Status of the MFT simulation

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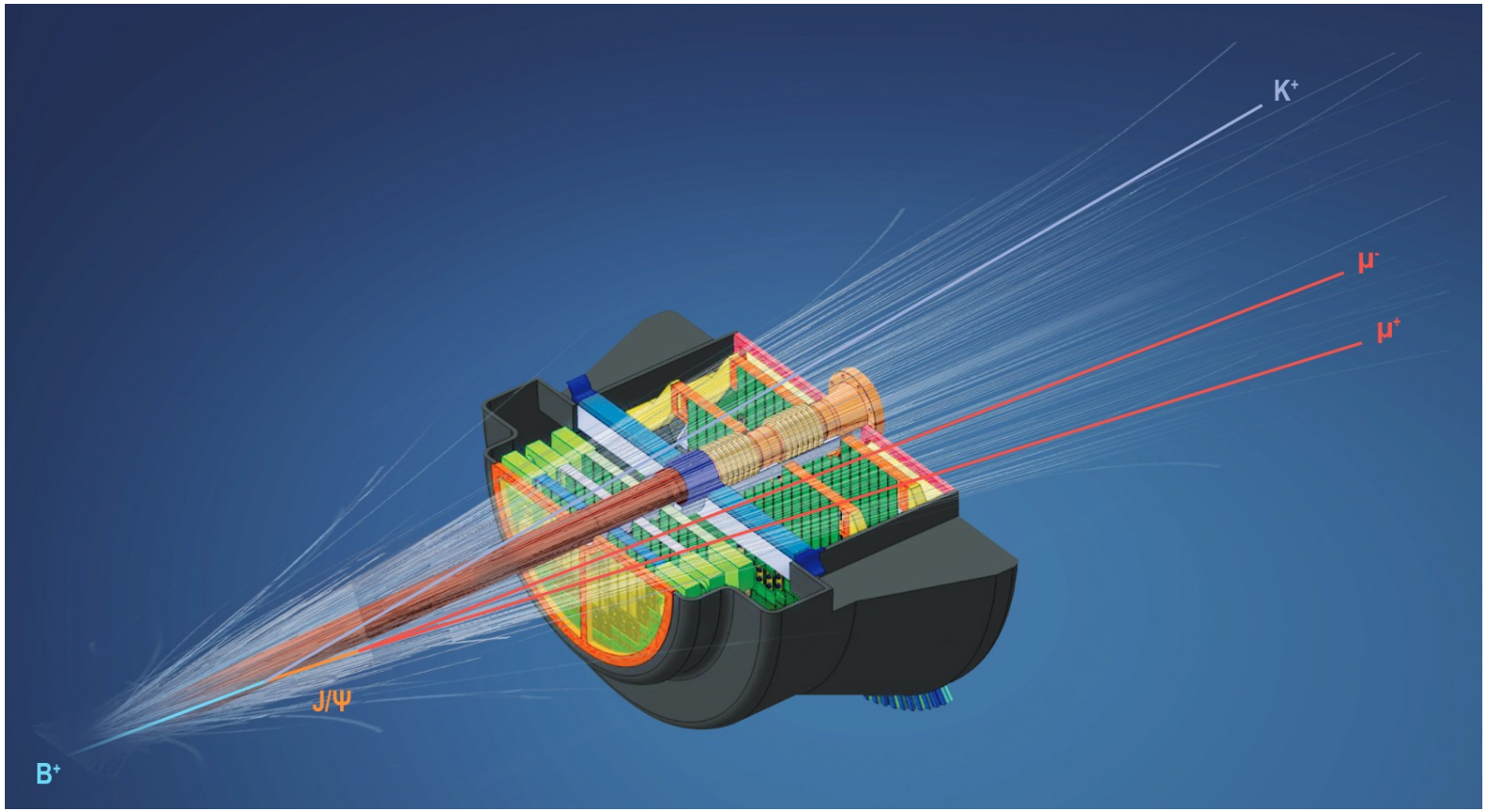
LPC+

