

FOOT Physics Performances
27 March 2019
Introduction

G. Battistoni

Today's Focus

- 1) Towards the next data taking at GSI**
 - **Layout**
 - **Emulsion Setup**
 - **Electronic Setup (and trigger)**
- 2) About software development**
- 3) News from recent test beam and analysis activity**
- 4) Towards the next Collaboration Meeting in June**
- 5) Today's agenda**

Cave A, free space etc will be described by Uli

Cave available on March 4.

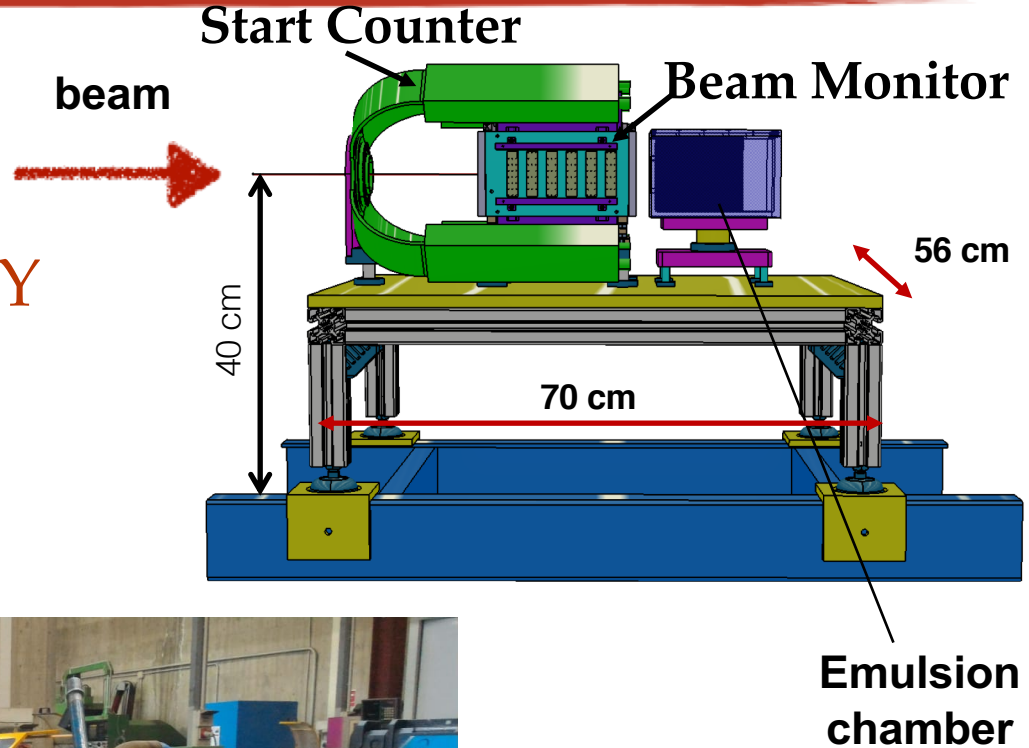
Start data taking: March 5. End data taking: March 9

Total beam time 16 hours, maybe more. We hope not less...

