

# **Pseudo-efficiencias (DY2015/2018)**

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Coral Weekly  
12.03.21

# Selection criteria

Inclusive selection:

- 1) LAS-LAS or LAS-Outer, no LAS-Middle;
- 2) all  $\mu^+\mu^-$  pairs
- 3) primary vertex (bpv or the vertex with the best  $\chi^2/ndf$ ) associated to  $\mu^+\mu^-$
- 4) The vertex is associated to the NH3 target
- 5)  $M_{\mu^+\mu^-} > 2 \text{ GeV}$ ;
- 6) track  $\chi^2/ndf < 10$  - for tracks outgoing from the selected pv;

The used MC sample is:

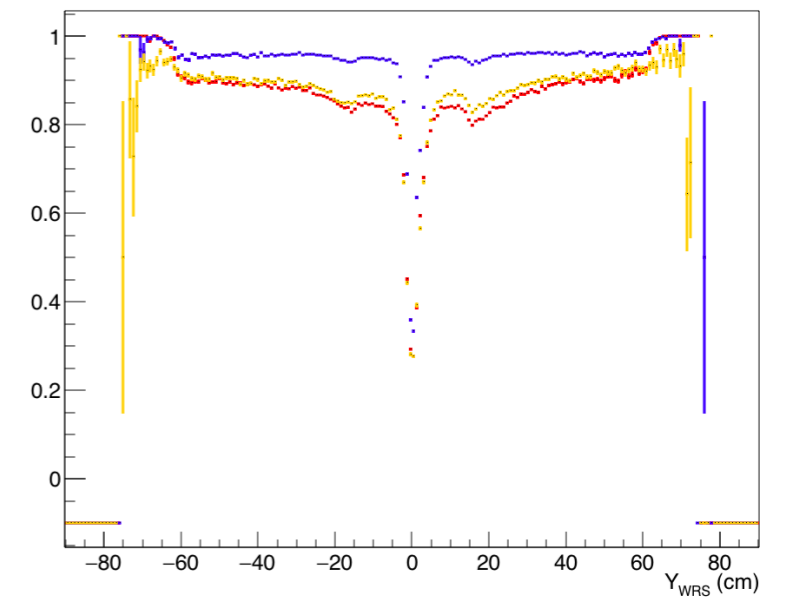
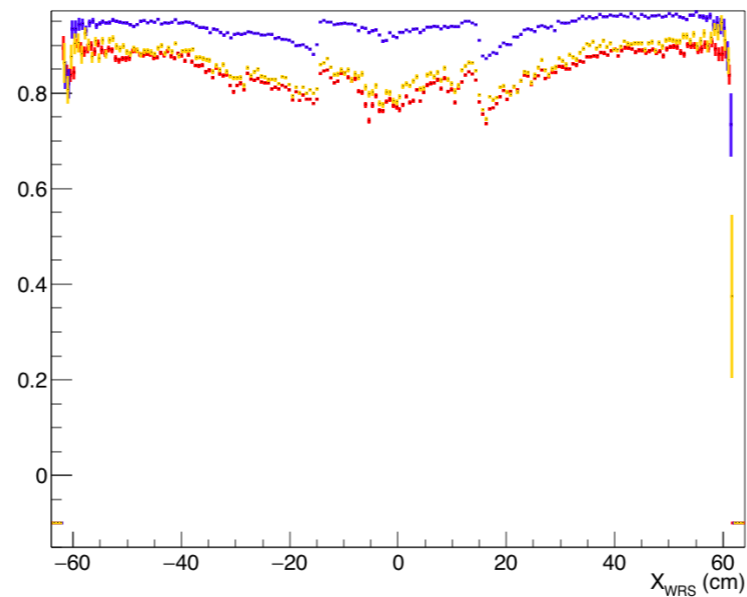
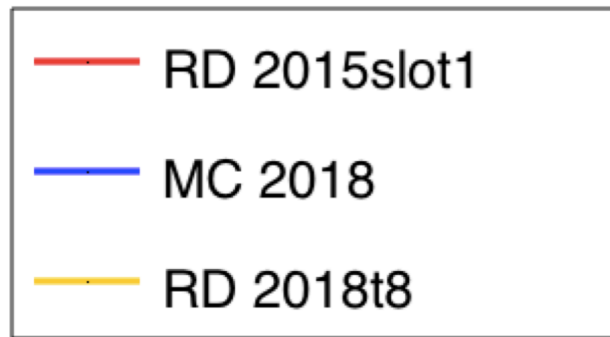
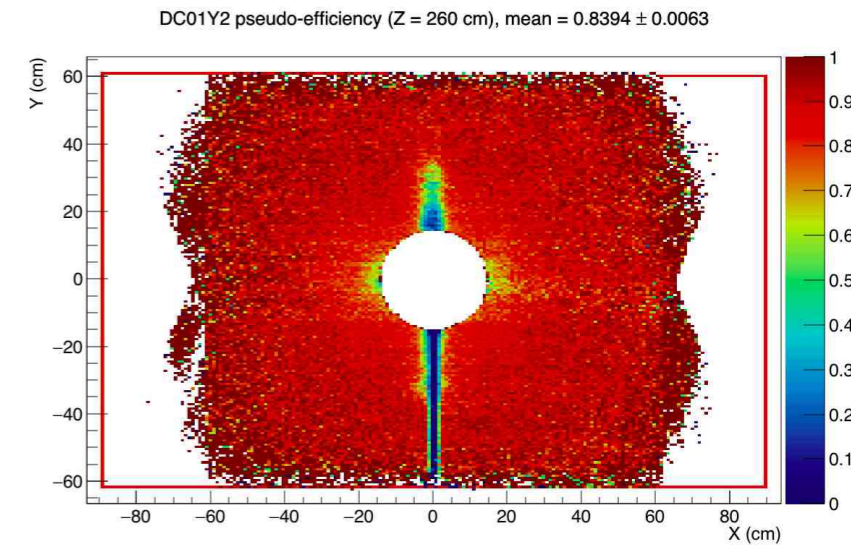
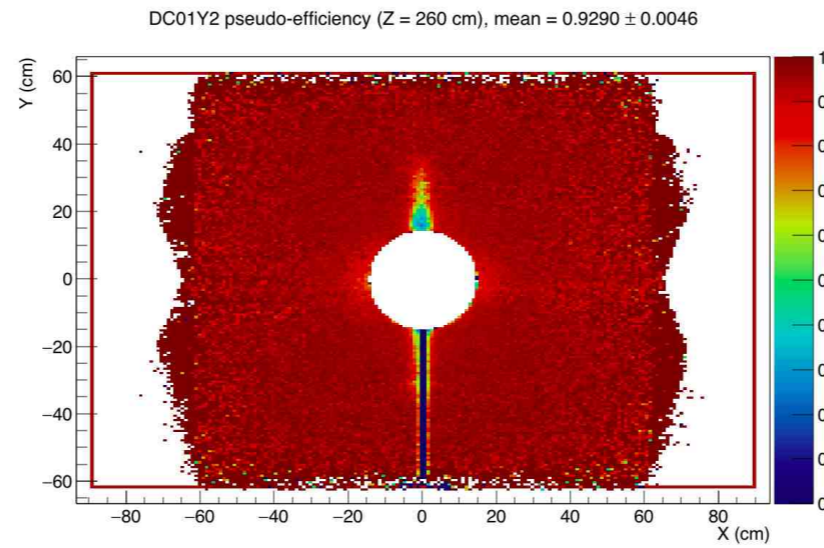
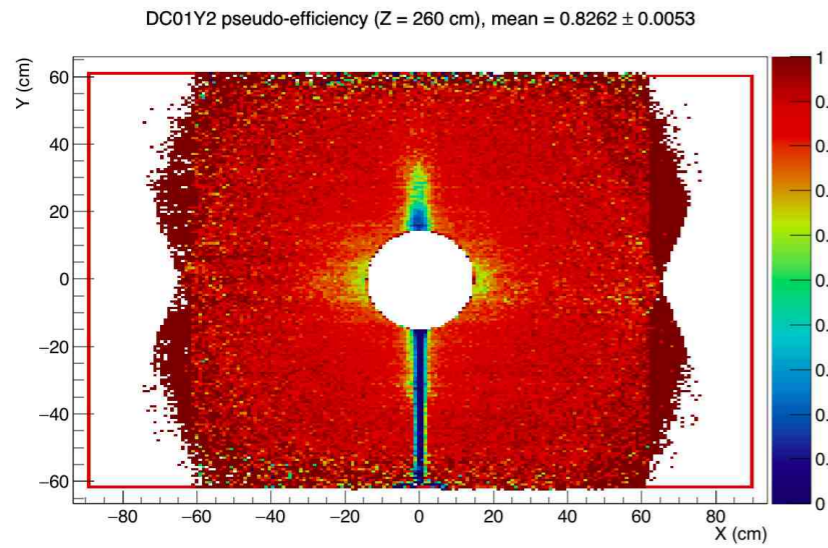
[/castor/cern.ch/user/y/ylian/dy2018/MC\\_HMDY/P03t8\\_coral\\_202012\\_P03t1DetEff\\_P02t8TrigEff/mDST](/castor/cern.ch/user/y/ylian/dy2018/MC_HMDY/P03t8_coral_202012_P03t1DetEff_P02t8TrigEff/mDST)