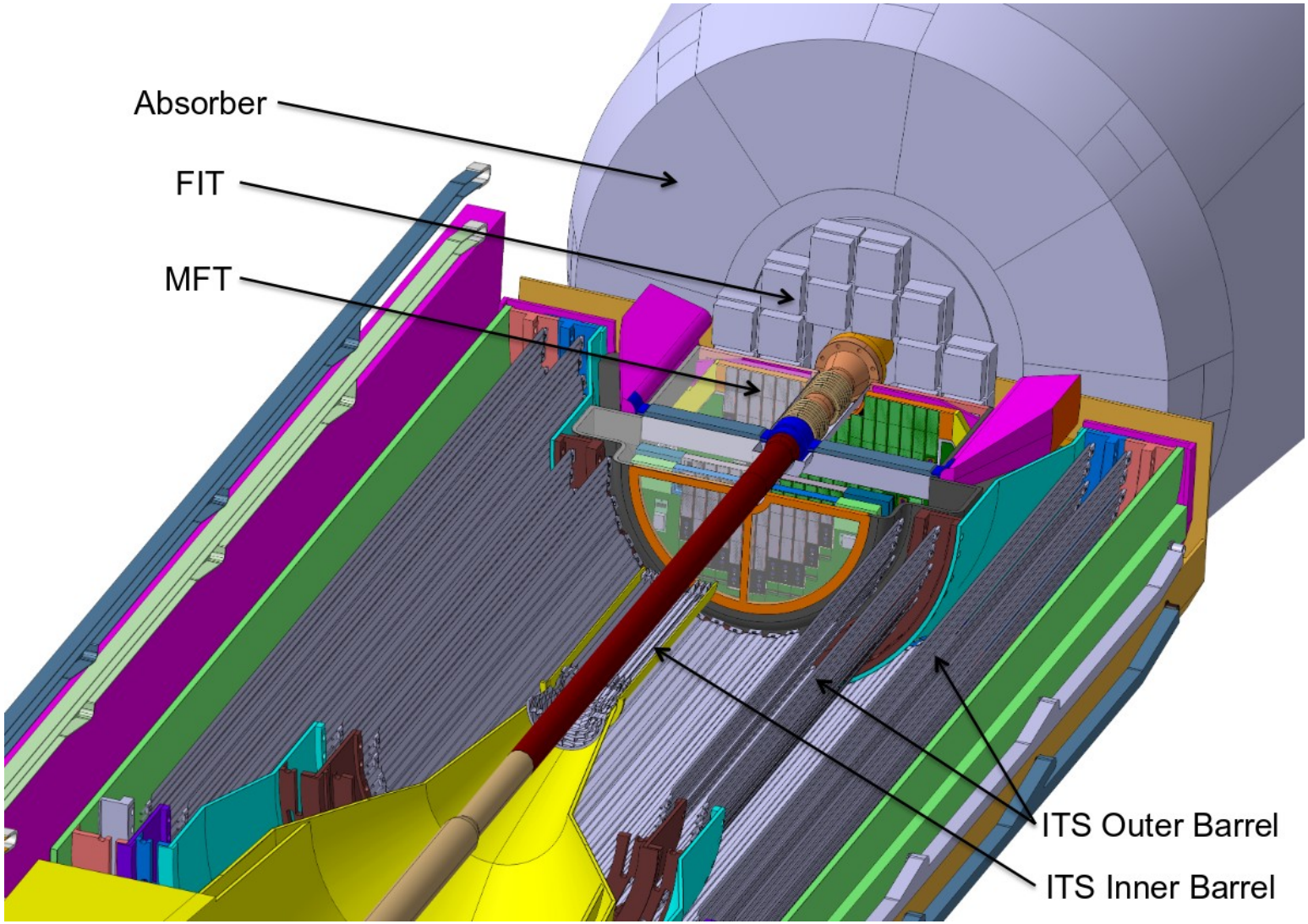
The MFT in ALICE

MFT = Muon Forward Tracker is a new (pixel) detector for Run3