Dismounting within morning of March 10

EMULSION SETUP

EXPOSURE GEOMETRY AT GSI

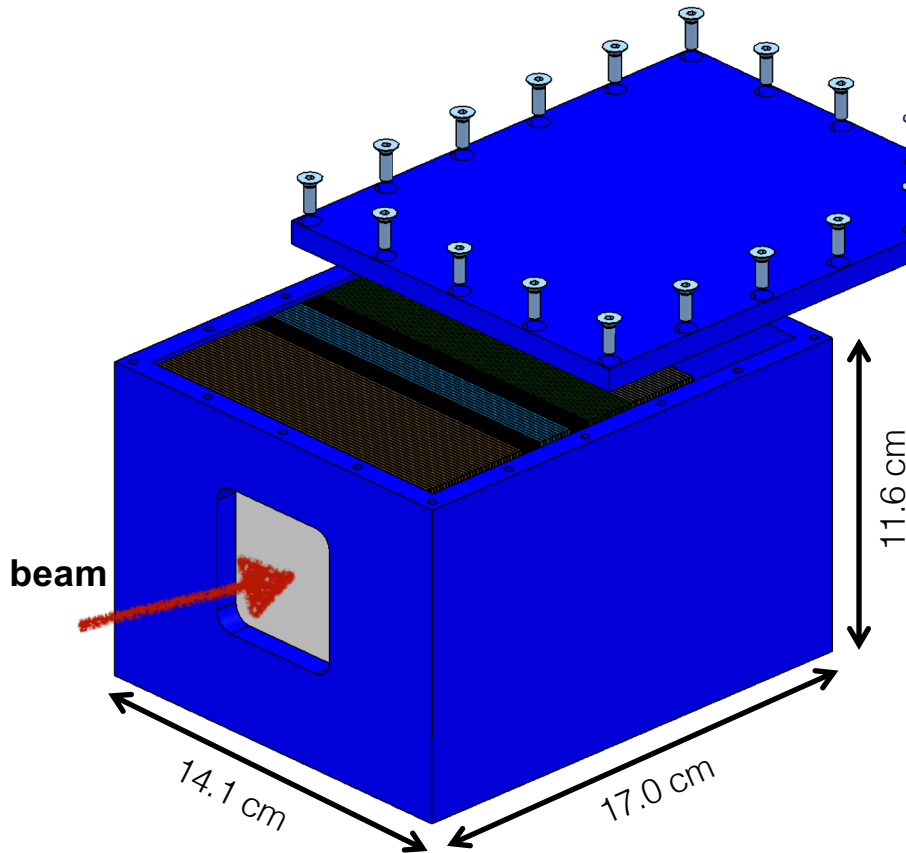


- ▶ Detectors support:
 - height range: 23.5 - 27.5 cm

EXPOSURE GEOMETRY AT GSI

EMULSIONS CHAMBER:

- ▶ plastic material (polycarbonate)
- ▶ 3D printer
- ▶ 0.8 cm thickness
- ▶ 5 x 5.6 cm² entrance window
- ▶ 14.6x22.6 x12.2 cm³
- ▶ Weight: 15-20 kg



EMULSIONS CHAMBER:

- ▶ 4 for run and 1 dummy for alignment



BEAM CHARACTERISTICS

BEAM CHARACTERISTICS (FROM ULI AND CHRIS)

- ▶ beam spot: 4-15 mm FWHM, gaussian/elliptical profile
- ▶ Spill intensity: 10^2 to 10^8 particles per second
- ▶ field size: up to 5×5 cm² never a problem (by magnetic scanning)
- ▶ the scanner takes care to provide the desired intensity regardless of fluctuations of spill/spill-pause

BEAM CHARACTERISTICS (FOR OUR MEASUREMENT)

- ▶ field size: 3×3 cm² (our desiderata)
- ▶ Max density (occupancy): 5000 particles/cm²

BEAM	TARGET	BEAM INTENSITY (beam particles/9cm ²)	BEAM INTENSITY (beam particles/6.25cm ²)
¹⁶O @ 200 MeV/n	C	28×10^3	20×10^3
	C ₂ H ₄	32×10^3	22×10^3
¹⁶O @ 400 MeV/n	C	20×10^3	14×10^3
	C ₂ H ₄	22×10^3	15×10^3

EXPOSURE STRATEGY

1^{RT} MEASUREMENT: O¹⁶ @200 MEV

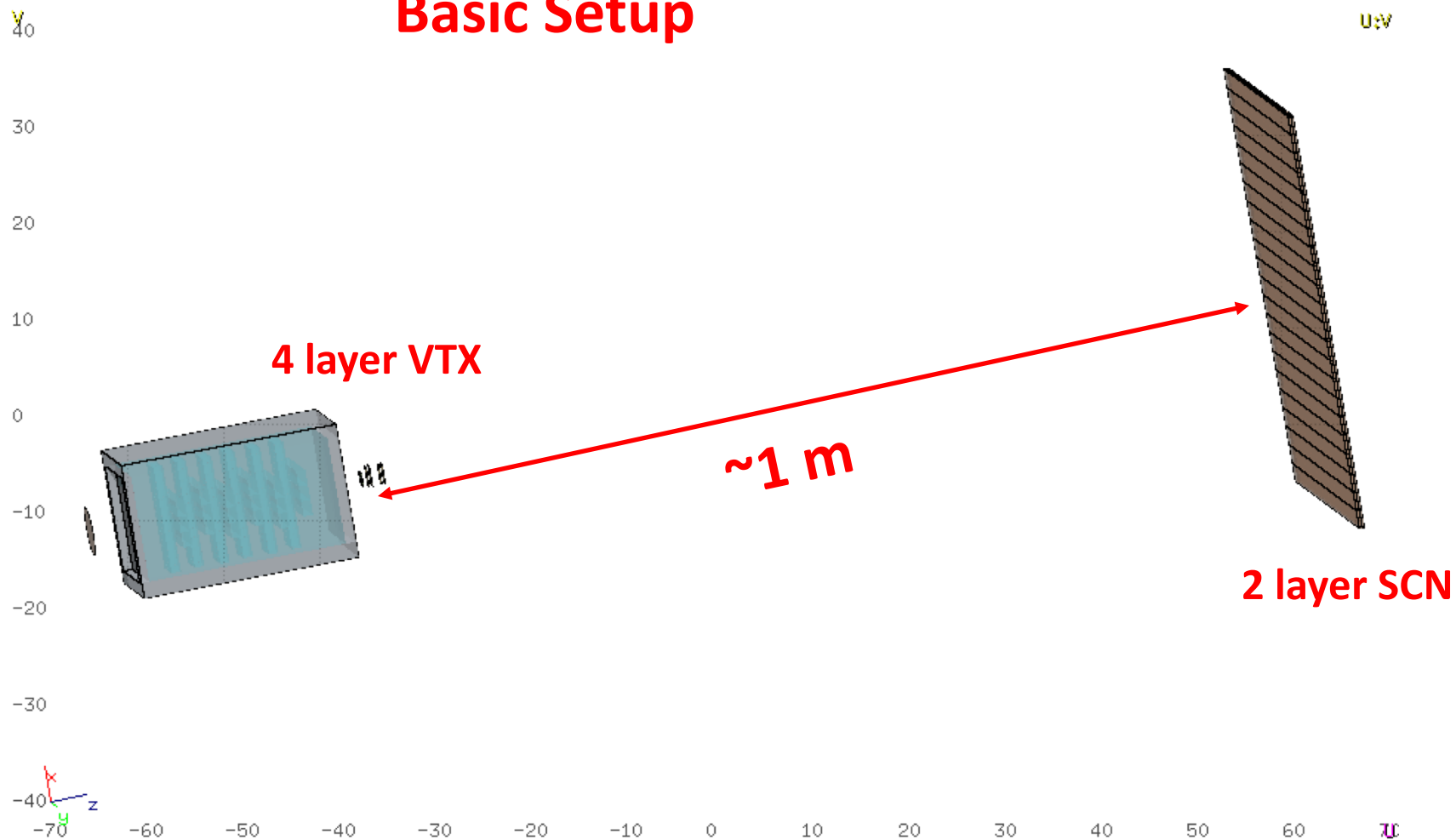
- ▶ Exposure optimization with SC + BM
- ▶ Beam OFF
- ▶ Emulsion positioning
- ▶ Beam ON
- ▶ Exposure

