

Compass 2015 DY Hodoscope Efficiencies

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Dataselection:

Special muon run data from p6 and p11:

- P6: 259333,259334,259335,259340,259348,259350,259351,259355
- P11: 262796,262797,262798,262800,262802,262803,262804,262805

Production from March 2016 located at:

</castor/cern.ch/compass/generalprod/testcoral/trigger2015t1/>

Method

Determine Hodoscope efficiencies via check of associated hit to extrapolated track.

N_{extrap} : # extrapolated tracks to hodoscope position.
via `det.InActive( $x_{extrapolated}$ ,  $y_{extrapolated}$ )`

N_{hits} : # extrapolated tracks to hodoscope position with associated hits.
via `track.NHitsFoundInDetect(det)`

$$\text{Efficiency: } \epsilon = \frac{N_{hits}}{N_{extrap}}$$

Cuts on Data

- skip if there is no CT bit set
- skip if there is no outgoing particle
- check for pid 5 or 6 (μ^+/μ^-)
- skip if there is no vertex
- track is required to have at least one measured point
- skip if ($\text{mom}_h < 10$)
- skip if ($x_0 < 30$)
- for LAST skip if ($Z_{\text{first}} > 600$)
- for everything else skip if ($Z_{\text{last}} < 4000$)

Cut out 2,0 cm around all edges including the dead zone to get rid of the border effects!

Comparison Triggerrate

P6 (122.909 $\times 10^{11}$ p/spill)

Prescaler setup for run 259337

Trigger element	Short name	Division factor	In rate (1st spill)	Out rate (1st spill)
Dimuon Trigger (Middle and LAS)	MT+LAST	1	118	118
One muon Middle Trigger	MT	1	62652	62652
Dimuon Trigger (Outer and LAS)	OT+LAST	1	81	81
One muon Outer Trigger	OT	1	5222	5222
Calorimeter Trigger	CT	1	71888	71888
Inner Veto	VI	0	1233687	0
Halo Trigger (H2 AND H4Outer)	Halo	0	52656	0
Beam Trigger	BT	0	1817093	0
Dimuon Trigger LAS	LAST 2mu	1	1895	1895
One muon Trigger LAS	LAST 1mu	1	4540	4540
True Random	TRand	0	6441	0
Noise Random	NRand	0	1721139	0

ION2: 3677800

P11 (100.688 $\times 10^{11}$ p/spill)

Prescaler setup for run 262800

Trigger element	Short name	Division factor	In rate (1st spill)	Out rate (1st spill)
Dimuon Trigger (Middle and LAS)	MT+LAST	1	154	154
One muon Middle Trigger	MT	1	67515	67515
Dimuon Trigger (Outer and LAS)	OT+LAST	1	135	135
One muon Outer Trigger	OT	1	5222	5222
Calorimeter Trigger	CT	1	77109	77109
Inner Veto	VI	0	7248923	0
Halo Trigger (H2 AND H4Outer)	Halo	0	548216	0
Beam Trigger	BT	0	957088	0
Dimuon Trigger LAS	LAST 2mu	1	1302	1302
One muon Trigger LAS	LAST 1mu	1	3581	3581
True Random	TRand	0	6889	0
Noise Random	NRand	0	1720726	0

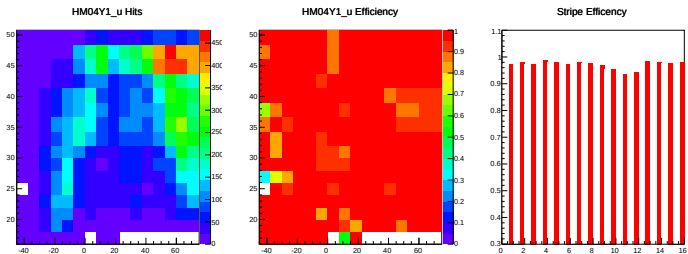
ION2: 7777400

Huge differences in environment triggers (VI/Halo/BT).