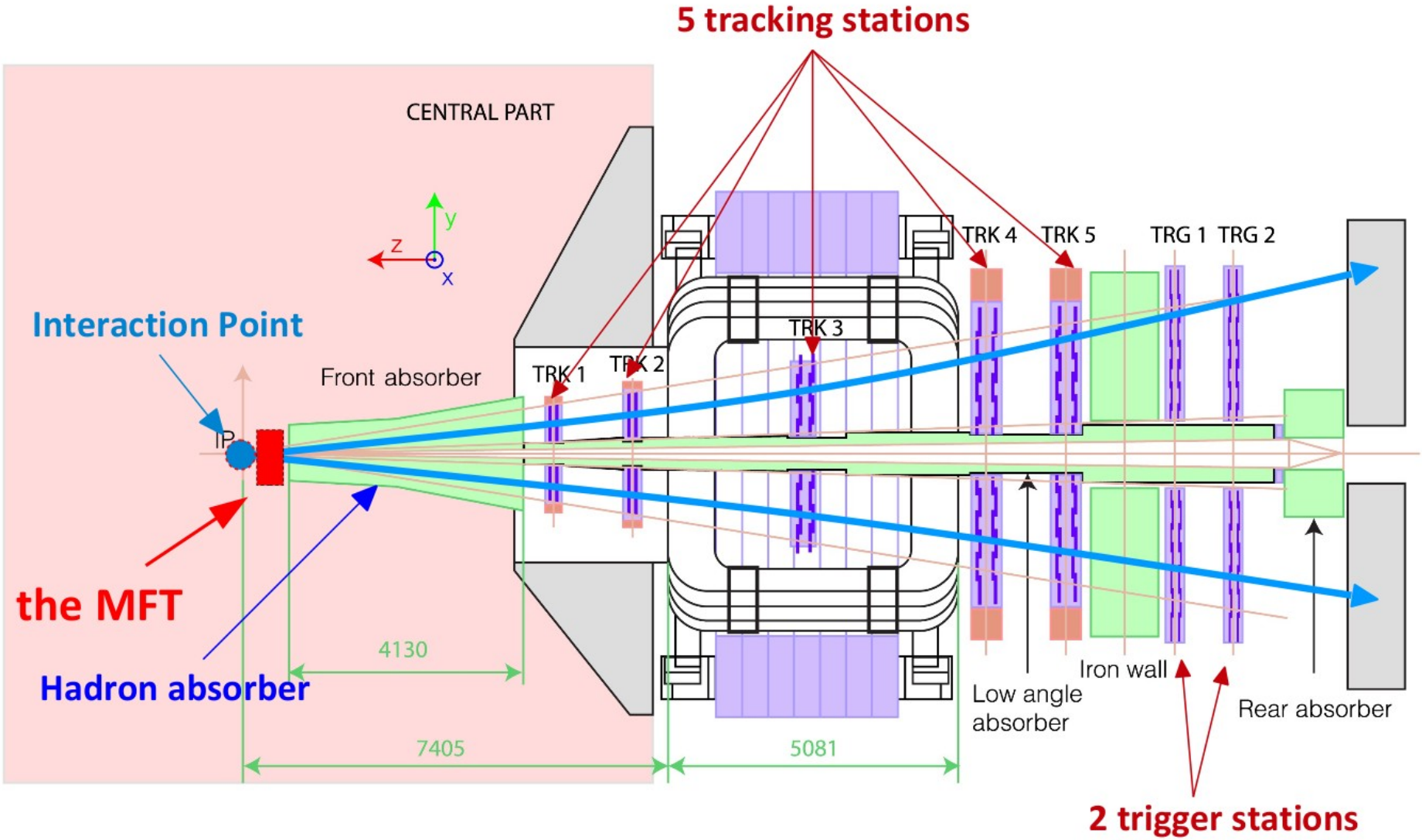
ALICE-TDR-018 May 30, 2015



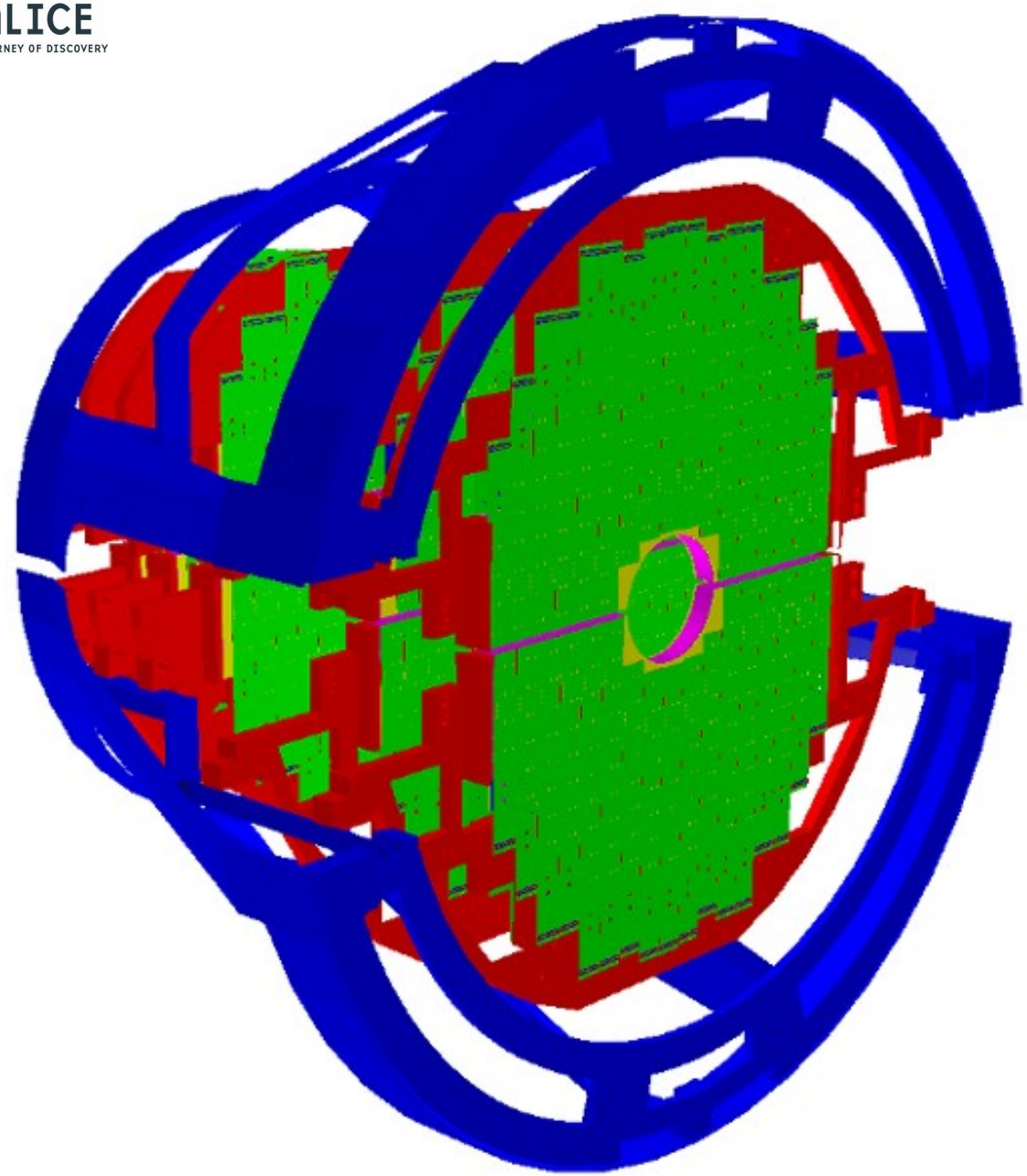
Where ?