2ND MEASUREMENT: O¹⁶ @400 MEV

- ▶ Exposure optimization with SC + BM
- ▶ Beam OFF
- ▶ Emulsion positioning
- ▶ Beam ON
- ▶ Exposure

GSI Setup

Basic Setup



Target and Beams

16-O Beam

Priority 200 MeV/u

Targets:

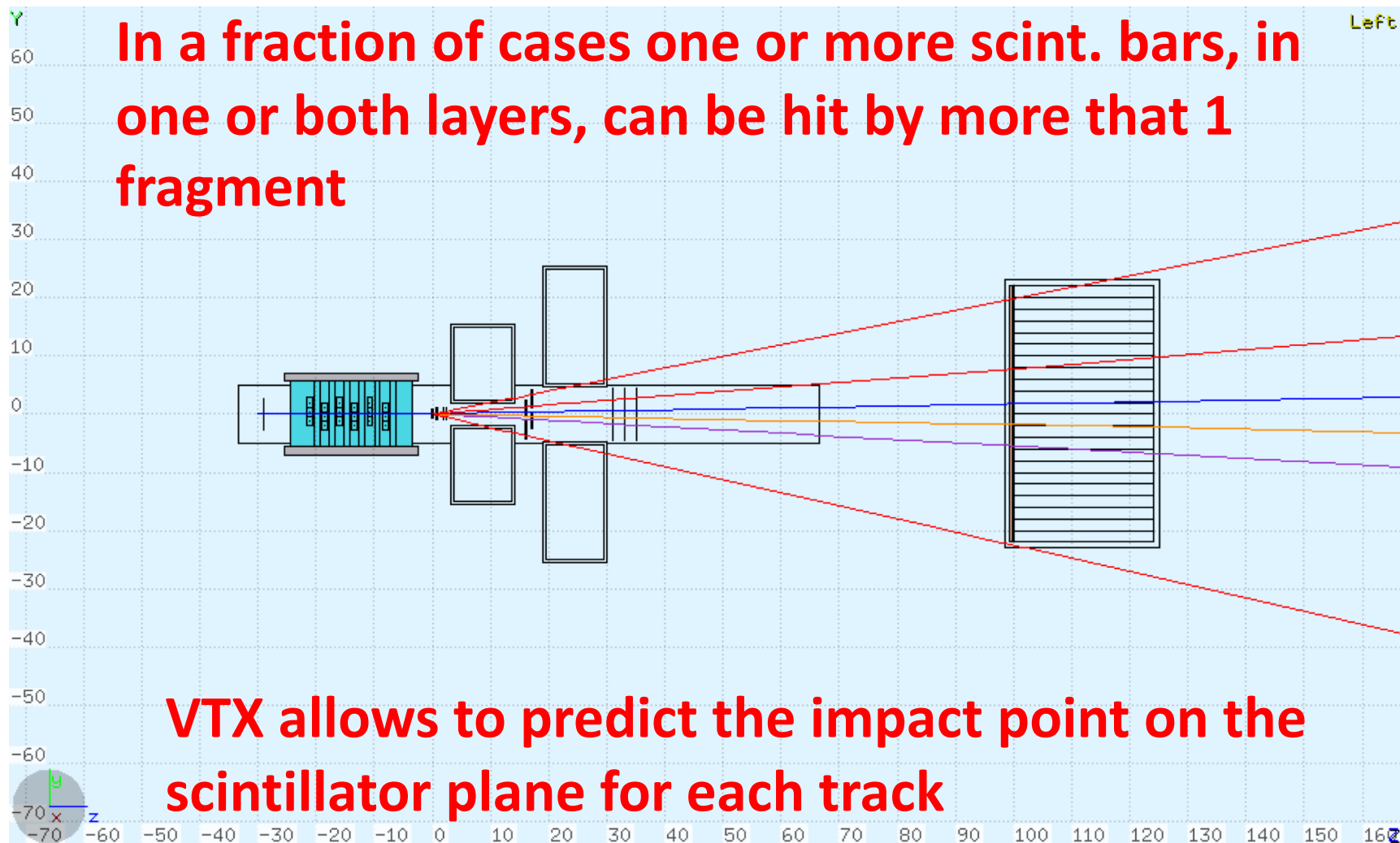
C and Polyethylene (C₂H₄)