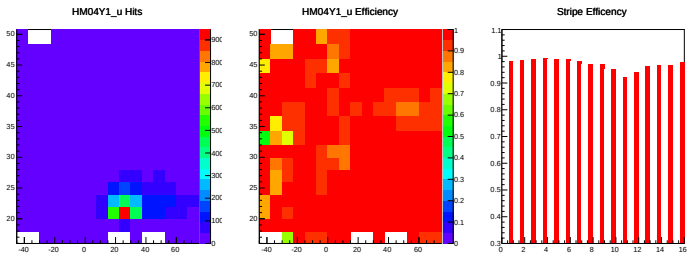
But run with higher intensity on t6 has lower physics trigger rate and muon ion chamber rate - hit pattern differs also.

HM04Y1_u

P6

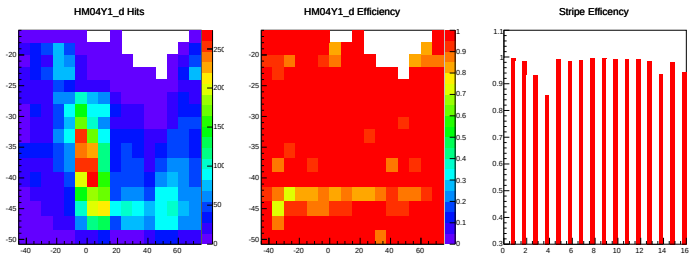


P11

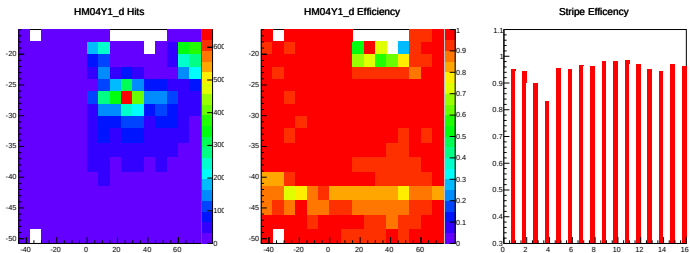


HM04Y1_d

P6

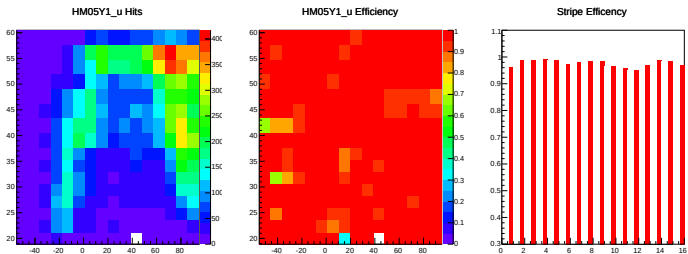


P11

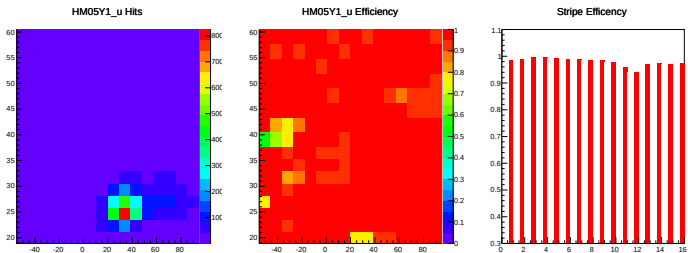


HM05Y1_u

P6

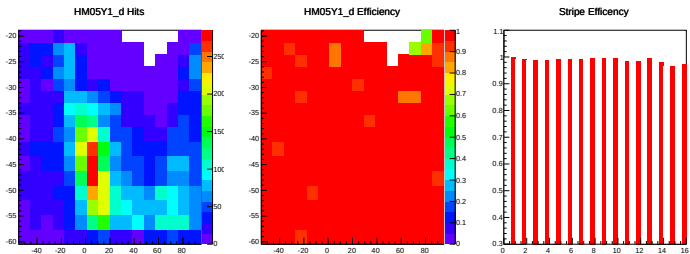