The big picture



The geometry: evolved from a copy/paste from AliRoot



- same sensor as the ITS, 920 in total

- ladders of 2, 3, 4 or 5 sensors (green)

- 5 two-sided disks with
  2*24
  2*24
  2*26
  2*32
  2*34 ladders

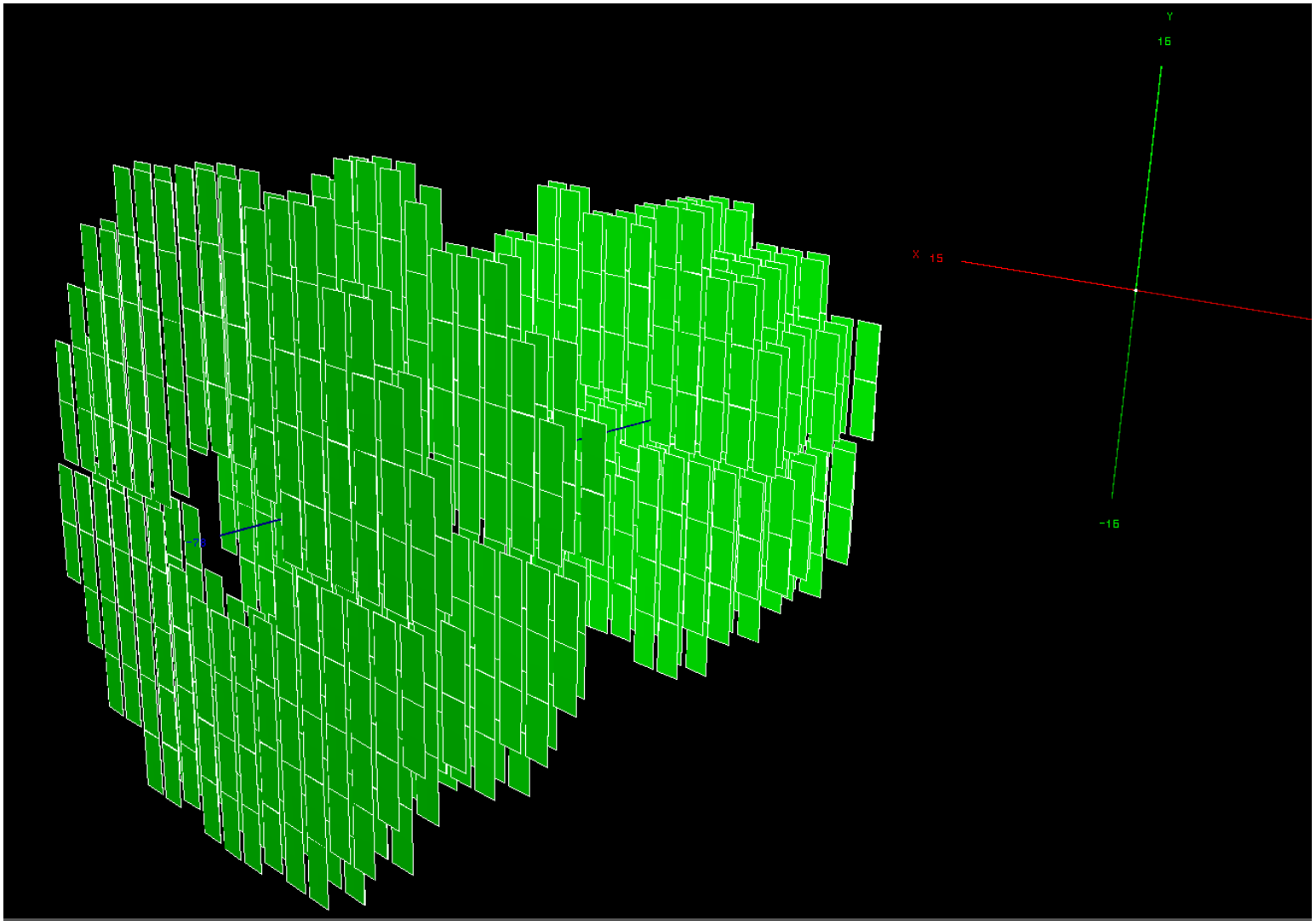
- two mechanically independent halves (upper/lower)

- 5 disk supports with cooling (red)