Available from GSI:

3 mm Graphite. Thickness = 0.55 g/cm²

5 mm PE ~0.5 g/cm²

GSI Setup



GSI Setup

In a fraction of cases one or more scint. bars, in one or both layers, can be hit by more than 1 fragment.

In this event in layer #1 one bar is hit by 2 fragments

In layer #2 all fragments hit different bars



A first guess

Fraction of events fully reconstructable: 0.69

Fraction of events where only 1 layer is fully reconstructable: 0.22

Fraction of events where both layers are not fully reconstructable: 0.09

However even in layers where there are multiple hits in a single bar, about ~50% of tracks is predicted to hit a single bar

GSI Setup: other possibilities

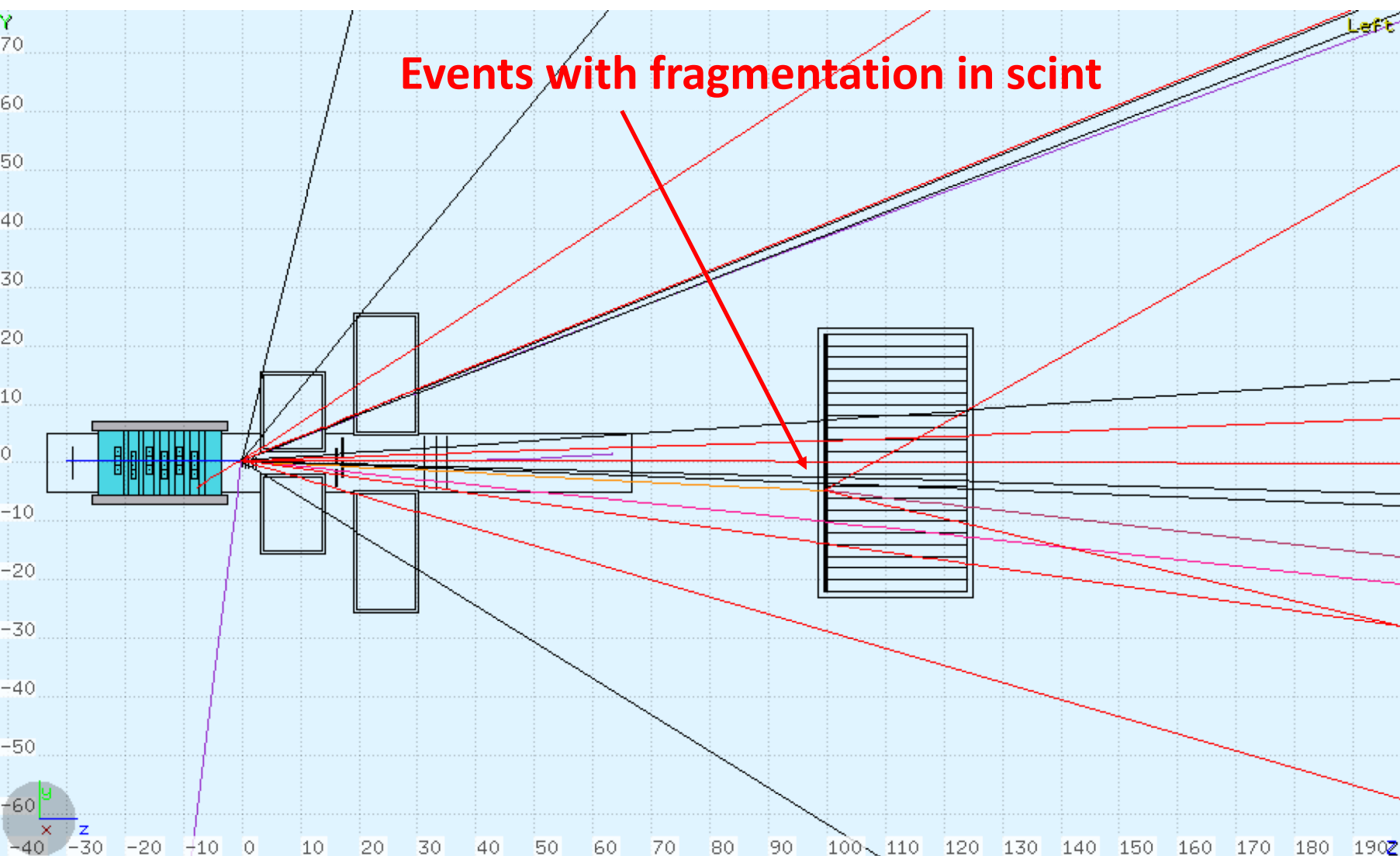
We can increase the distance of scint. from the target. Test at 150 cm:

Fraction of events fully reconstructable: 0.77

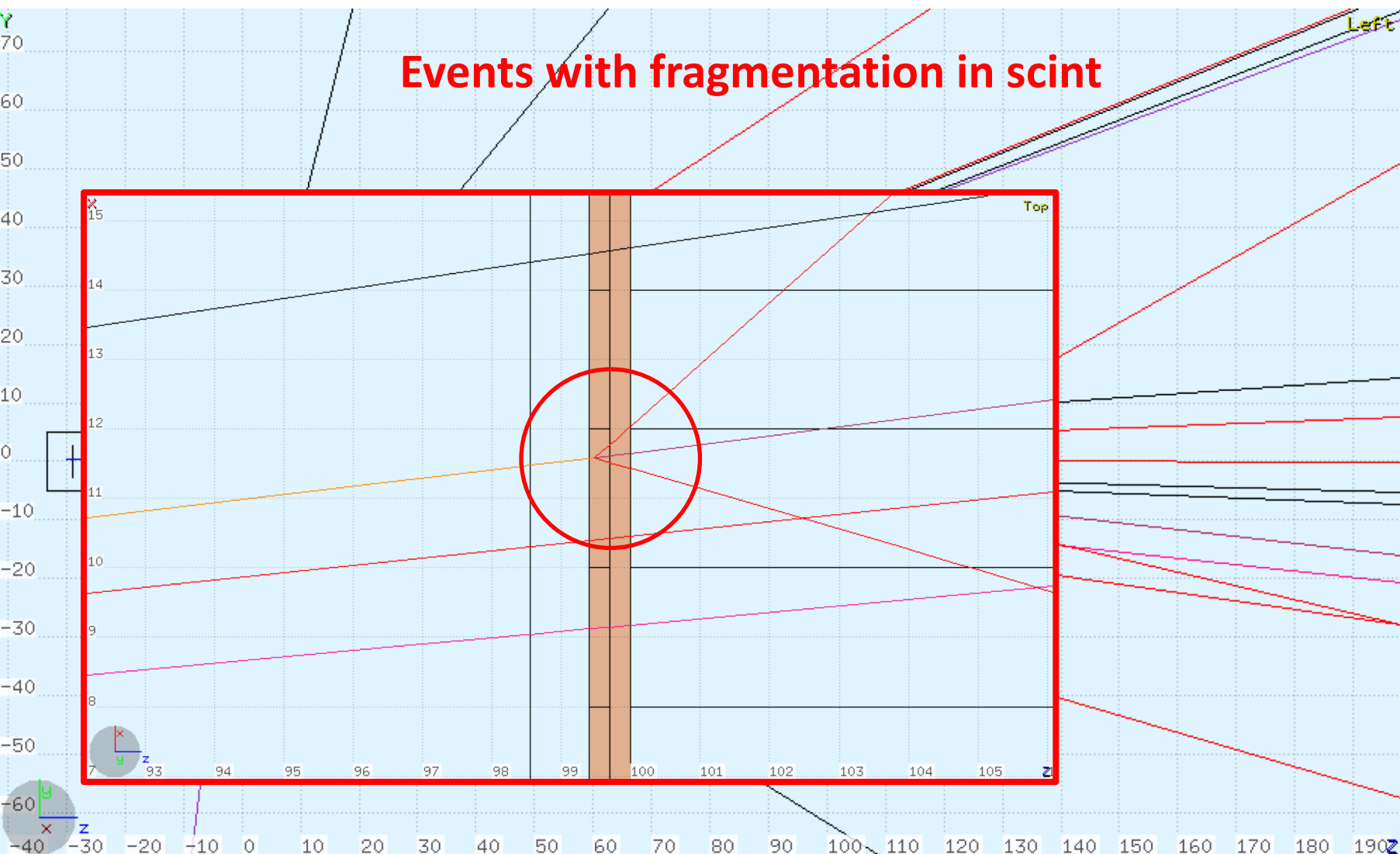
Fraction of events where only 1 layer is fully reconstructable: 0.18

