Simulation of CNAO23 run with Al target

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Introduction

During CNAO2023 run we took some data using an Al target 2 cm thick (run 6064. Magnet up)

The purpose was to widen as much as possible the primary beam by means of multiple scattering so to allow a better study of IT (and also VT)

A dedicated simulation was requested

Additional Simulation

In the CNAO23PS_MC campaign a new run for the 2 cm Al target was created: run 203

In order to avoid complications and create a new campaign, in this run we left the magnet in place, but the field was "switched off"

Bending view
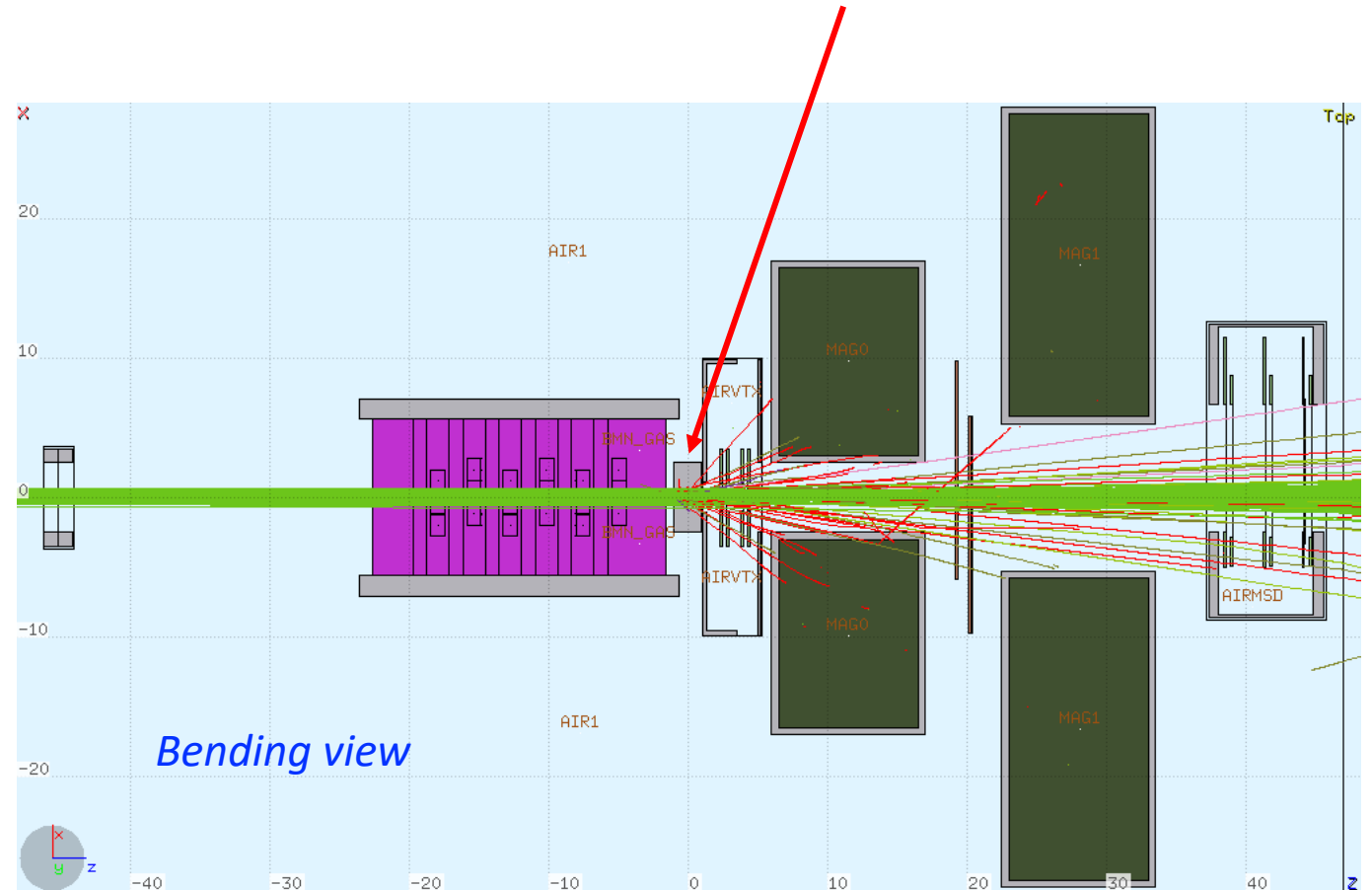
Availability

A first batch of 10^6 events is available on Tier1 at:

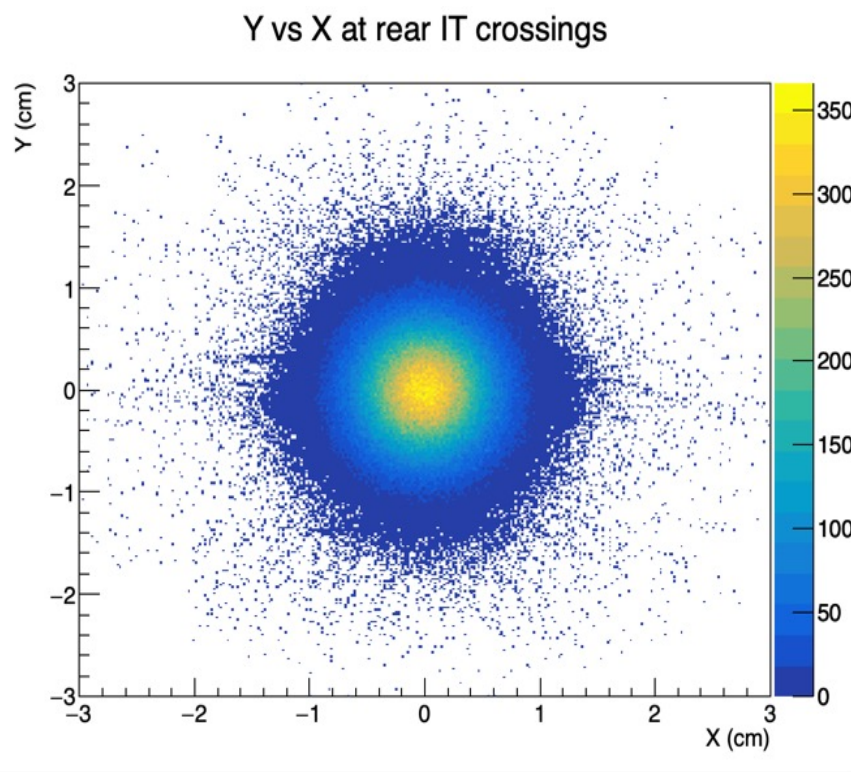/storage/gpfs_data/foot/shared/SimulatedData/CNAO23PS_MC

The file is 12C_Al_200_1.root

(remind: to be processed using -exp CNAO23PS_MC -run 203)

Some checks at the level of MC-truth:

Y vs X after IT

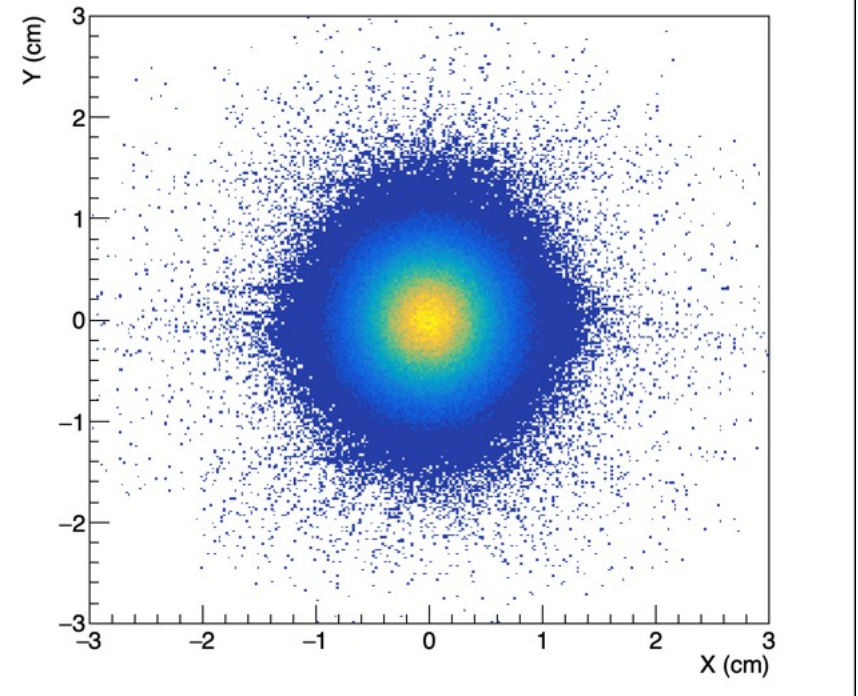**2 cm Al target**

0.5 cm C target
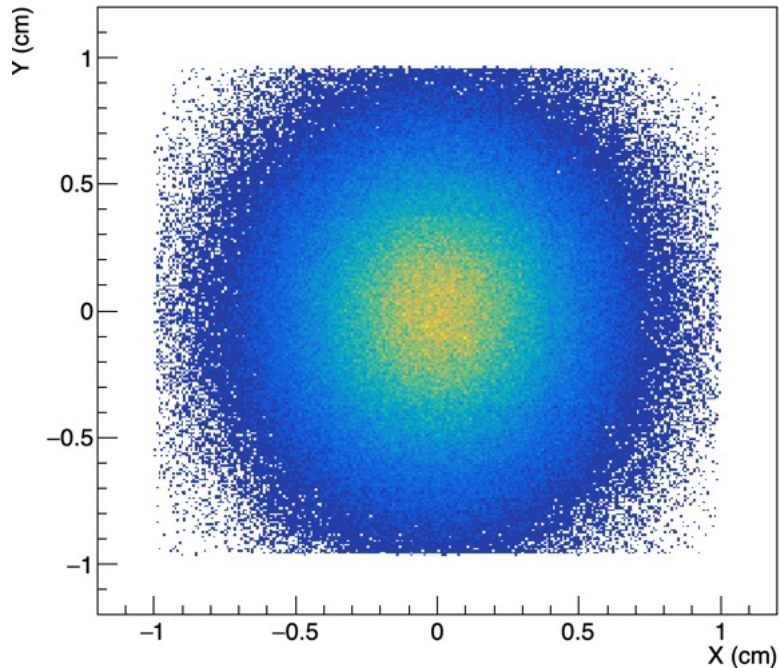

Actually it's hard to find any difference…

Some differences may be spotted on VT

2 cm Al target   Y vs X after VT   **0.5 cm C target**
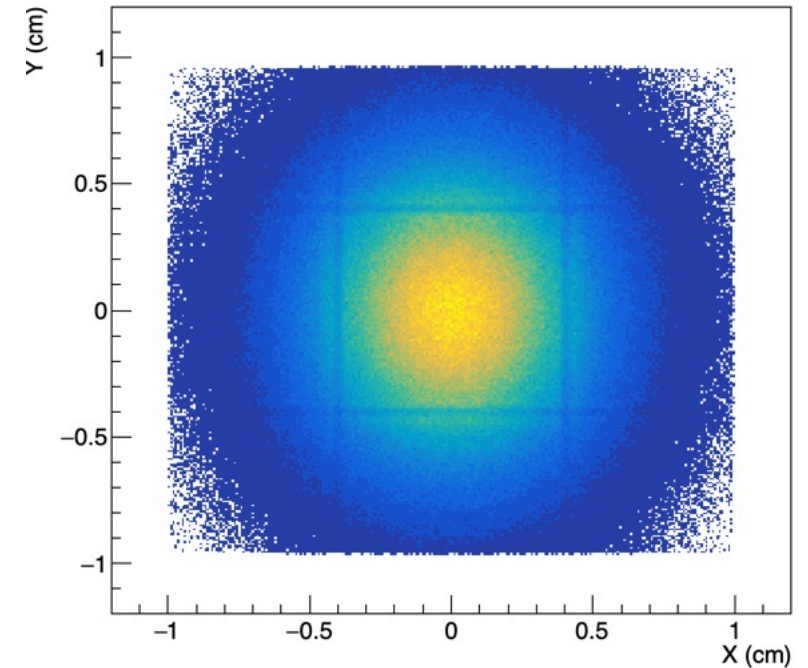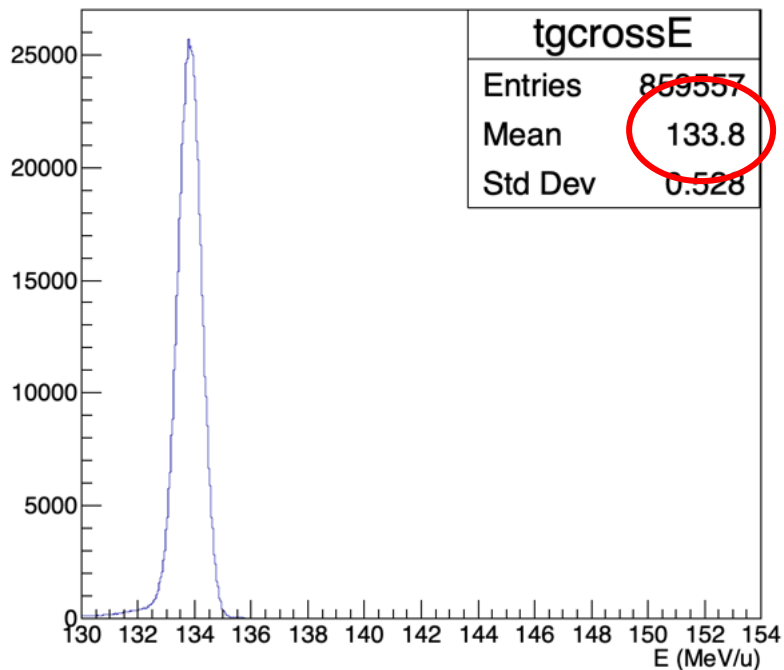