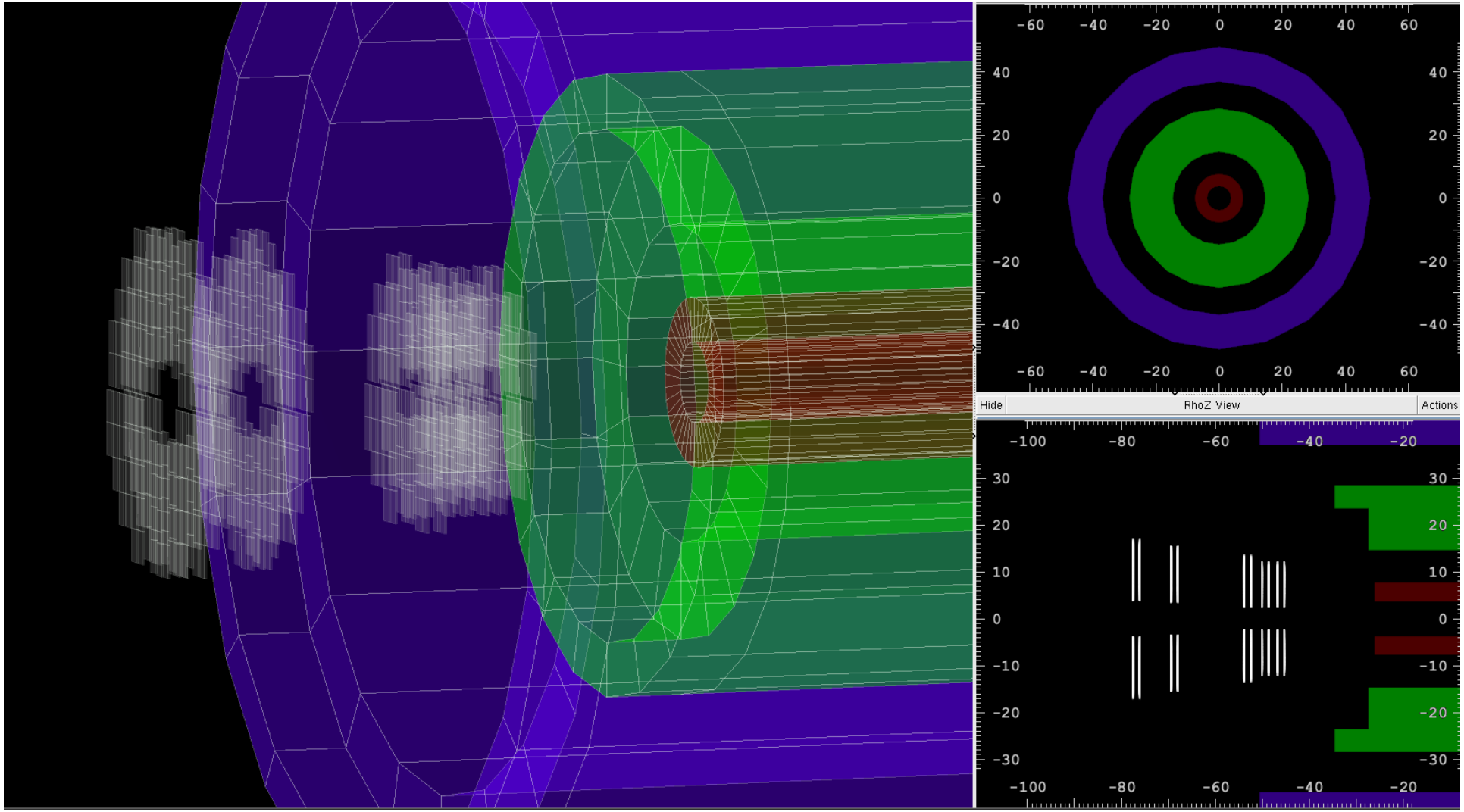
- cone for the services (blue)