P11

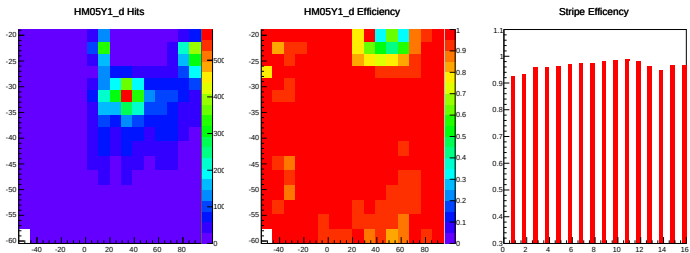


HM05Y1_d

P6

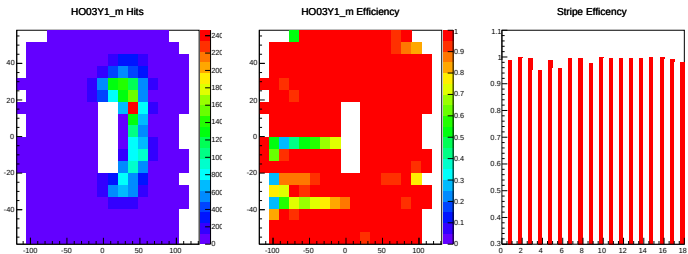


P11

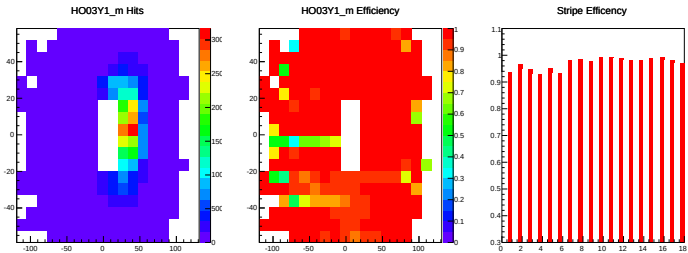


HO03Y1_m

P6

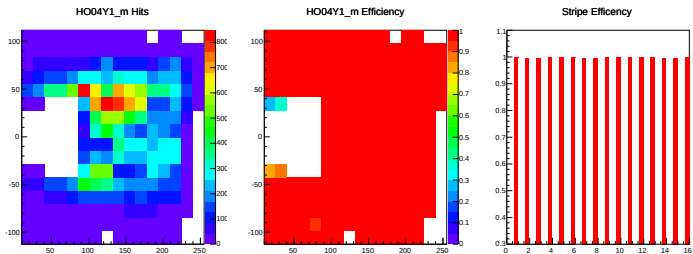


P11

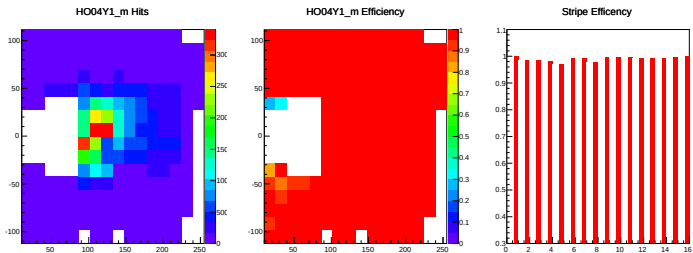


HO04Y1_m

P6

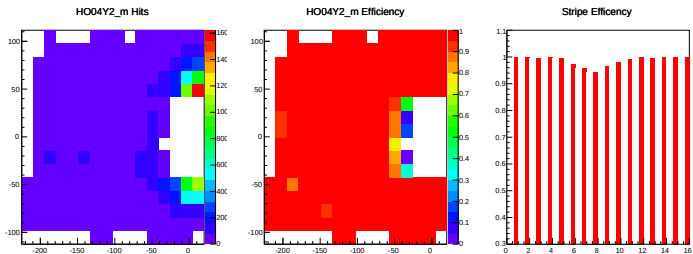


P11

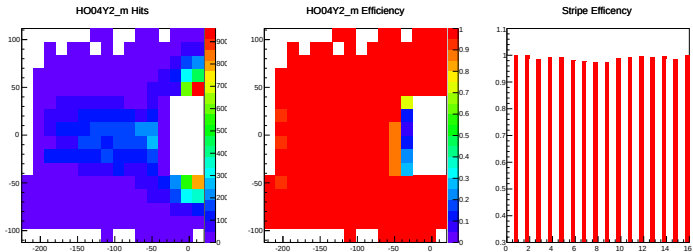


HO04Y2_m

P6

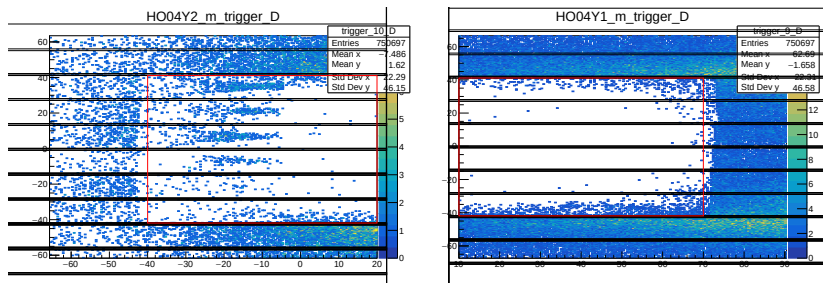


