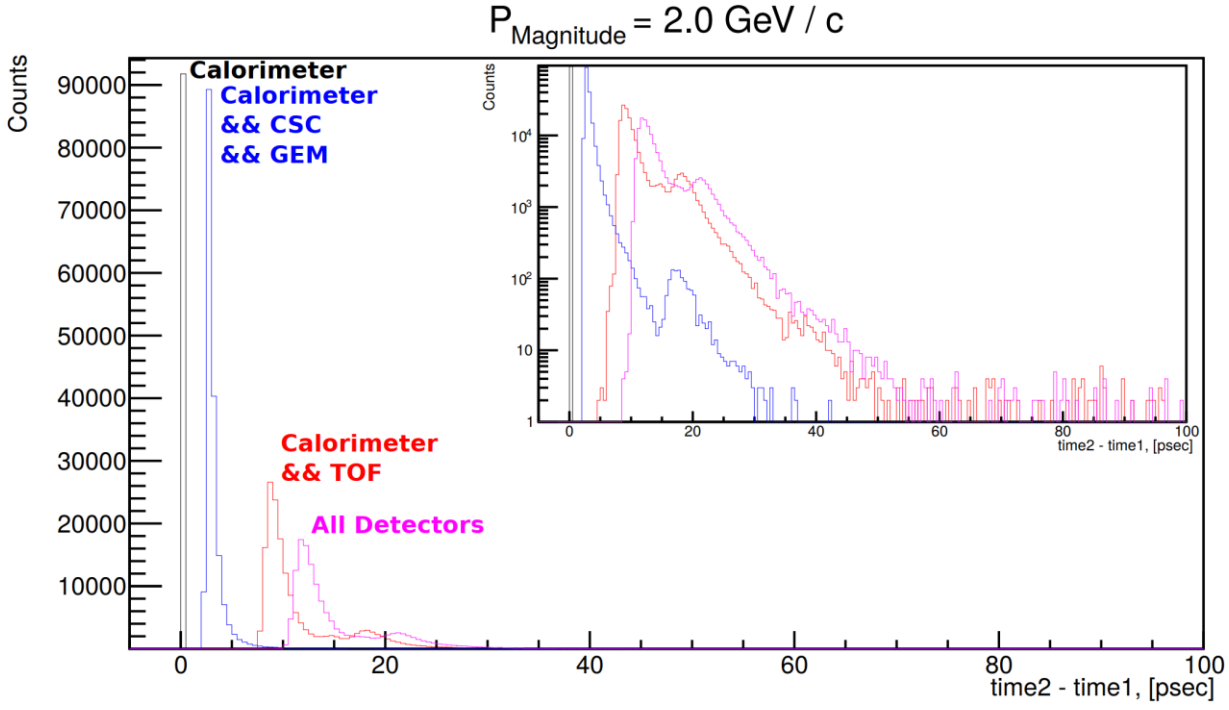

**Time1** is tof calculated from the initial proton momentum and it's length track from the Vertex to the Calorimeter Hit Position