A *light* geometry for the event display

select only the sensitive volumes



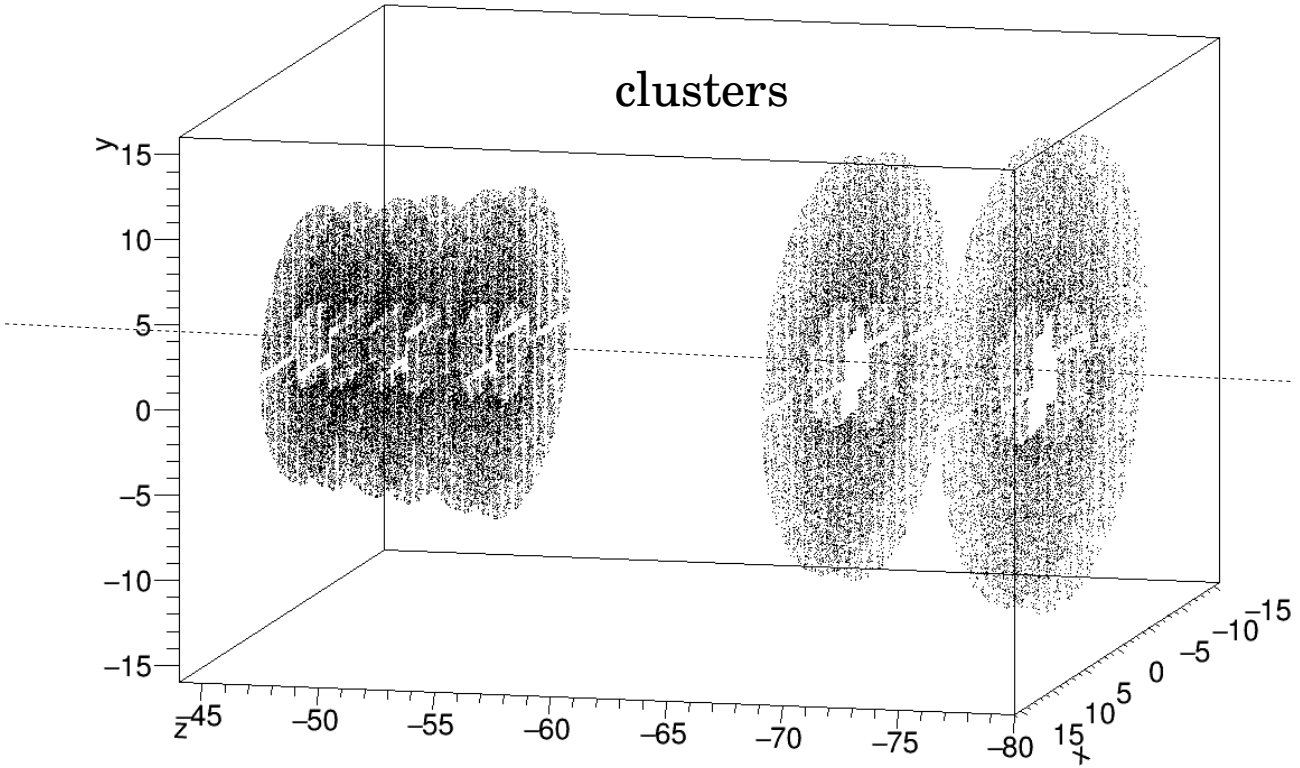
Views with the MFT and the ITS



Status of the simulation

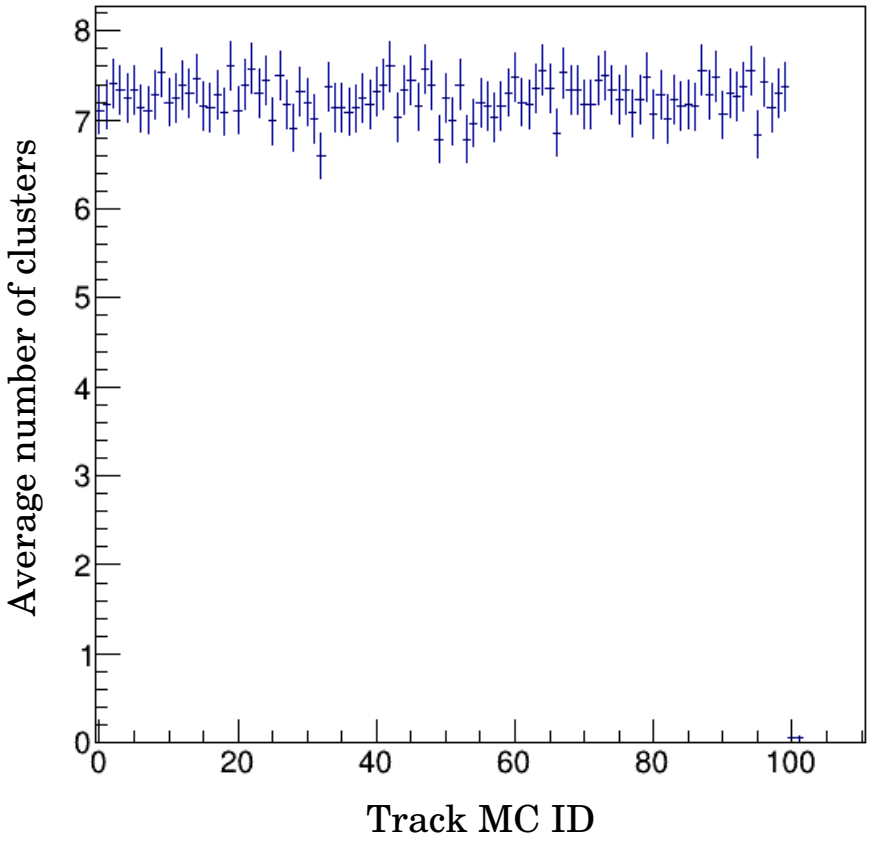
The MFT simulation is using the common sensor simulation classes with the ITS

- MC production of hits (two hits by sensitive volume, 50μm of silicon)
- generation of firing pixels (digitization + noise prob. 0, 1.E-5, 1.E-7 / pixel)
- grouping of fired pixels in clusters (clusterization)



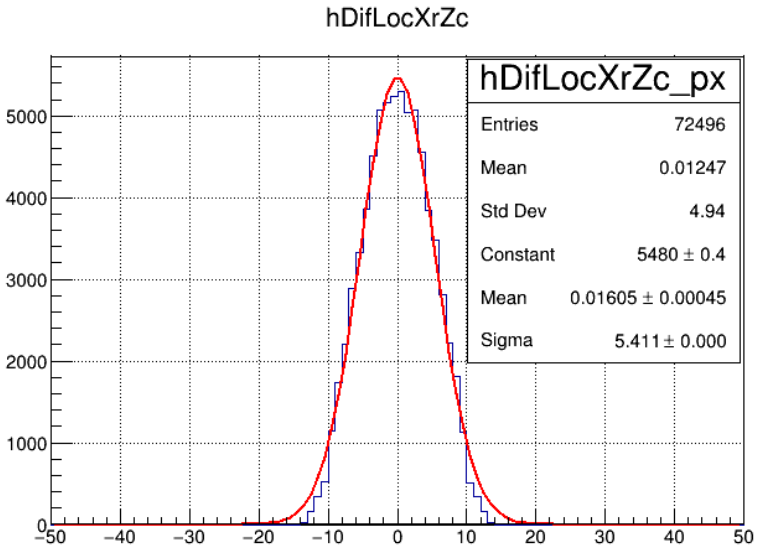
Some results

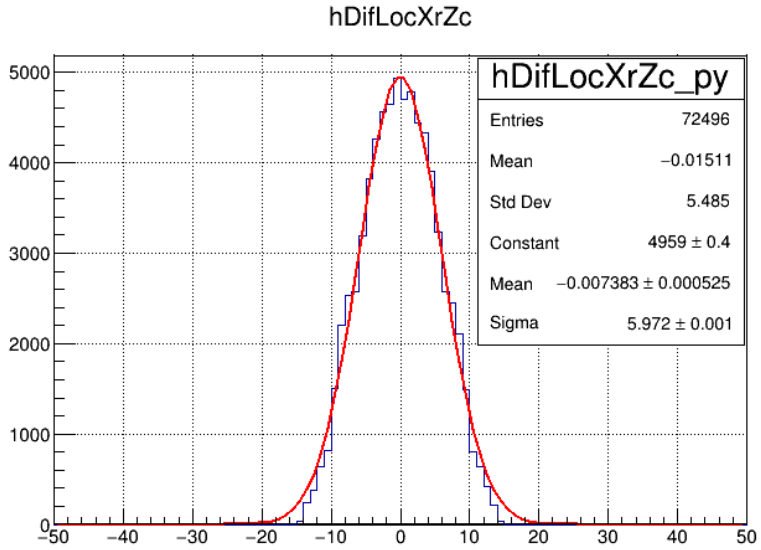
Number of clusters by MC track
(maximum 10 clusters per track)