# DC01Y1

## 2015slot1RD

## 2018t8MC

## 2018t8RD

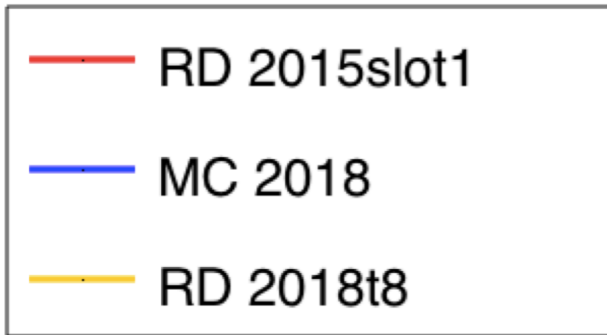
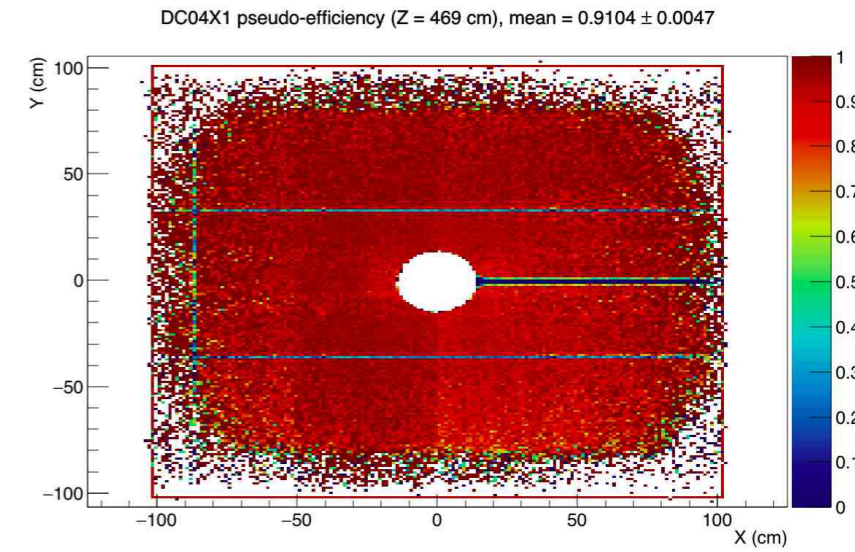
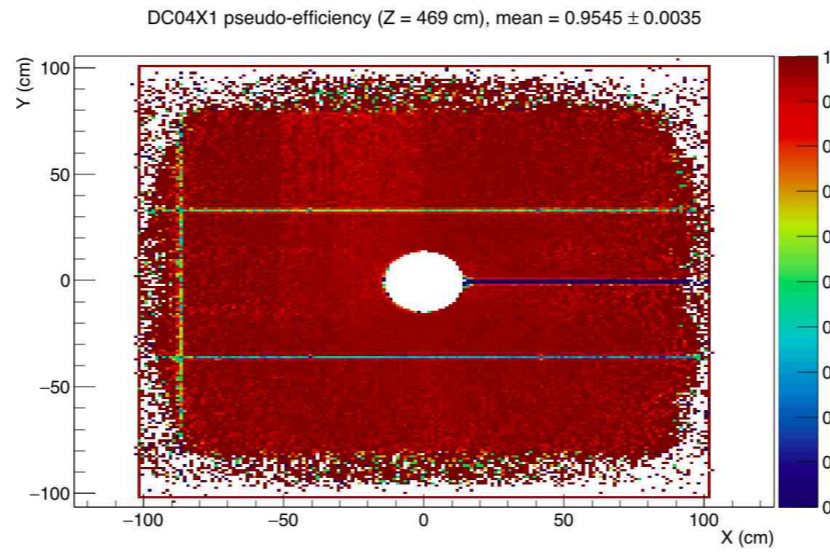
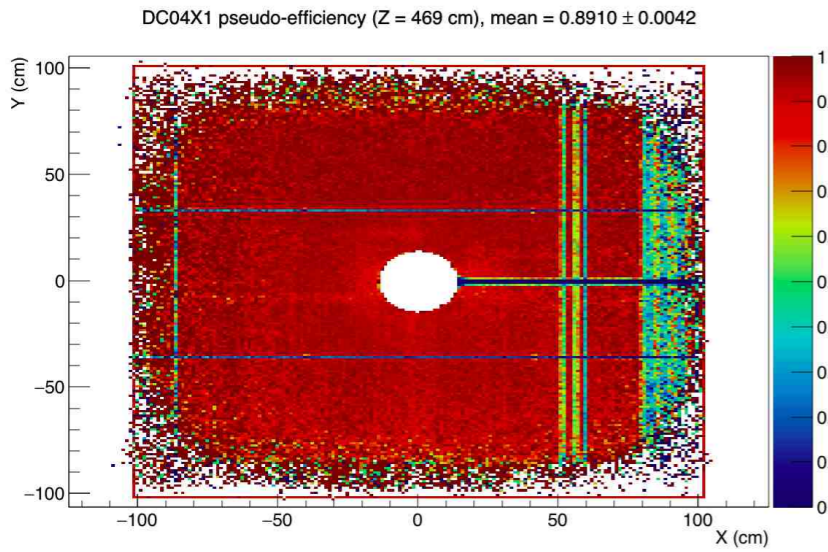


# DC04X1

## 2015slot1RD

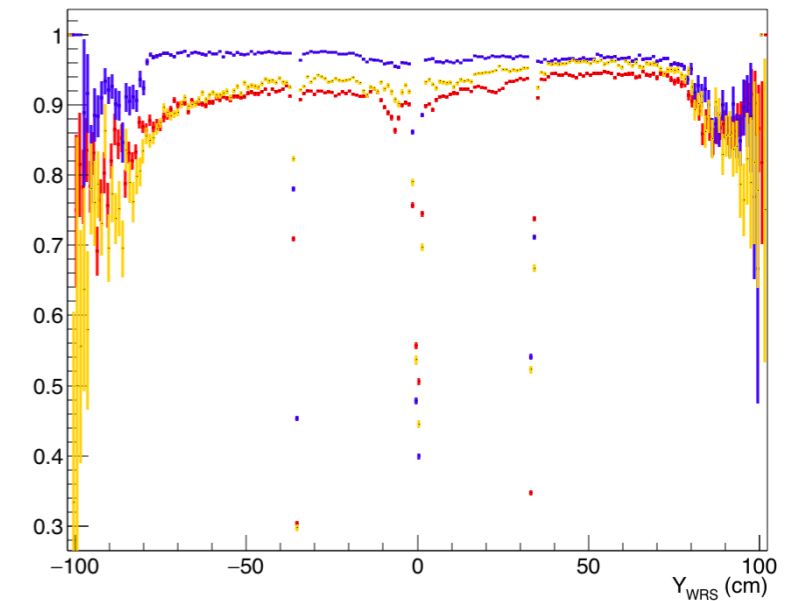
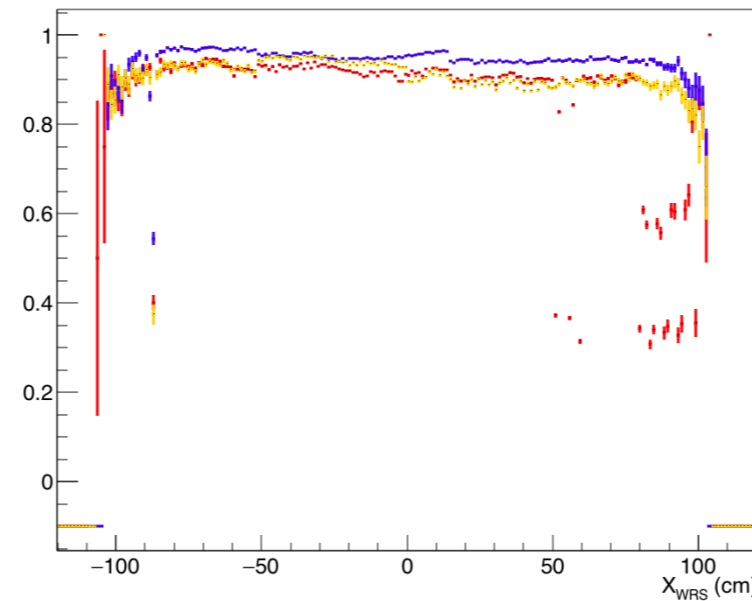
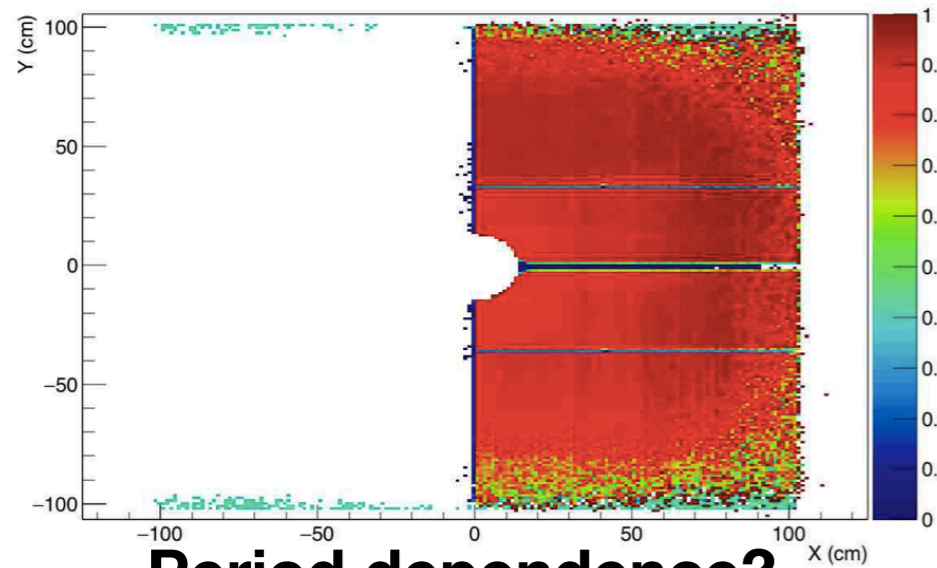
## 2018t8MC

## 2018t8RD



## DY2018P02t8

DC04X1 pseudo-efficiency (Z = 469 cm)