**Time2** is tof measured directly by the Calorimeter

**The protons hits in the detectors expand the peaks**

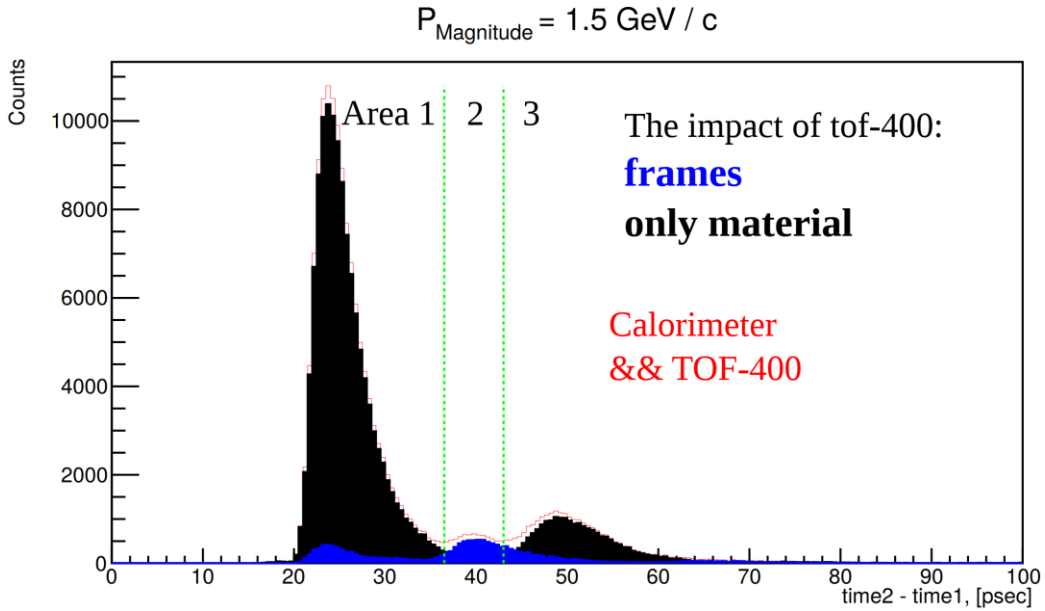
# The impact of arm detectors on calorimeter time resolution