MC: 100 μ^{-1} with GenBox within the MFT geometrical acceptance

Projected “MC resolutions”
(cluster - MC hit)





Testing with macros

```
O2/macro/README_mft
        /run_sim_mft.sh   + run_sim_mft.C
        /run_digi_mft.sh + run_digi_mft.C
        /run_clus_mft.sh + run_clus_mft.C
        /CheckDigits_mft.C
        /CheckClusters_mft.C
```

Plans for the reconstruction

Studies for the TDR with AliRoot

1) MFT standalone tracking based an a Cellular Automaton algorithm combined with a simple linear track finder

- event track multiplicity
- fake track contamination
- interaction vertex estimation
- transverse momentum estimation (momentum is ~parallel to Bz)

2) standalone MFT tracks attached to MCH spectrometer tracks:

- propagation of the spectrometer track through the hadron absorber down to the interaction vertex
- precision of the MCH+MFT track association
- estimation of the new track parameters using the Kalman filter

ESD track kinematics: x, y, z, p_x, p_y, theta_x, theta_y

(MUON + MFT)

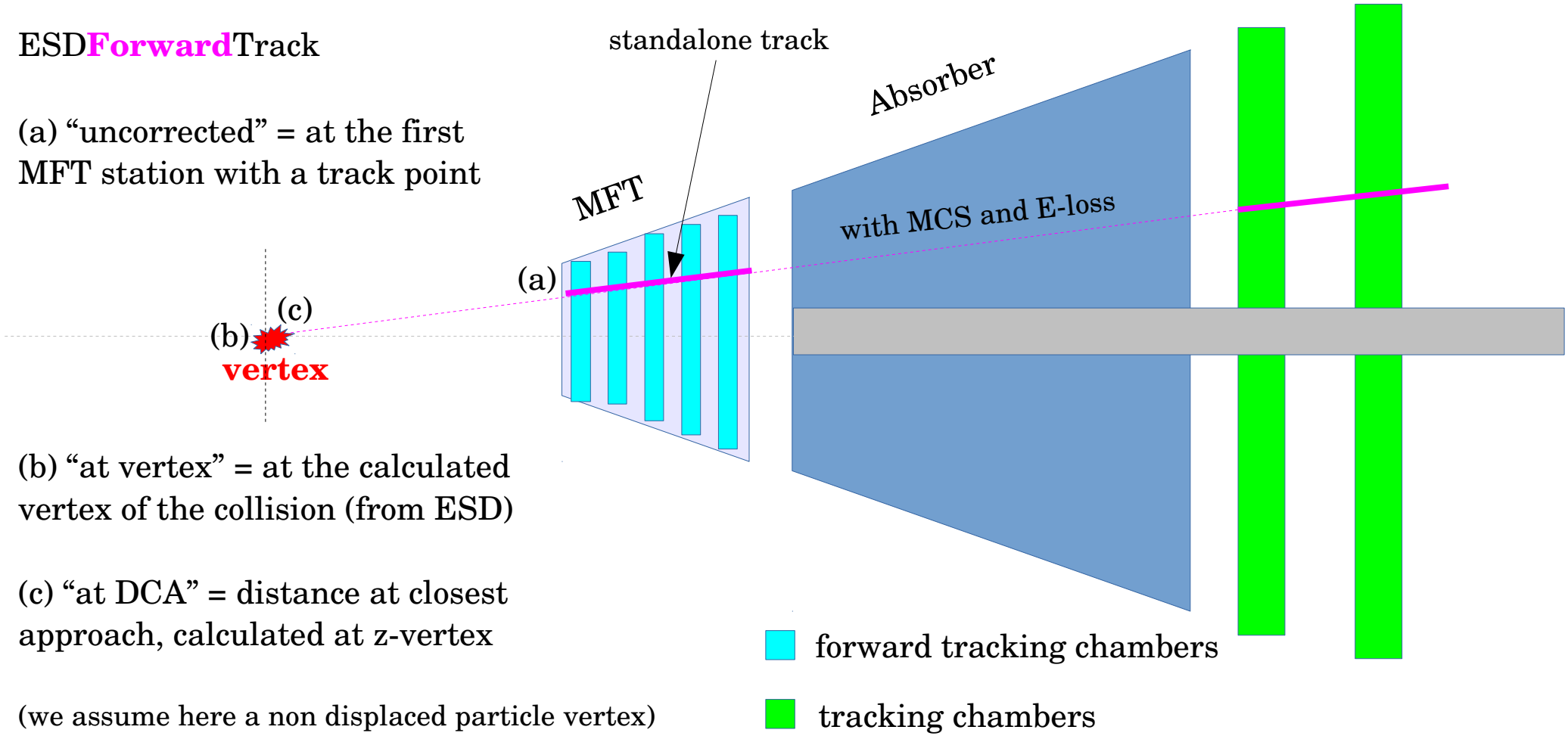
ESD**Forward**Track

(a) “uncorrected” = at the first MFT station with a track point

(b) “at vertex” = at the calculated vertex of the collision (from ESD)

(c) “at DCA” = distance at closest approach, calculated at z-vertex

(we assume here a non displaced particle vertex)



Using O2 devices on the CCIN2P3 OpenStack platform (obsolete, early 2017)