P11



HO04 Deadzone

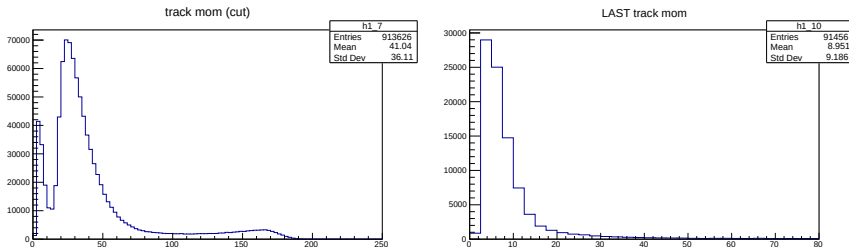
Deadzone according to detectors.259361.transv.dat:



Shown data from beginning of 2016

→ But still wrong HO04(Y1/Y2) deadzone information in:
[/afs/cern.ch/compass/detector/geometry/2015](https://afs.cern.ch/compass/detector/geometry/2015)

Momentum distribution of LAST muon events



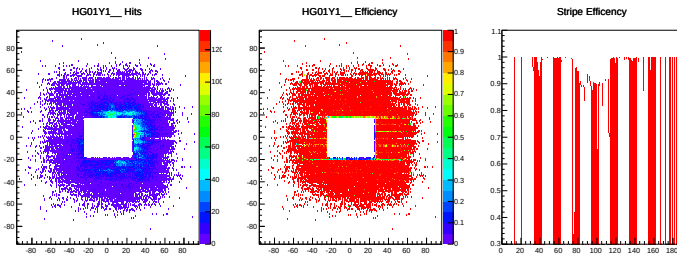
Why last muons so low momentum ?