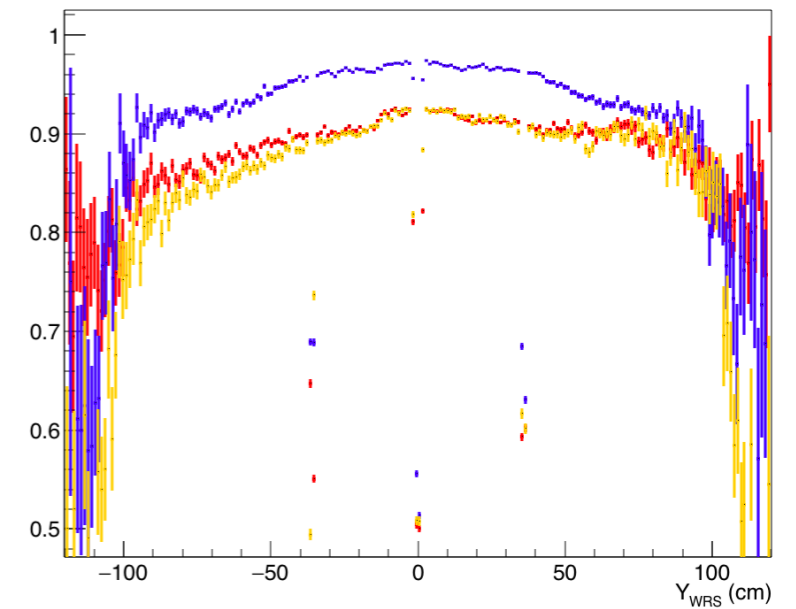
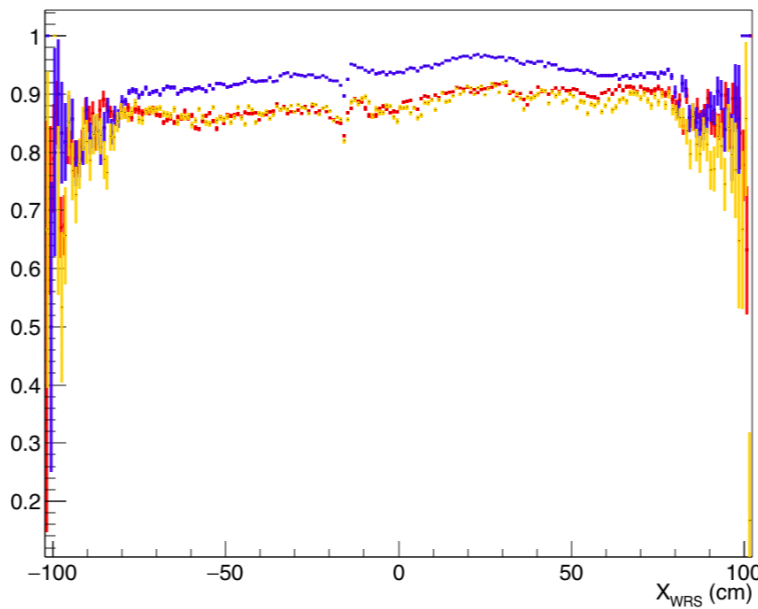
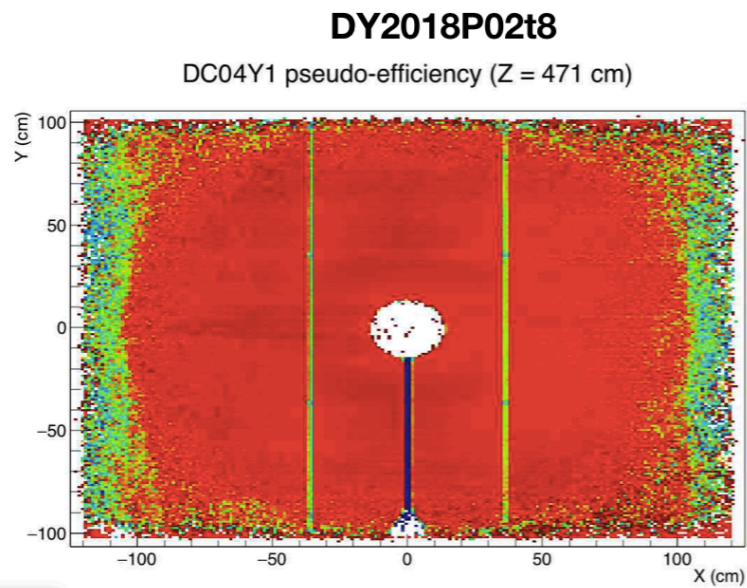
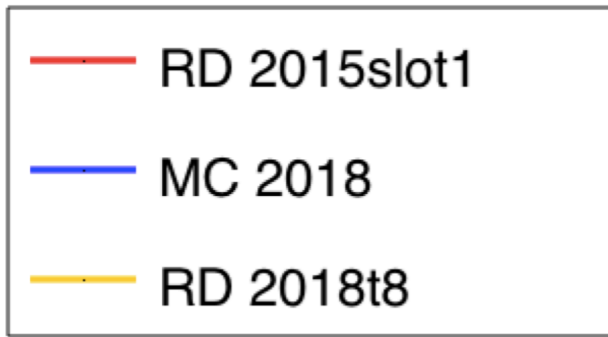
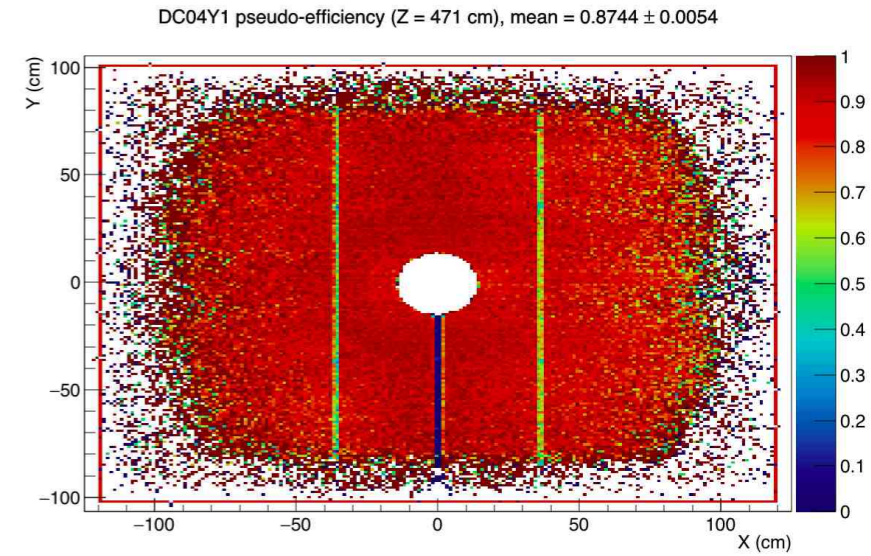
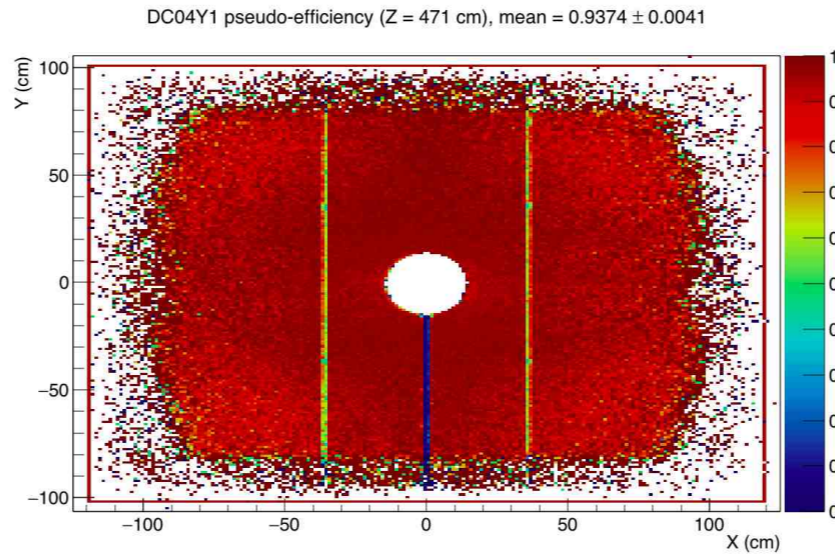
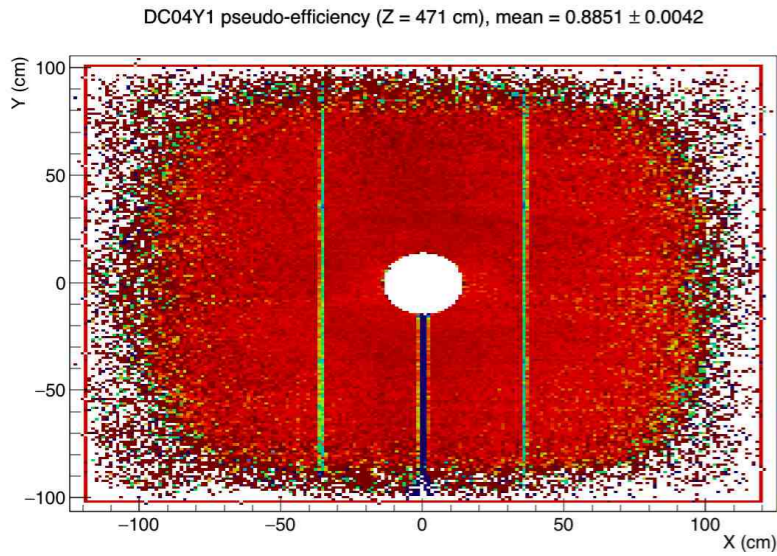
## Period dependence?