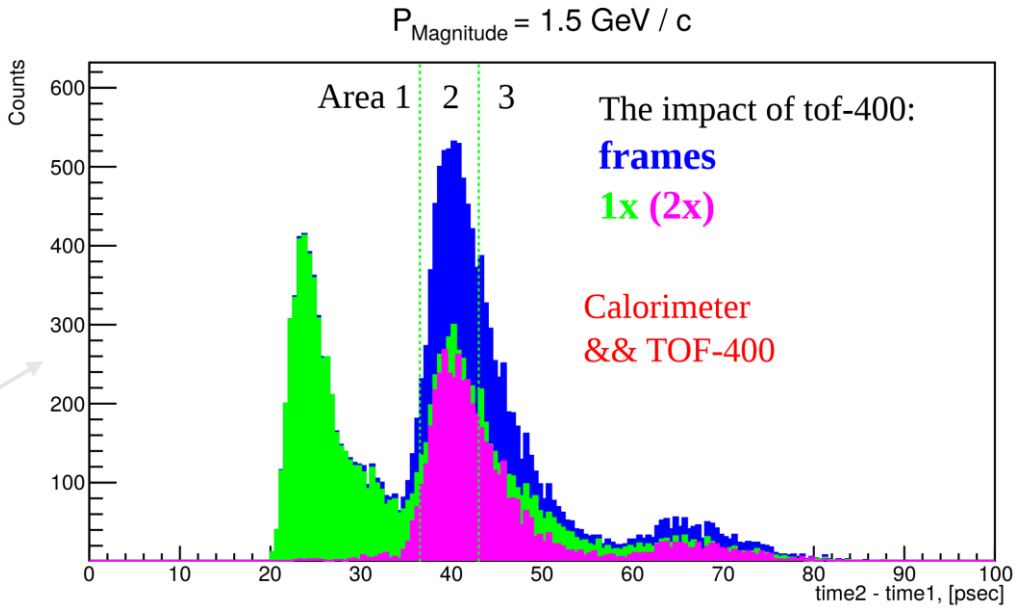


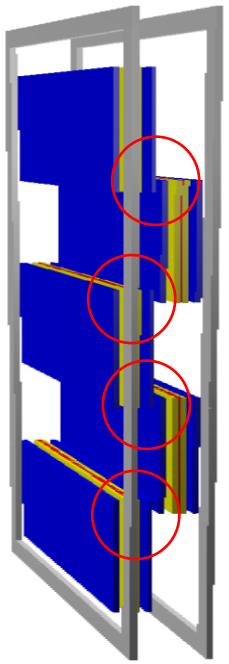




**At bigger momentum the peaks get more narrow and become closer to the delta-peak**

# The impact of TOF materials