Fraction of events where both layers are not fully reconstructable: 0.05

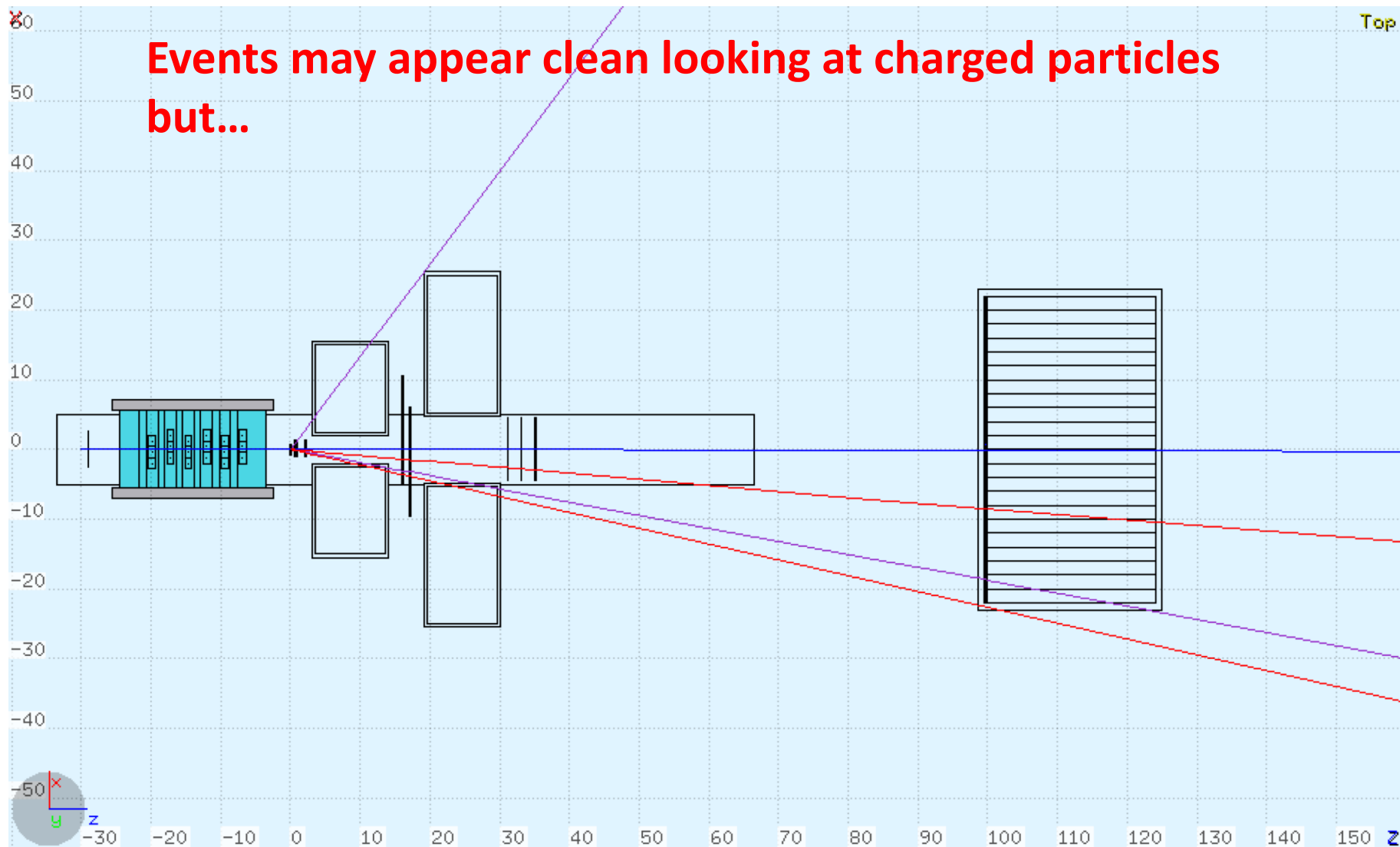
Last but maybe not least (not related to geometry)