# DC04Y1

## 2015slot1RD

## 2018t8MC

## 2018t8RD



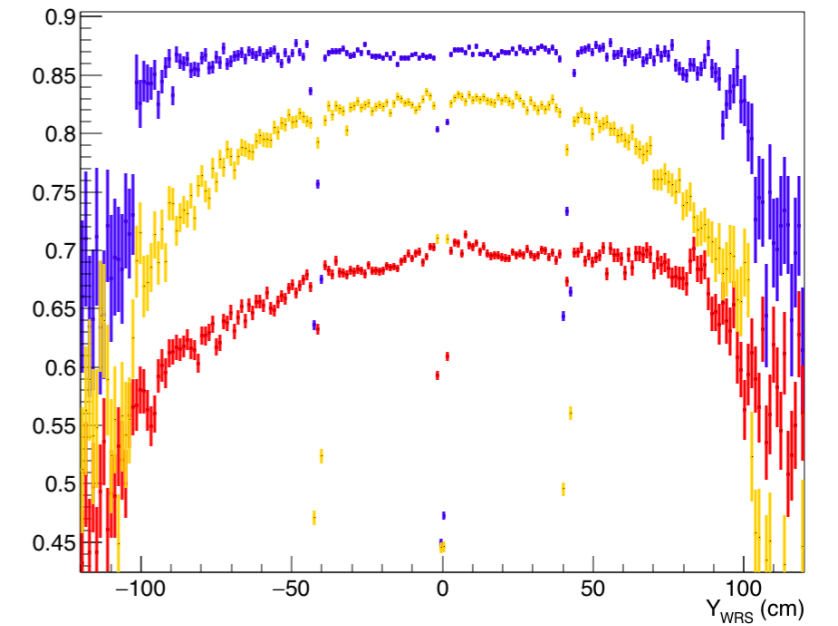
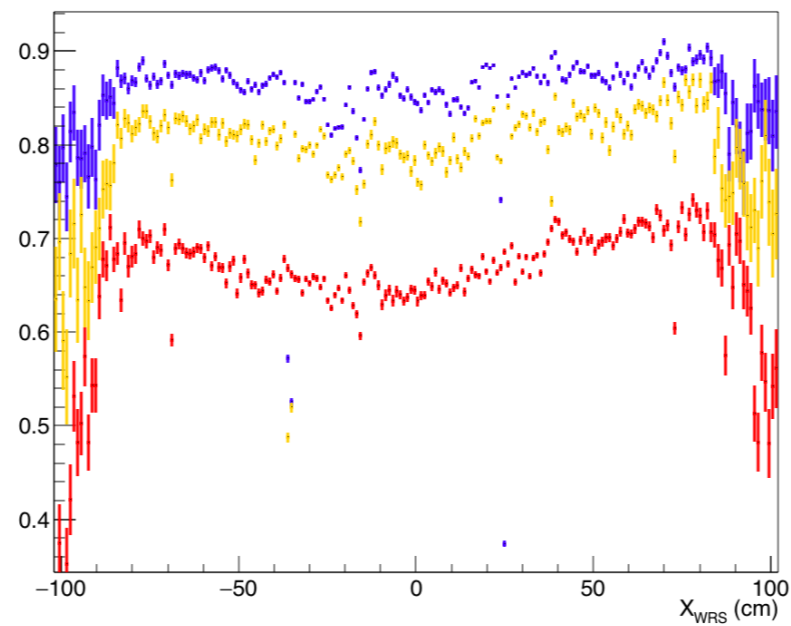
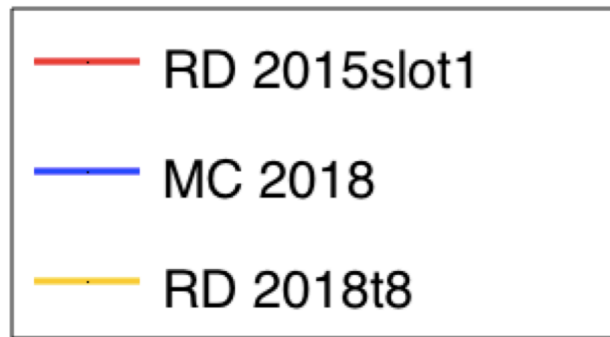
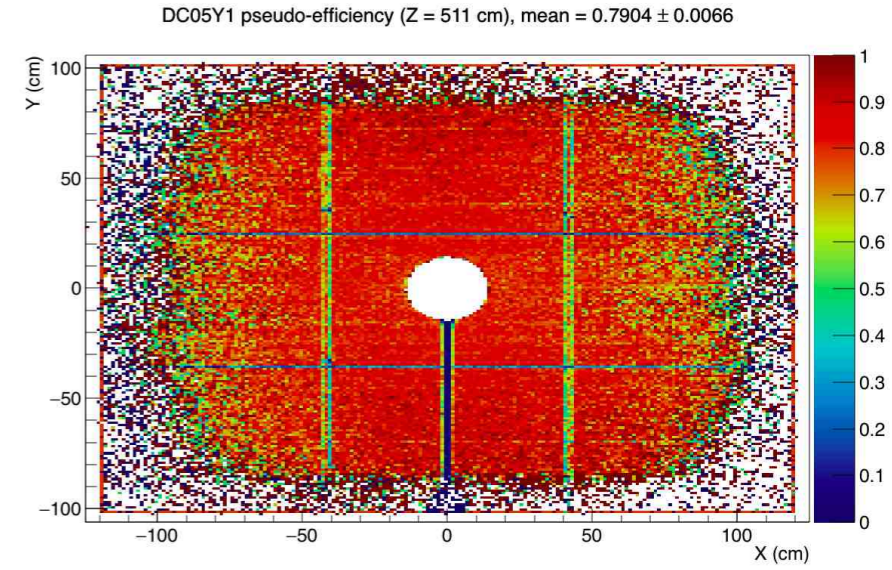
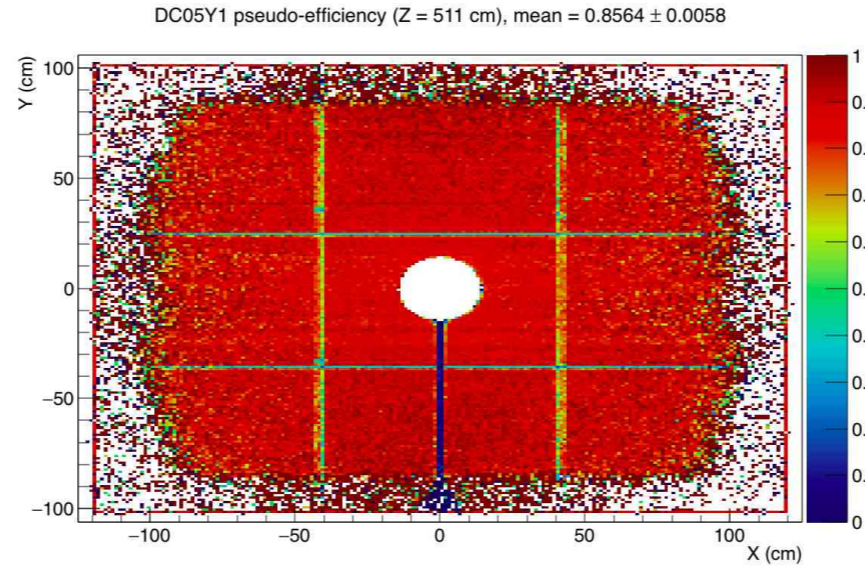
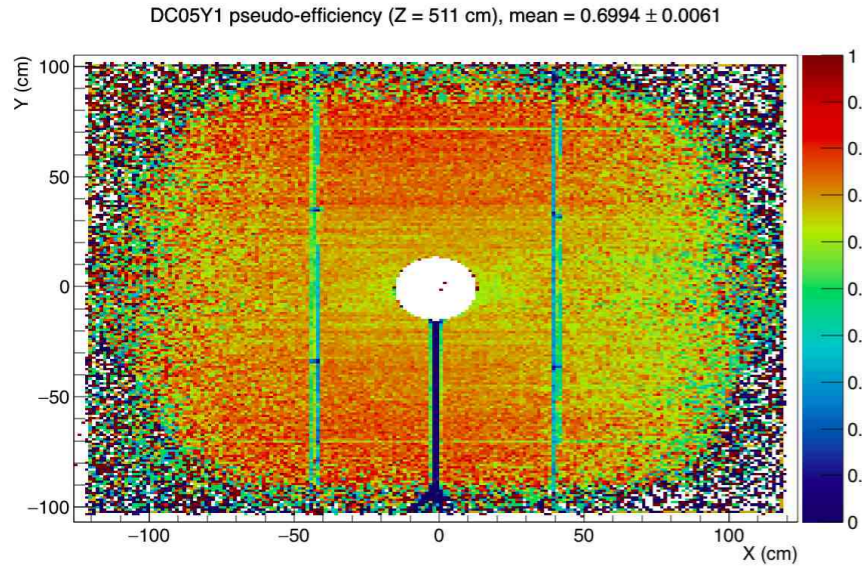
## Period dependence?

# DC05Y1

## 2015slot1RD

## 2018t8MC

## 2018t8RD



**The plane was inactive in 2015.**

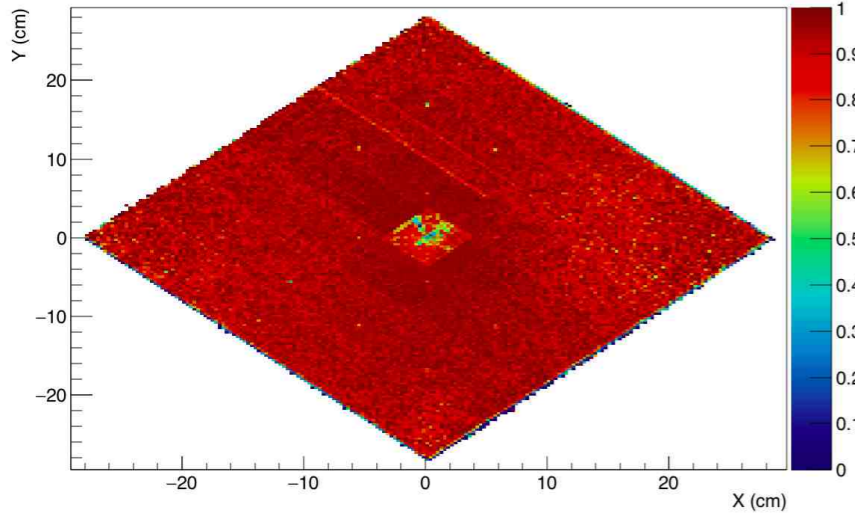
# MP01MU-U1

## 2015slot1RD

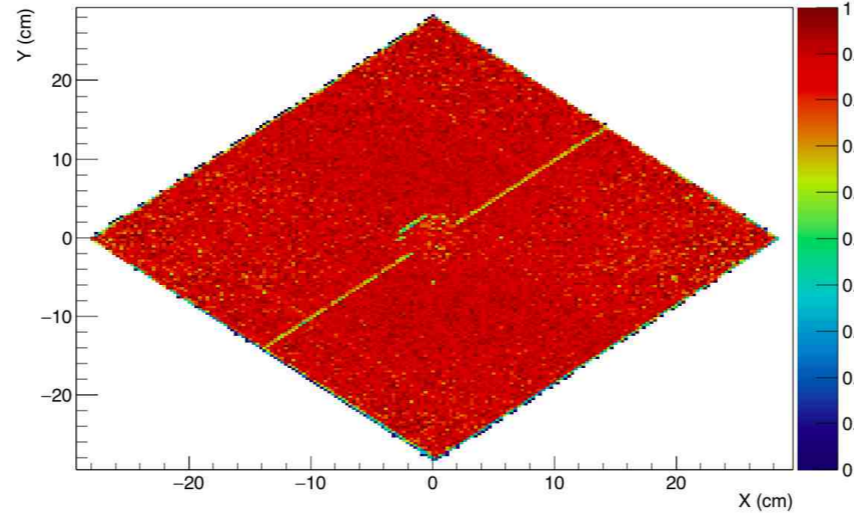
## 2018t8MC

## 2018t8RD

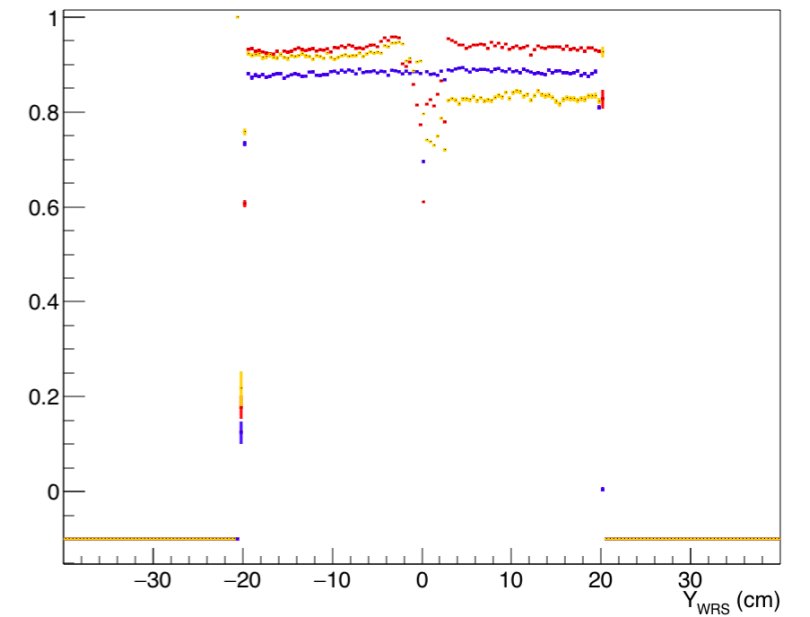
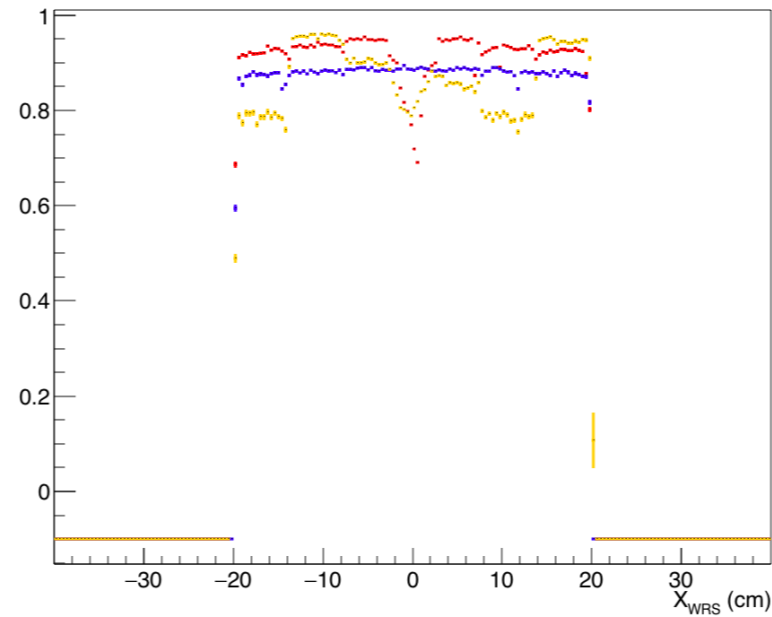
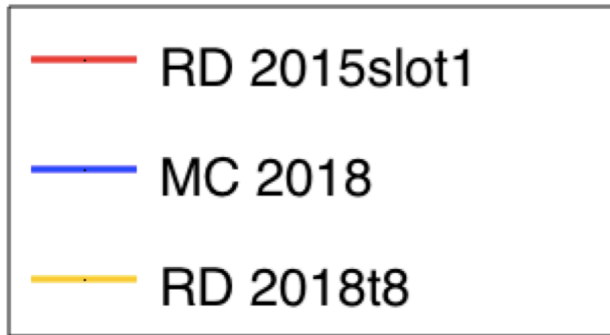
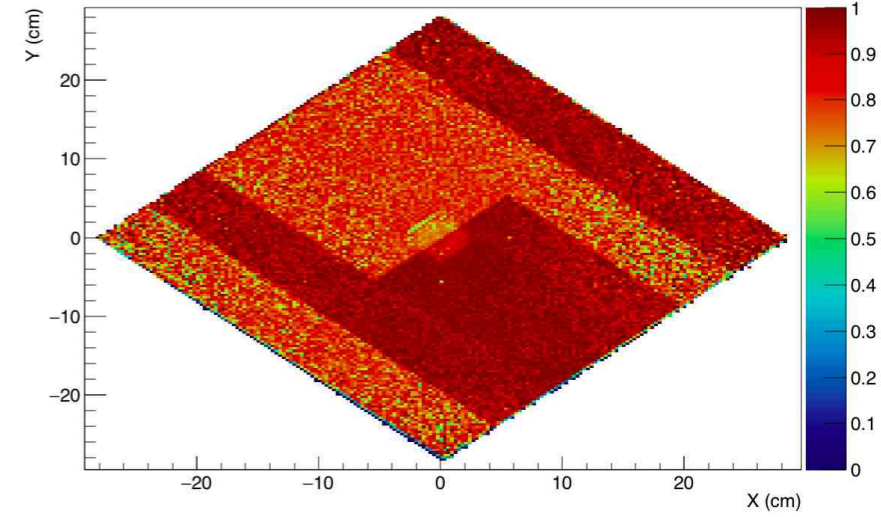
MP01MU-U1 pseudo-efficiency (Z = 142 cm), mean =  $0.8778 \pm 0.0044$