and frames on calorimeter time resolution



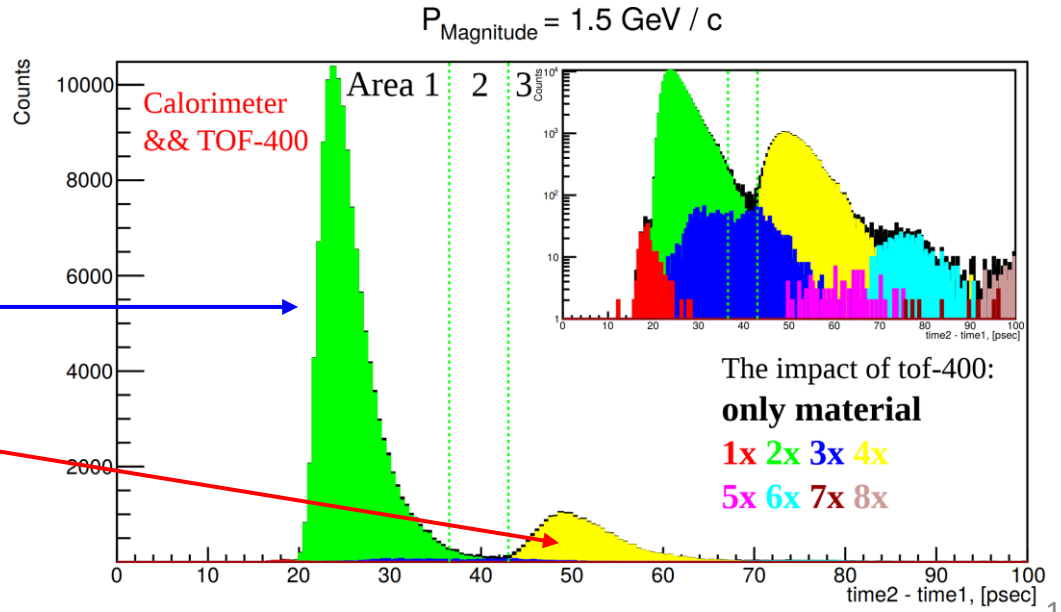



***FRAMES***

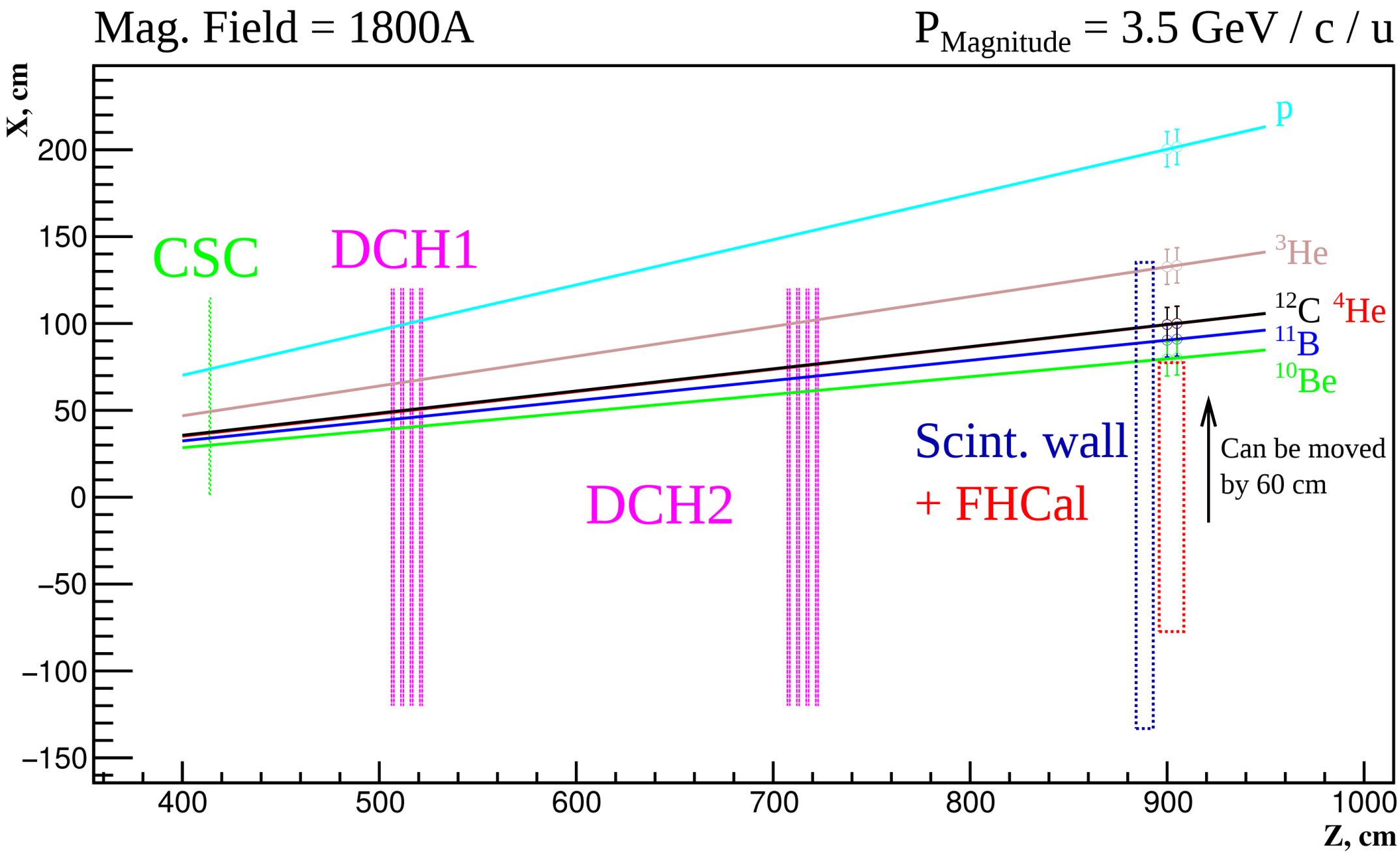
***2X MATERIAL PER ONE MODULE***

***4X MATERIAL DUE TO