→ modify momentum cut - skip if ($\text{mom} < 1$) to get more statistic

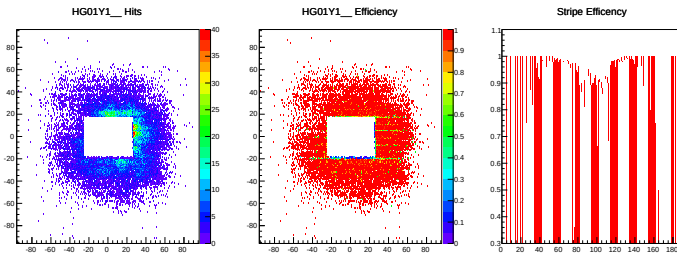
No edge cut to check alignment

HG01Y1

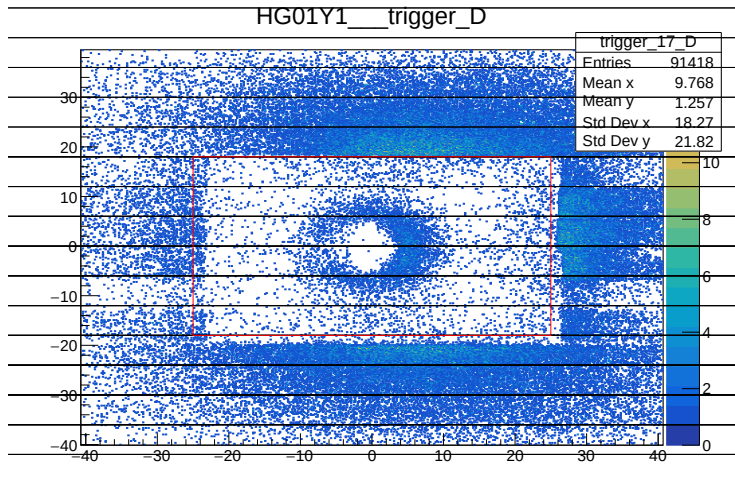
P6



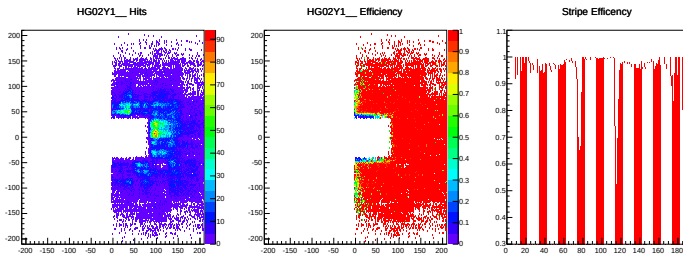
P11



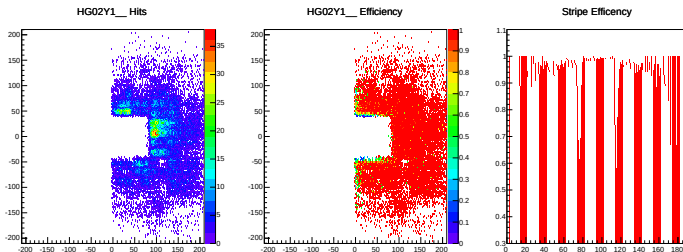
HG01Y1 Alignment



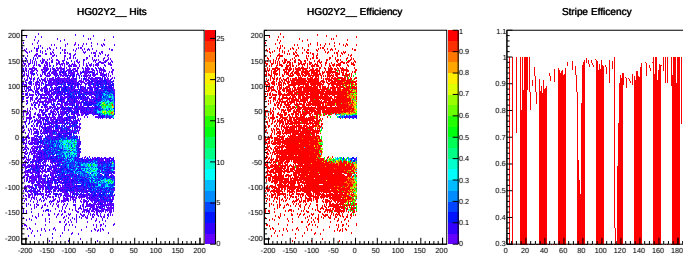
P6



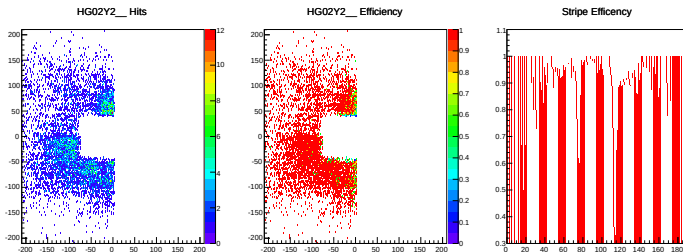
P11



P6



P11



Summary & Outlook

No major differences between p6 and p11.

- **Middle:**

- one bad stripe
 - some diffuse inefficiencies

- **Outer:**

- two half bad stripes in HO03
 - still wrong deadzone for HO04 (115cm instead of 110cm)

- **LAST:**

- inefficiencies on the overlap region
 - wrong hole dimensions in HG01

→ reproduction of p6 and p11 with final alignment and produce also second series of trigger calibration runs in p11. (ongoing)

Analysis of single muon Trigger efficiency is ongoing