MP01MU-U1 pseudo-efficiency (Z = 142 cm), mean =  $0.8680 \pm 0.0076$



MP01MU-U1 pseudo-efficiency (Z = 142 cm), mean =  $0.9279 \pm 0.0044$



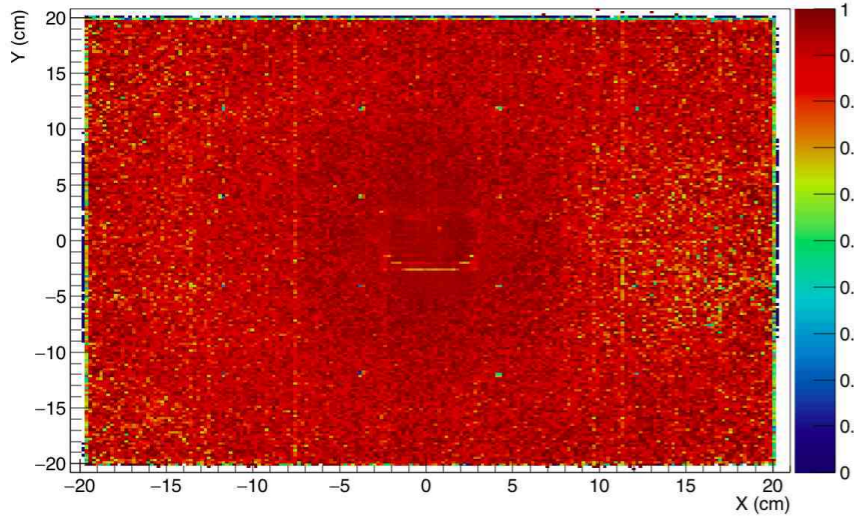
# MP01MX-X1

2015slot1RD

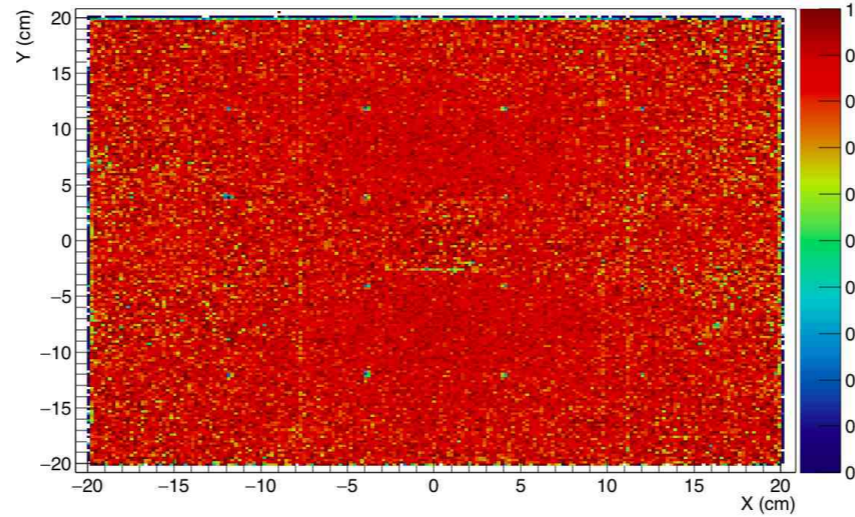
2018t8MC

2018t8RD

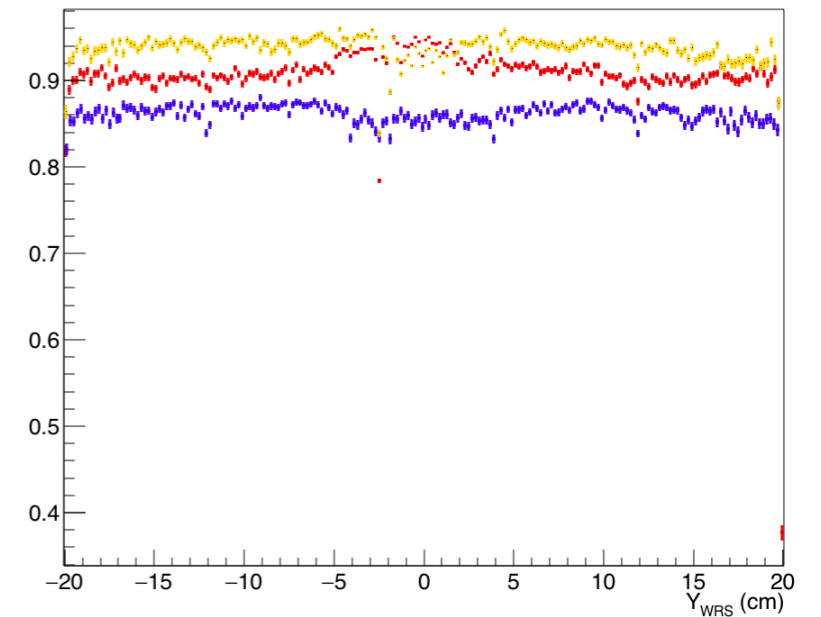
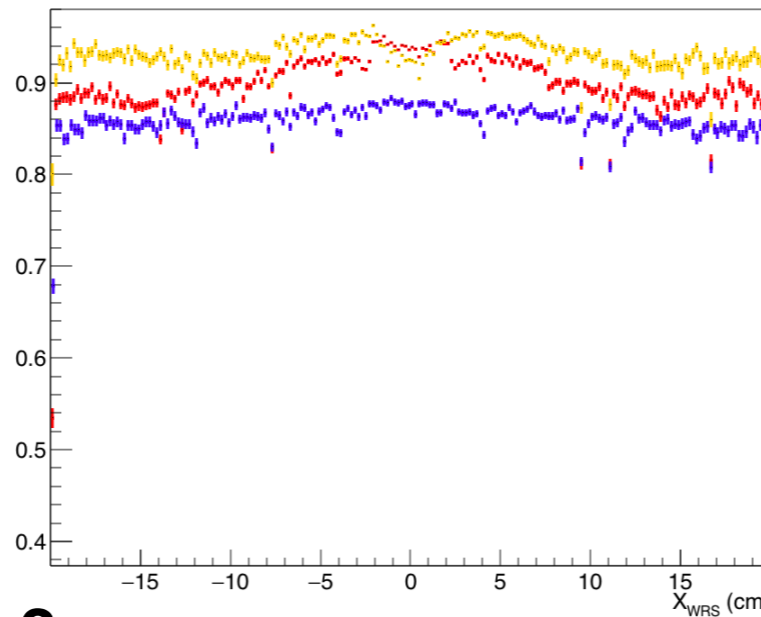
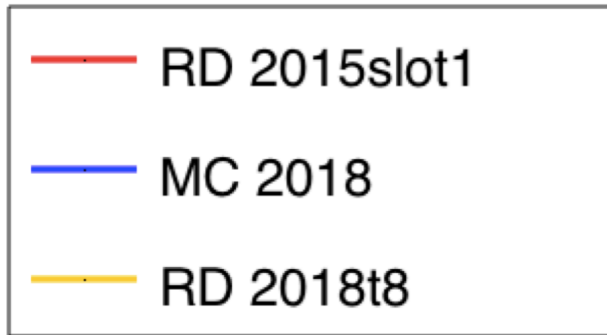
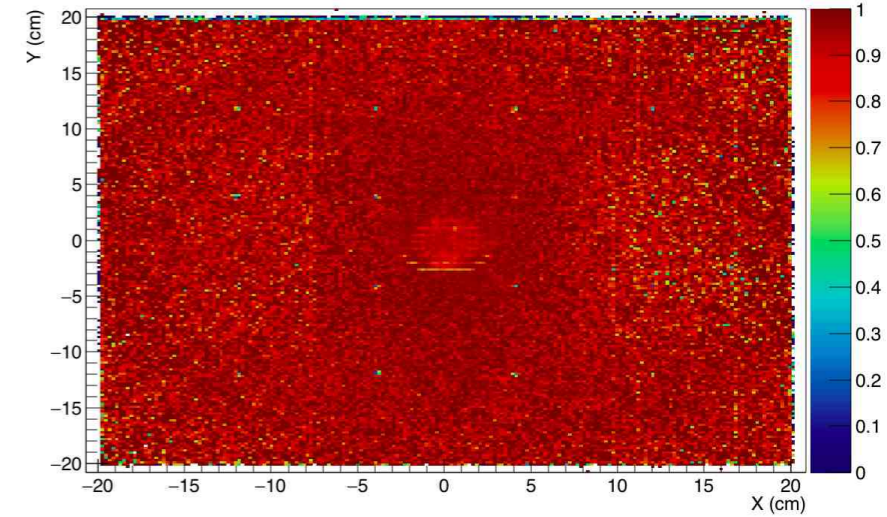
MP01MX-X1 pseudo-efficiency (Z = 148 cm), mean =  $0.8937 \pm 0.0041$