OVERLAPPING OF 2X MODULES***



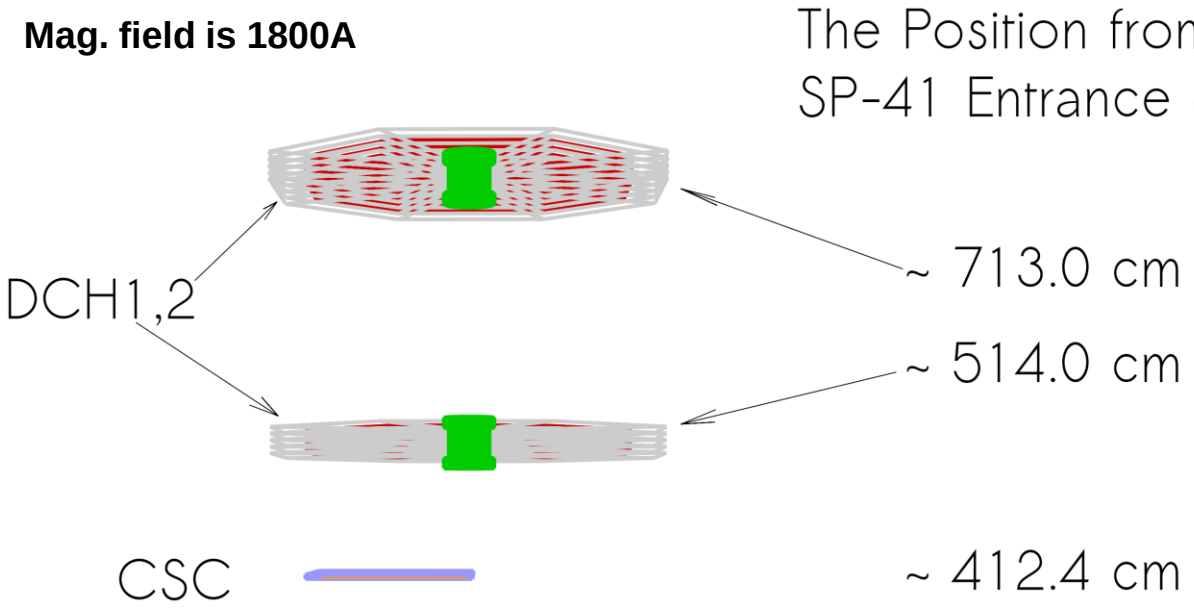
# Recoil Fragments

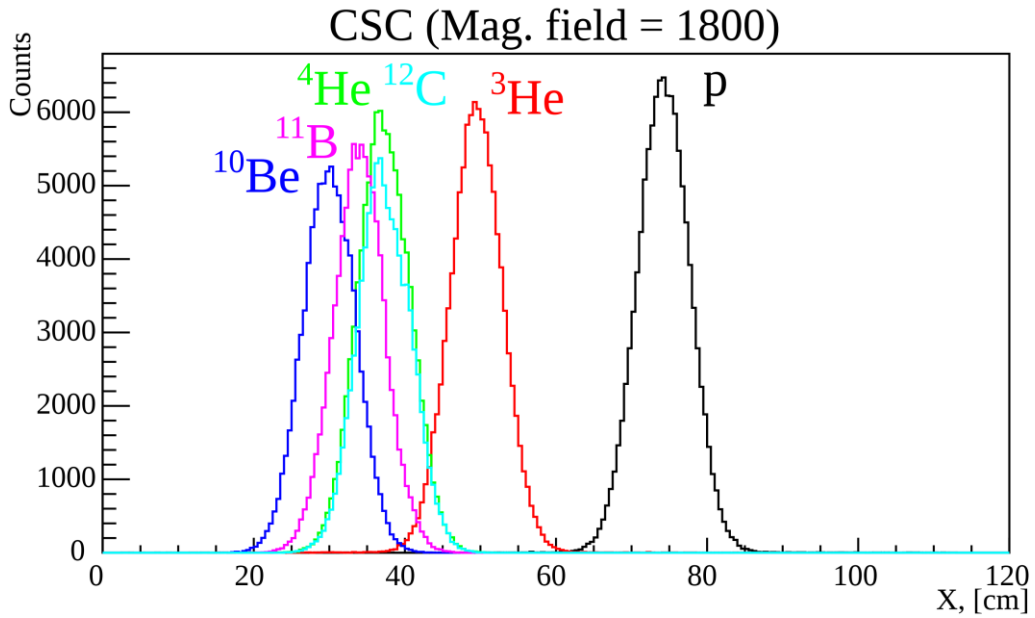
# The fragments mean tracks downstream the SP-41 (X-Z Projection)