Limit Summary


Instances
Used 4 of 10


VCPUs
Used 16 of 20


RAM
Used 16GB of 23.4GB


Floating IPs
Allocated 2 of 5


Security Groups
Used 1 of 10

lpc

Project

Compute

Overview

Instances

Volumes

Images

Access & Security

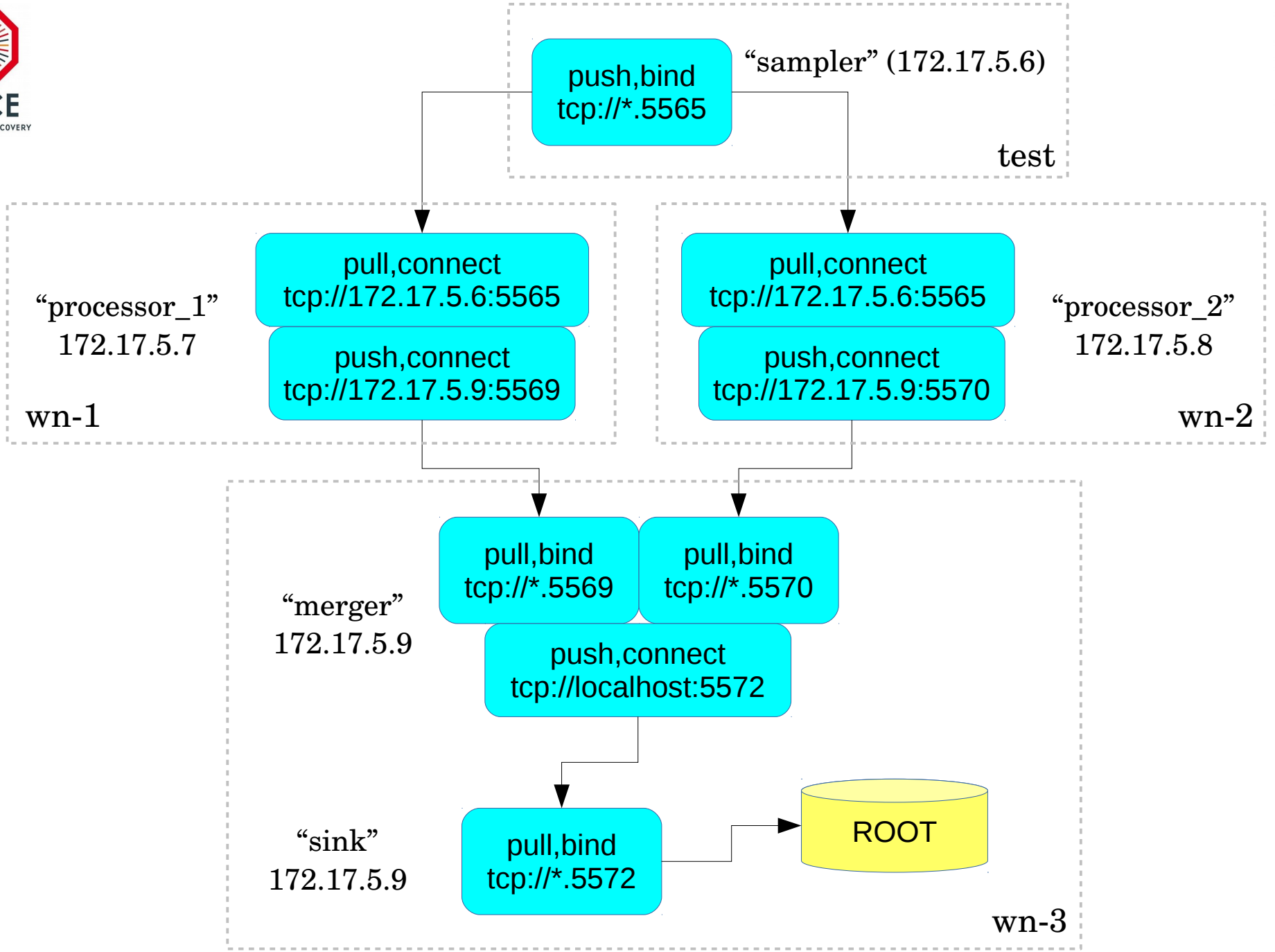
Object Store

Identity

Instances

Instance Name	Image Name	IP Address	Size
vulpescu_aliceo2_wn-3	vulpescu_aliceo2_test_save05	172.17.5.9	m1.medium.4
vulpescu_aliceo2_wn-2	vulpescu_aliceo2_test_save05	172.17.5.8	m1.medium.4
vulpescu_aliceo2_wn-1	vulpescu_aliceo2_test_save05	172.17.5.7	m1.medium.4
vulpescu_aliceo2_test	-	172.17.5.6 Floating IPs: 134.158.246.139	m1.medium.4

Displaying 4 items


push,bind
tcp://*.5565
“sampler” (172.17.5.6)
test
“processor_1”
172.17.5.7
wn-1
pull,connect
tcp://172.17.5.6:5565
push,connect
tcp://172.17.5.9:5569
pull,connect
tcp://172.17.5.6:5565
push,connect
tcp://172.17.5.9:5570
“processor_2”
172.17.5.8
wn-2
“merger”
172.17.5.9
pull,bind
tcp://*.5569
pull,bind
tcp://*.5570
push,connect
tcp://localhost:5572
“sink”
172.17.5.9
pull,bind
tcp://*.5572
ROOT
wn-3

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Youri Belikov
…