MP01MX-X1 pseudo-efficiency (Z = 148 cm), mean =  $0.8660 \pm 0.0075$



MP01MX-X1 pseudo-efficiency (Z = 148 cm), mean =  $0.9319 \pm 0.0043$



**Problem with thresholds of hits?**



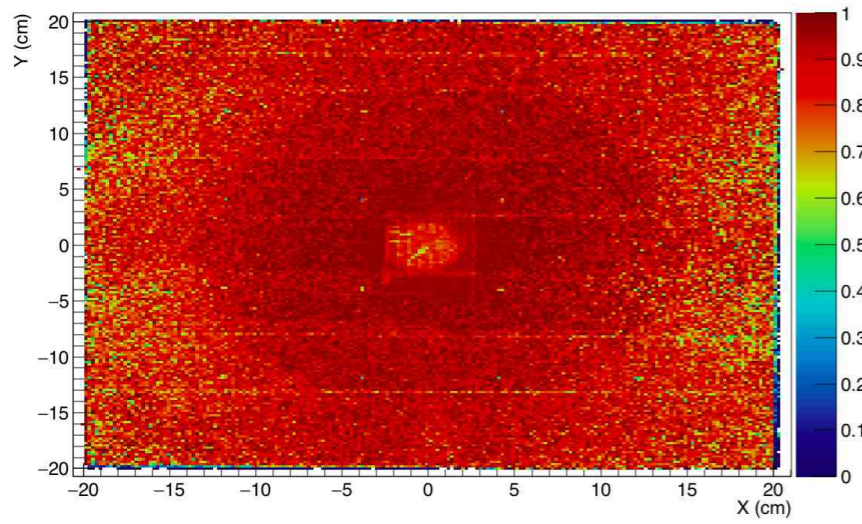
# MP01MY-Y1

## 2015slot1RD

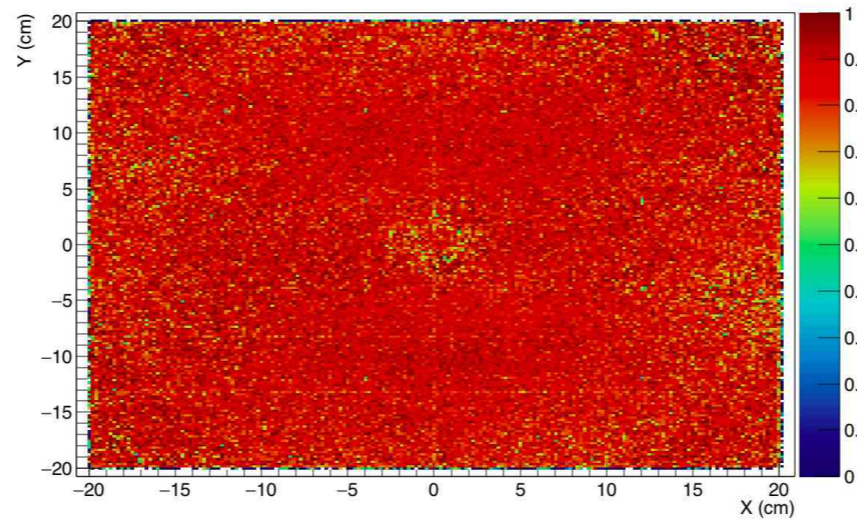
## 2018t8MC

## 2018t8RD

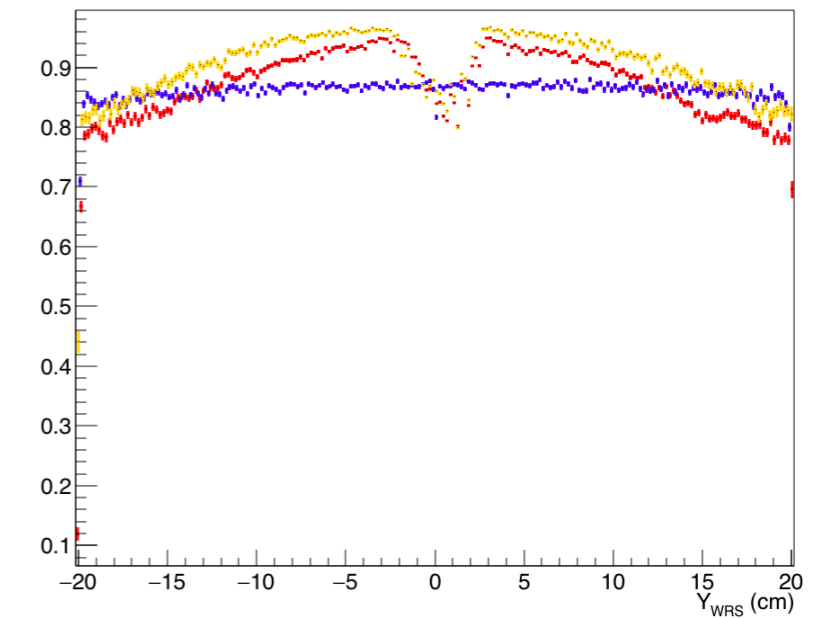
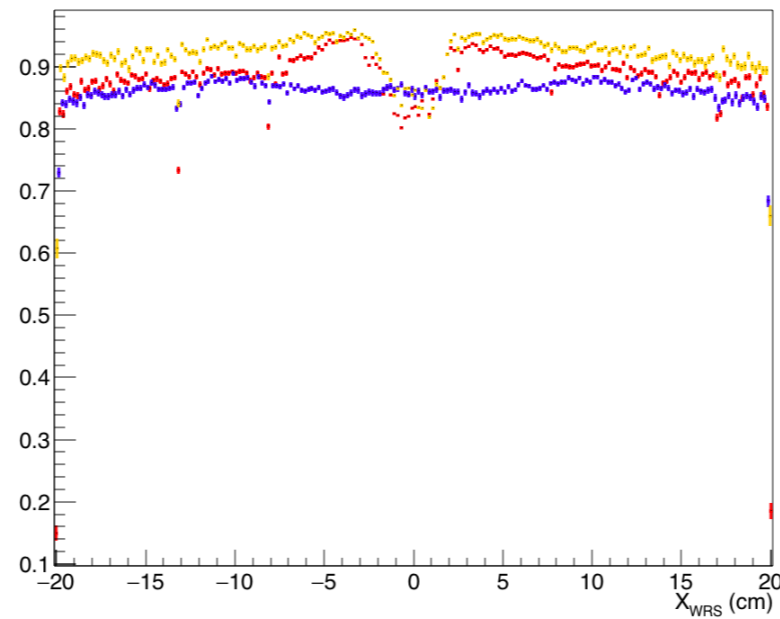
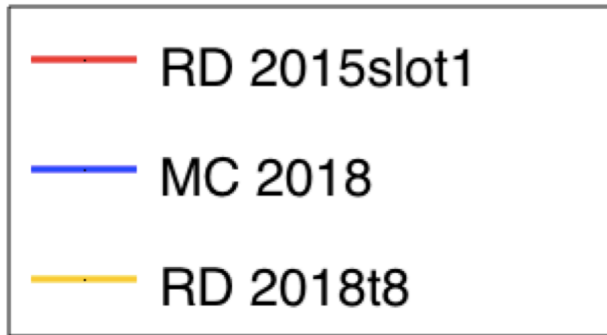
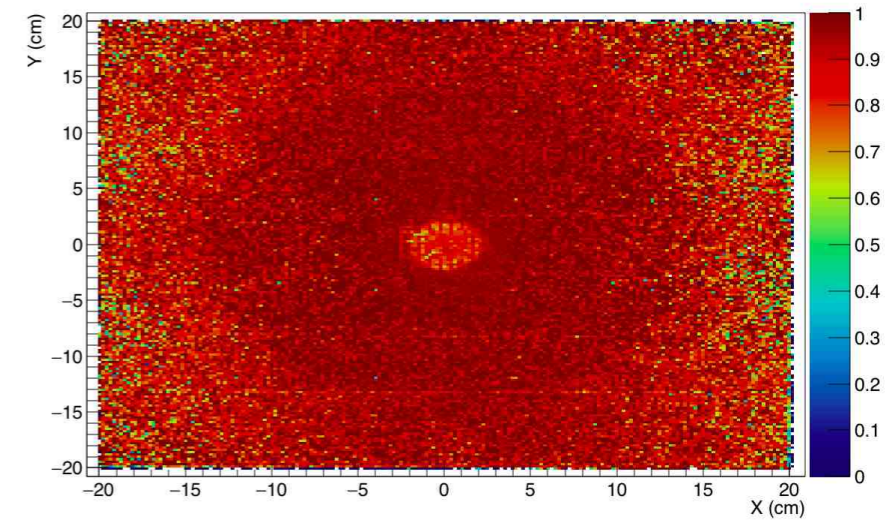
MP01MY-Y1 pseudo-efficiency (Z = 151 cm), mean =  $0.8678 \pm 0.0045$