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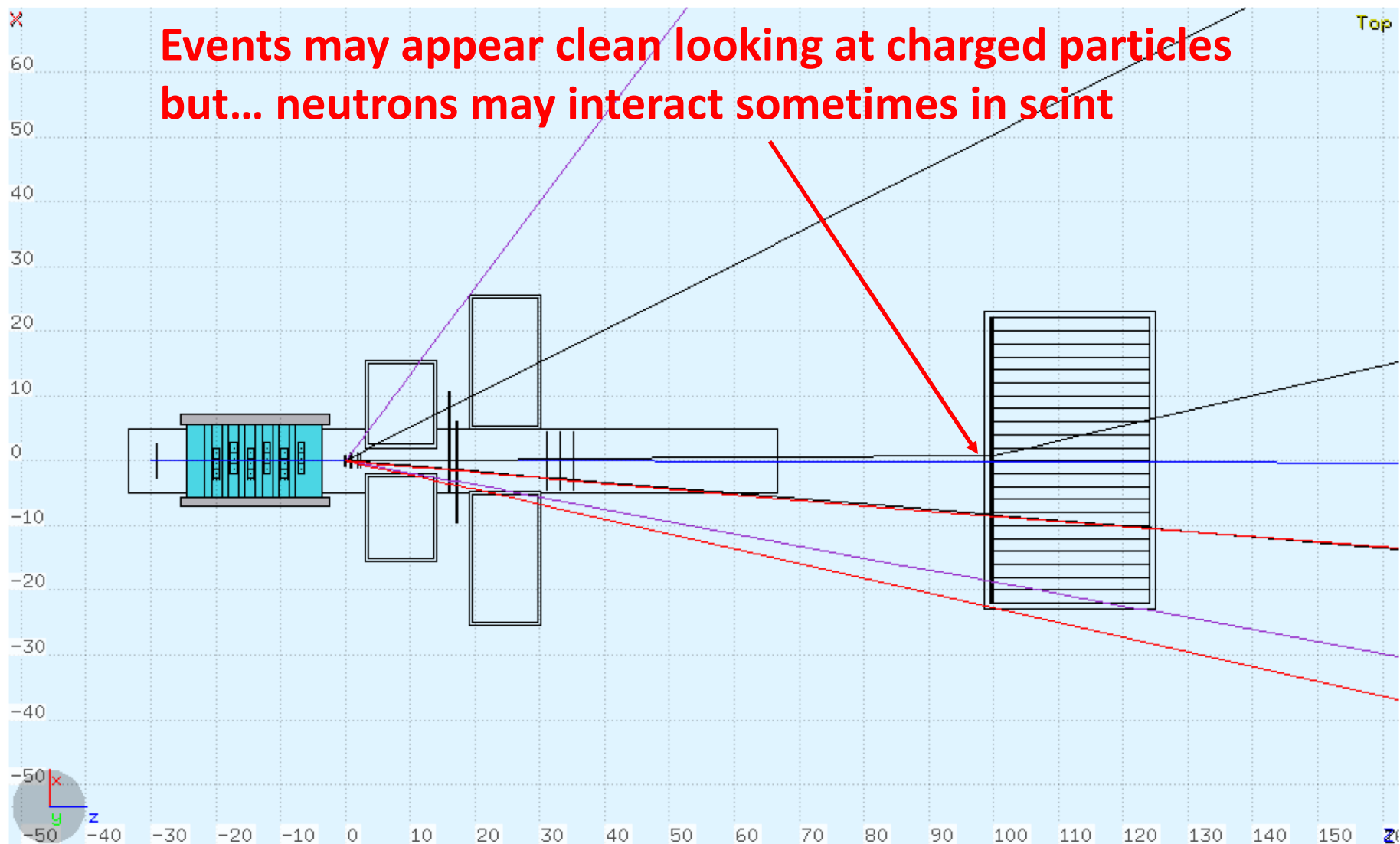


Last but maybe not least (not related to geometry)