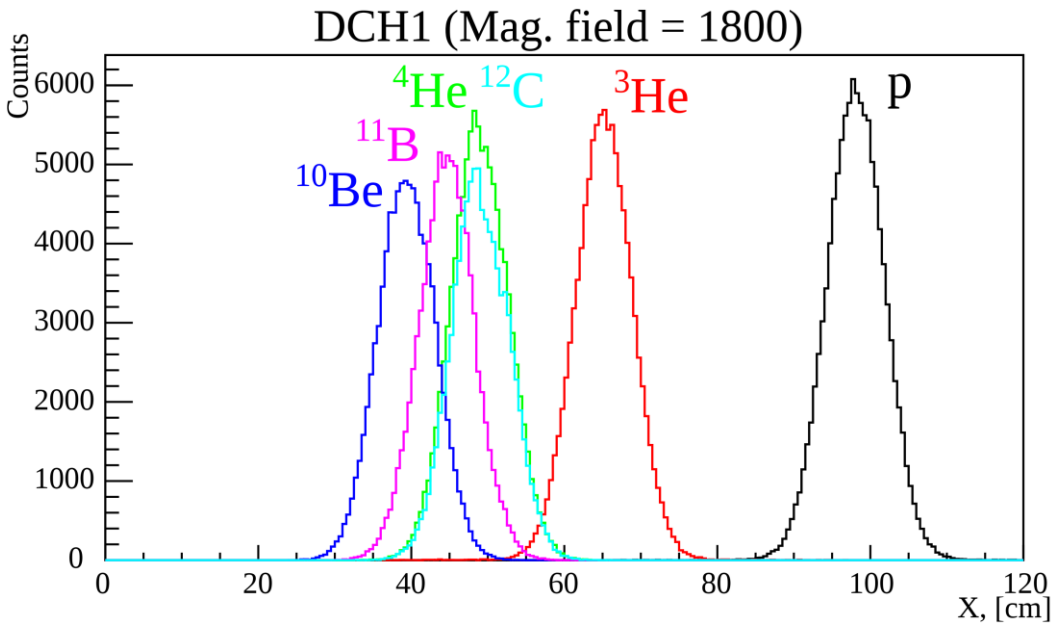


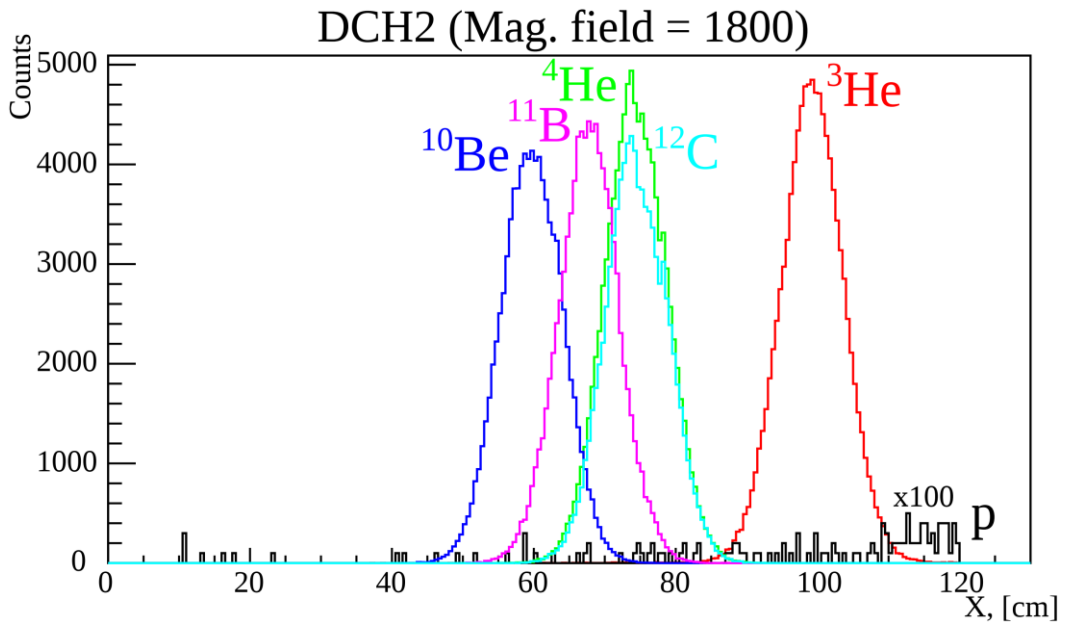
# Downstream the analyzing magnet

**Mag. field is 1800A**



# Conclusion

- Trigger Protons:

  TOF Resolution is not strongly impacted by the detectors used for tracking

- Recoil Fragments:

  Acceptance was optimized to detect protons and heavy fragments