MP01MY-Y1 pseudo-efficiency (Z = 151 cm), mean =  $0.8664 \pm 0.0075$



MP01MY-Y1 pseudo-efficiency (Z = 151 cm), mean =  $0.9067 \pm 0.0050$



**Problem with thresholds of hits?**

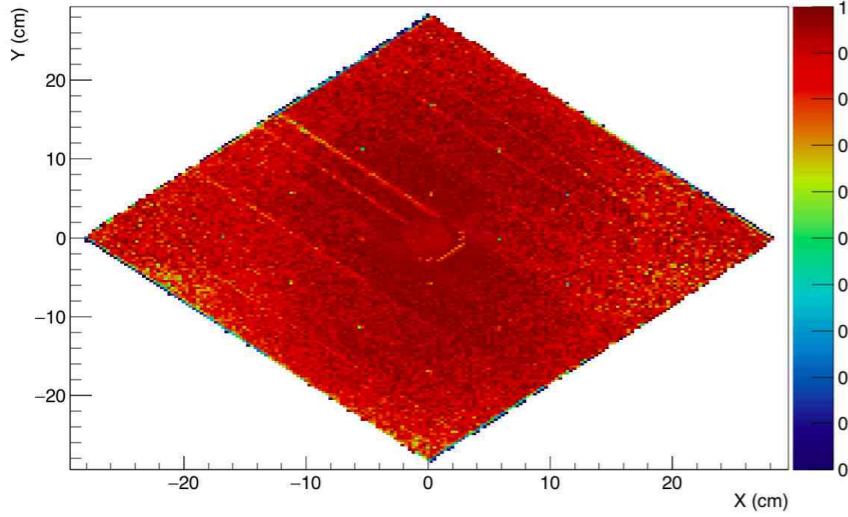
# MP02MU-U1

## 2015slot1RD

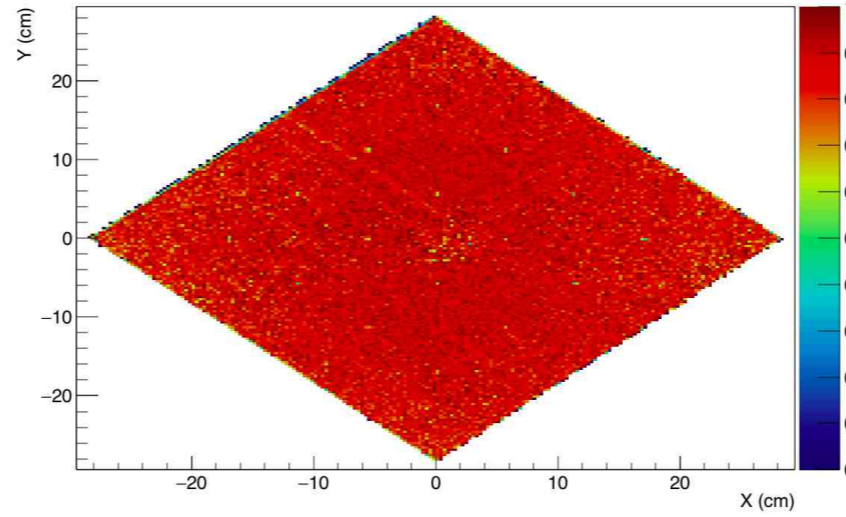
## 2018t8MC

## 2018t8RD

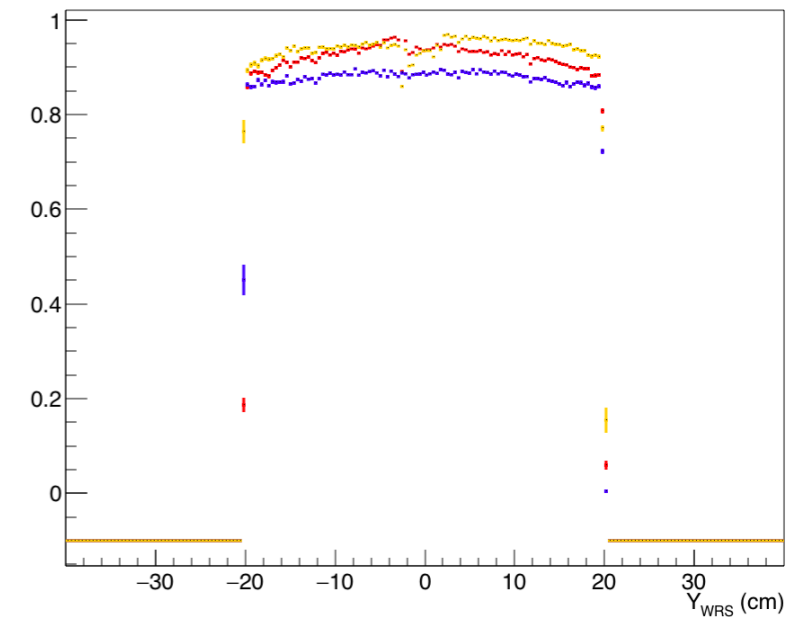
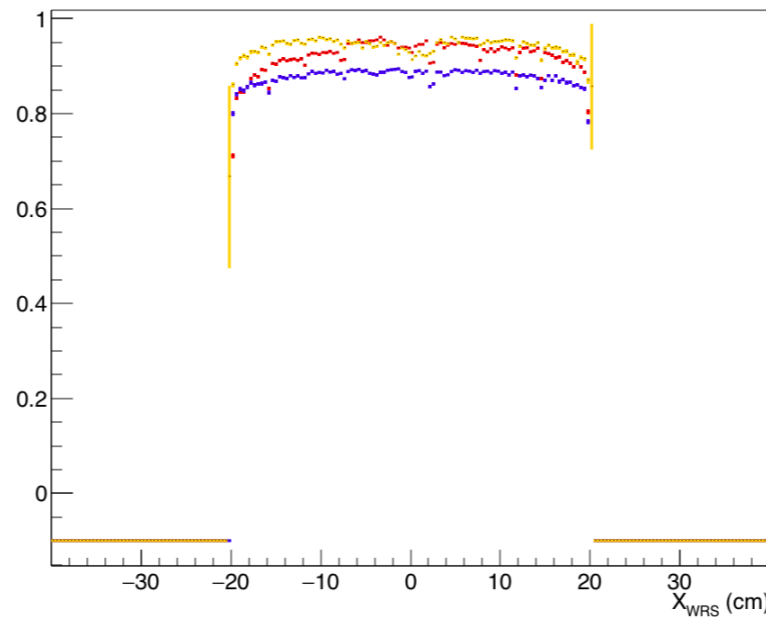
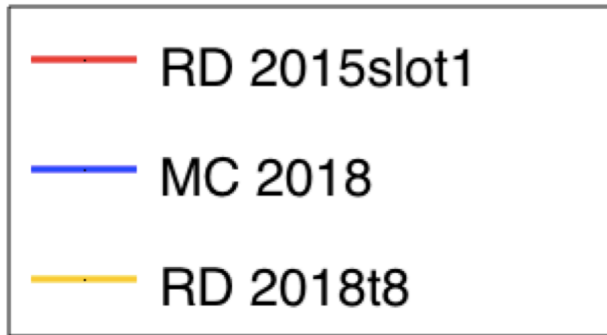
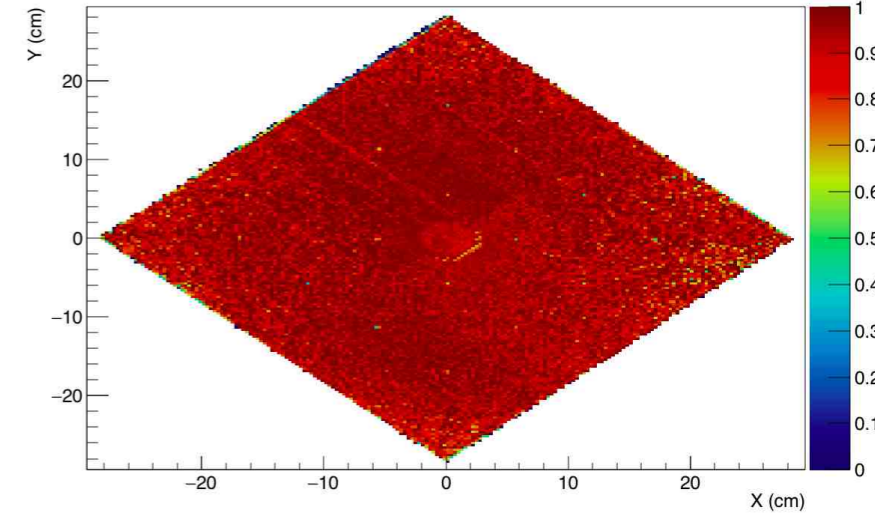
MP02MU-U1 pseudo-efficiency (Z = 192 cm), mean =  $0.9240 \pm 0.0036$



MP02MU-U1 pseudo-efficiency (Z = 192 cm), mean =  $0.8684 \pm 0.0081$



MP02MU-U1 pseudo-efficiency (Z = 192 cm), mean =  $0.9505 \pm 0.0039$



**Problem with thresholds of hits?**

# HG02Y1

## 2015slot1RD

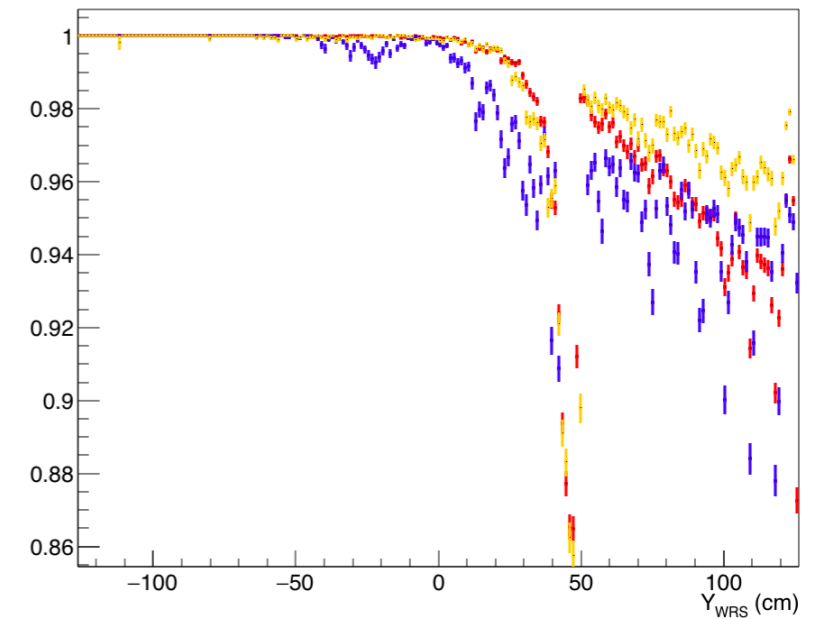
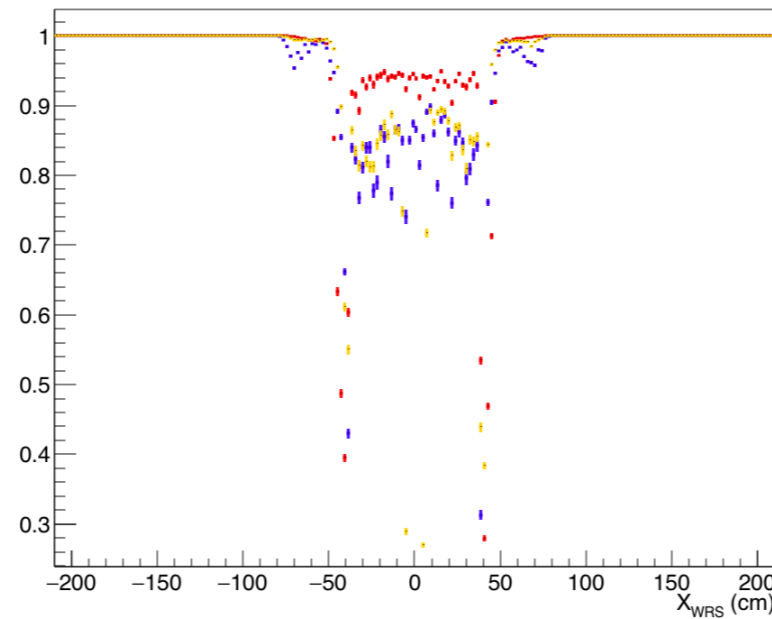
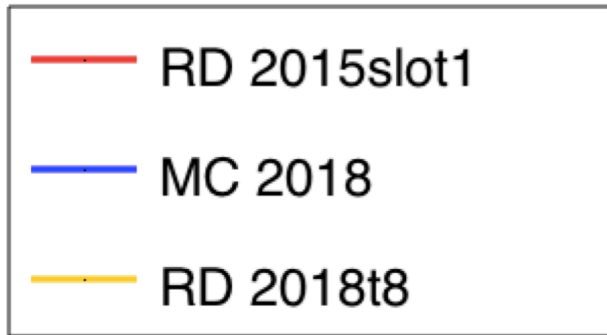
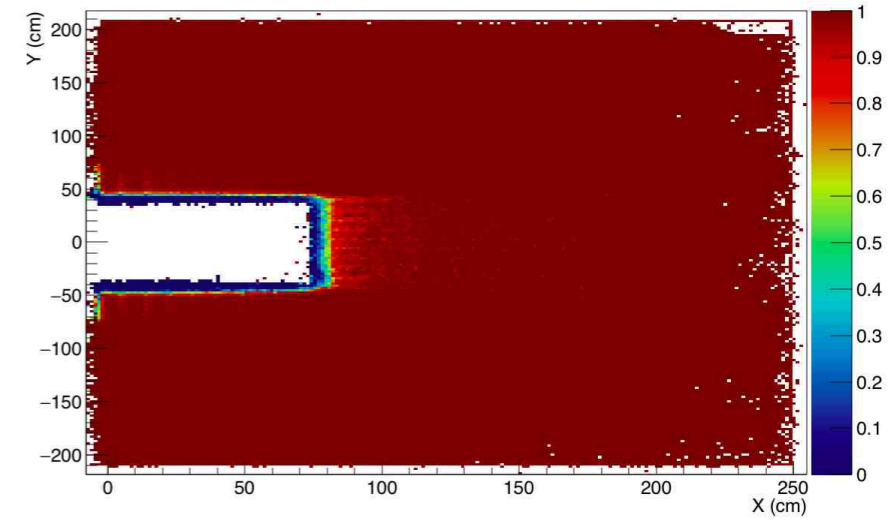
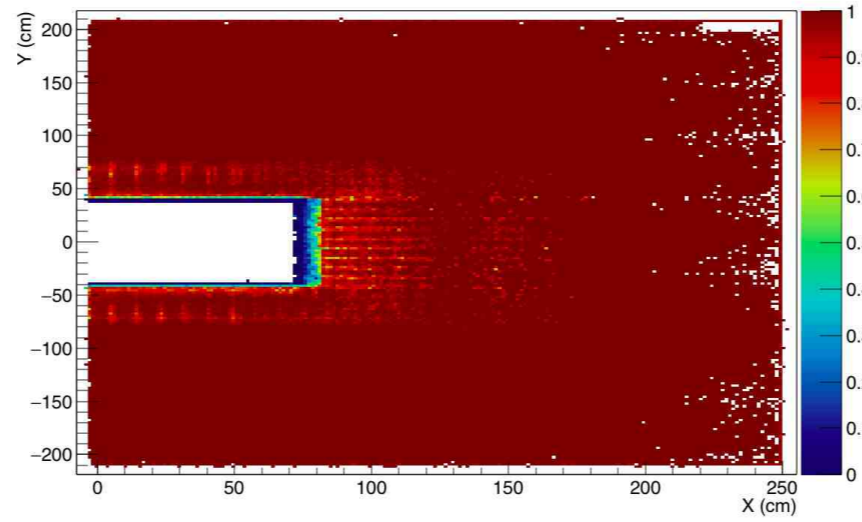
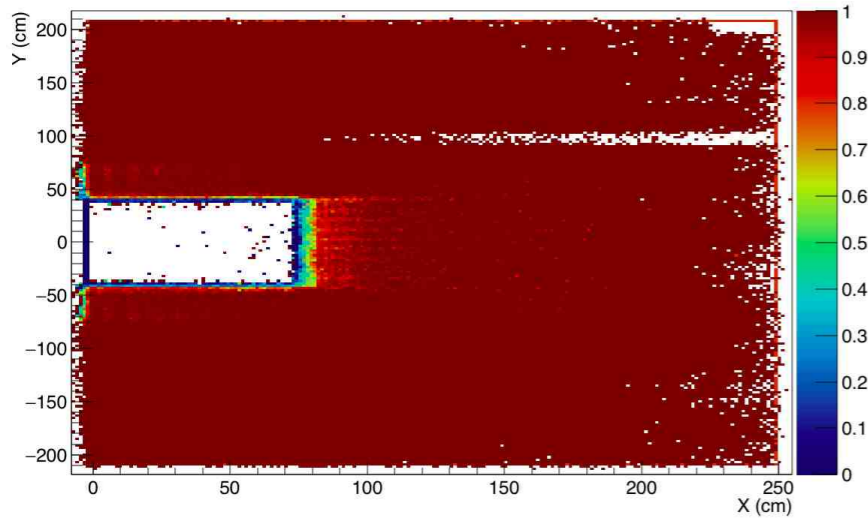
## 2018t8MC