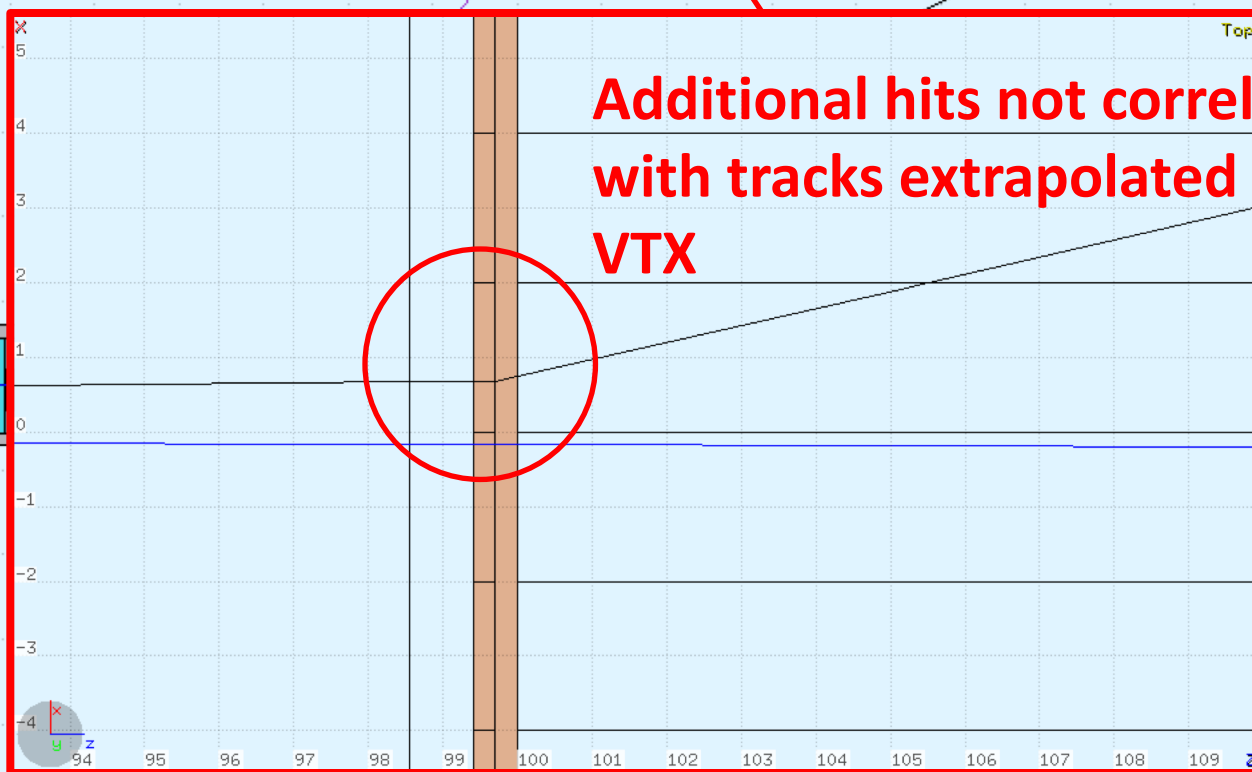
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**Events may appear clean looking at charged particles
but... neutrons may interact sometimes in scint**



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Next FOOT Collaboration Meeting

<https://agenda.infn.it/event/18616/>



Europe/Rome ▾ English ▾ Login



VI FOOT Collaboration Meeting

5-7 June 2019

CNAO, Strada Campeggi, 53, 27100 Pavia PV

Europe/Rome timezone

Today's Agenda

<https://agenda.infn.it/event/18733/>

Analysis of FOOT Performances Skype Meeting



📅 Wednesday 27 Mar 2019, 10:00 → 13:50 Europe/Rome

- | | | | | |
|--------------|---------|---|-------|--|
| 10:00 | → 10:15 | Introduction
Speaker: Giuseppe Battistoni (MI) | 🕒 15m | |
| 10:15 | → 10:30 | Cave A and spaces at GSI
Speaker: Dr Ulrich Weber (GSI)
2019.03.27__CaveA... | 🕒 15m | |
| 10:30 | → 10:45 | Update on Simulation
Speaker: Serena Marta Valle (MI) | 🕒 15m | |
| 10:45 | → 11:00 | Software Status and update (new geom branch)
Speaker: Christian Finck (CNRS-In2p3) | 🕒 15m | |
| 11:00 | → 11:15 | Emulsion setup for GSI and related simulation
Speaker: Giuliana Galati (NA) | 🕒 15m | |
| 11:15 | → 11:30 | Preliminary analysis of possible measurements at GSI with electronic setup
Speaker: Roberto Spighi (BO) | 🕒 15m | |
| 11:30 | → 11:45 | Oxygen fragmentation: what can be found in literature
Speaker: Roberto Spighi (BO) | 🕒 15m | |
| 11:45 | → 12:00 | Measurements at CNAO with TOF scintillation bars
Speaker: Aafke Christine Kraan (PI) | 🕒 15m | |
| 12:00 | → 12:15 | Cross Section measurements of ^{12}C fragmentation at large angle at CNAO
Speaker: Mattei Ilaria (INFN) | 🕒 15m | |
| 12:15 | → 12:30 | Trigger Performance
Speaker: Giacomo Traini (ROMA1) | 🕒 15m | |
| 12:30 | → 12:45 | Recent Test Beam of Beam Monitor. Calibration with MSD
Speakers: Sofia Colombi (T), Yunsheng Dong (MI) | 🕒 15m | |
| 12:45 | → 13:00 | Status of calorimeter
Speaker: Dr Lorenzo Scavarda (INFN) | 🕒 15m | |