

# 2D hodoscope efficiencies in MC

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## Data sets:

- Real: P09slot5.1  
/castor/cern.ch/compass/data/2016/oracle\_dst/P09/slot5.1
- MC: P09 new HODOs: /eos/experiment/compass/mc/production/reco/2016/P09/mu+\_lepto\_HODOs/mDST/

### Beam muon:

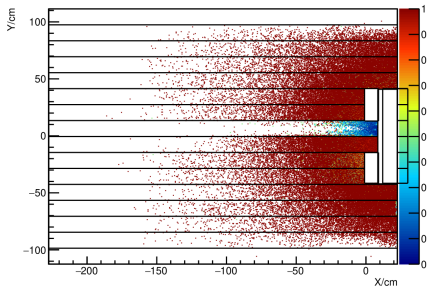
- BestPrimaryVertex (BPV)
- BPV in target
- beam muon has track

### Scattered muon:

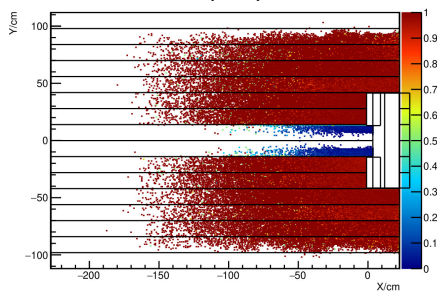
- `iMuPrim(true,true,false,false)`
- has track
- `zFirst < 300`
- `zLast > 1500` (to extend for SAS hodoscopes)
- `xx0 > 15`
- $Q^2 > 0.1$  GeV
- $mom > 0.1$  MeV
- For LAS check muonwallA (before and after absorber) hits  
else check muonwallB or MWPC (PB01-06) hits
- CALO trigger fired (hit in HCAL1 or HCAL2)  
(for real data/ for mc no requirement) → idea: unbiased data  
(independent of trigger system)

⇒ Extrapolate track of scattered muon to hodoscope position

P09slot5.1:

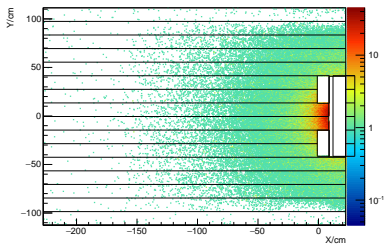


P09 new HODOs (MC):



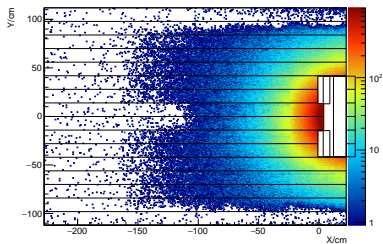
## P09slot5.1 (extrap):

HO04Y2\_m\_extrap



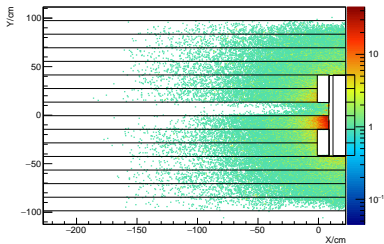
## P09 new HODOs (extrap):

HO04Y2\_m\_extrap



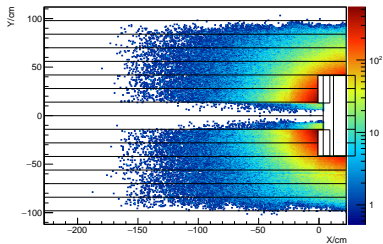
## P09slot5.1 (hits):

HO04Y2\_m\_hits



## P09 new HODOs (hits):

HO04Y2\_m\_hits



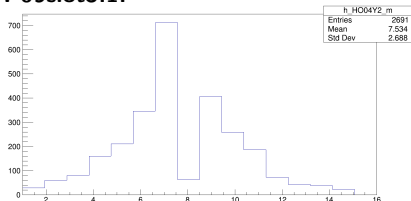
## Caused by method of efficiency determination?

- As problem is absence in 2018 → correspondence with Yu-Hsiang
- Compare data selection of 2016 and 2018
  - ⇒ besides some minor differences in the cuts which are applied main difference in the methods are:
    - In 2016 corresponding hit in hodoscope to track are determined by checking `PaTrack::NHitsFoundInDetect()`
      - cons no direct information of the slab which was hit, but as long as a precise extrapolation is possible it is fine
    - In 2018 check the `PaDigits` of a corresponding hit `PaHit::vDigits()` to link directly the hit to a the corresponding slab number
- Checking my Phast method and the functions used for hints where the hits are removed → No hints found
- Also use the information of `PaDigits` and plot the number of hits vs. the slab number

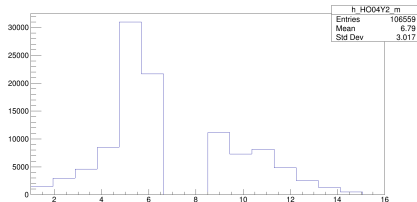
## Basic selection cuts:

- BPVertex with beam muon
- Scattered muon iMuPrim(true,true,false,false,15)
- $xx0 > 15$
- $Q2 > 0.1$
- $mom > 0.1$

P09slot5.1:



P09 new HODOs (MC):



⇒ Hits seems to already been removed on TGeant/reconstruction level