With the Al target the BM wire shadow should be smoothed out by MS (confirmed by looking at X or Y projections)

Of course there is a significant energy loss in target
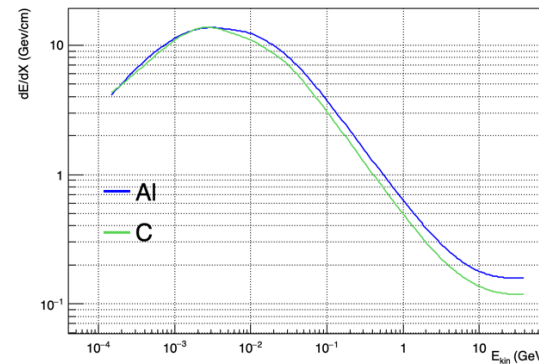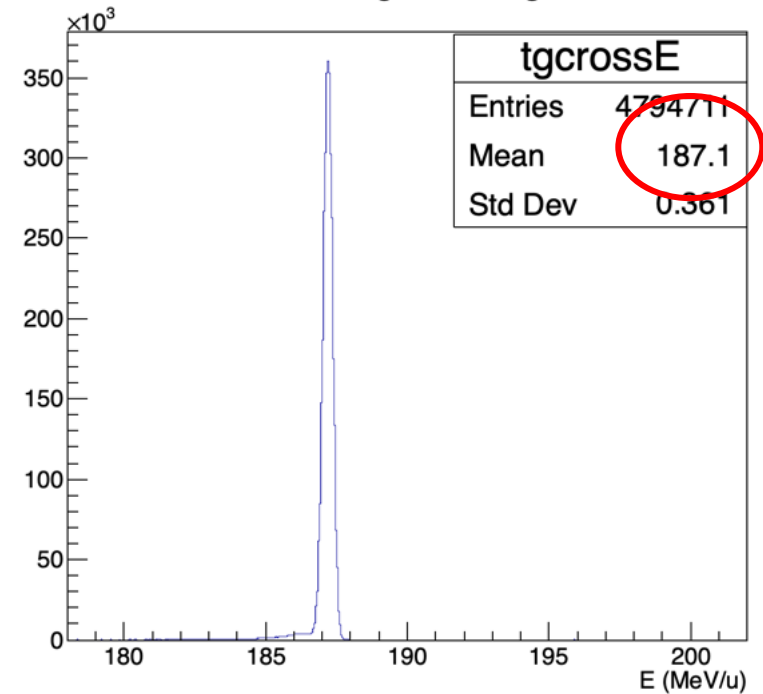
Residual E after Target

2 cm Al target

0.5 cm C target

^{12}C @200 MeV/u ➔ Etot = 2.4 GeV:

Eloss in Al = 0.343 GeV/cm
Eloss in C = 0.266 GeV/cm

Conclusions

- We are anyway curious to see if there is a correspondence with exp. data

- Among other things: does the BM wire shadow change?

- Let us know if more events are needed