## 2018t8RD

HG02Y1 pseudo-efficiency (Z = 1618 cm), mean =  $0.8113 \pm 0.0094$

HG02Y1 pseudo-efficiency (Z = 1618 cm), mean =  $0.9586 \pm 0.0050$

HG02Y1 pseudo-efficiency (Z = 1613 cm), mean =  $0.9730 \pm 0.0036$

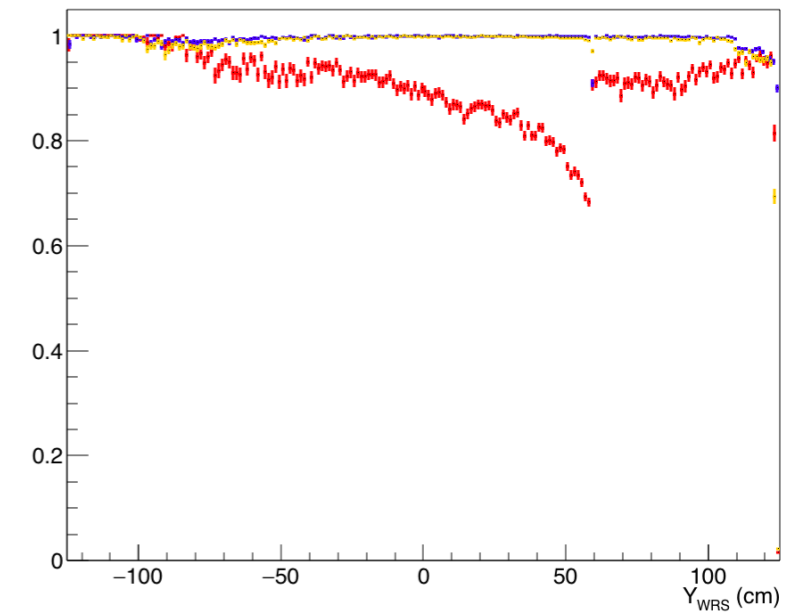
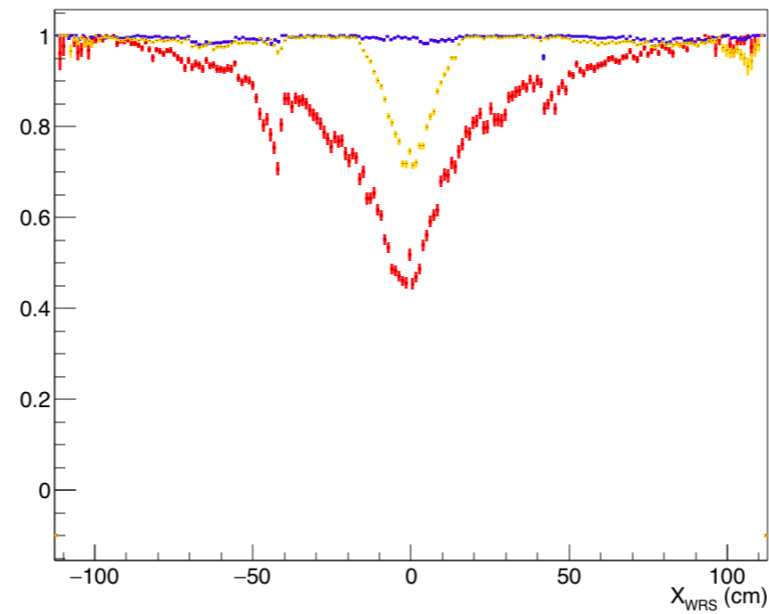
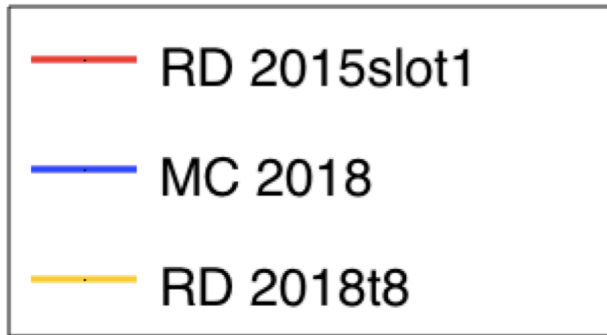
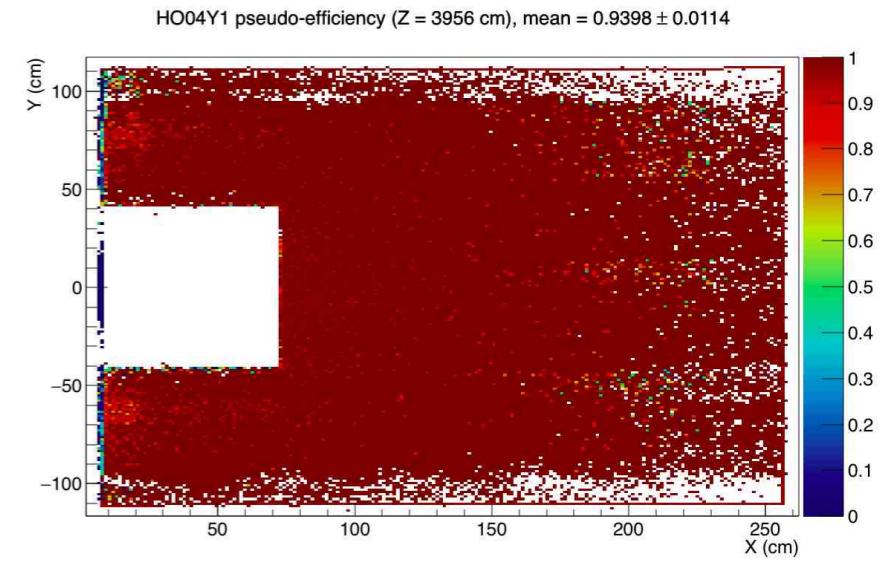
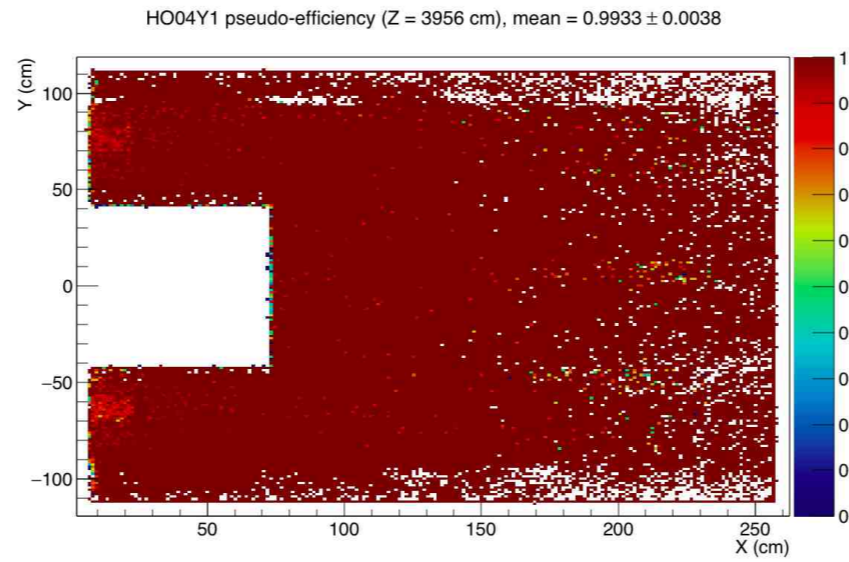
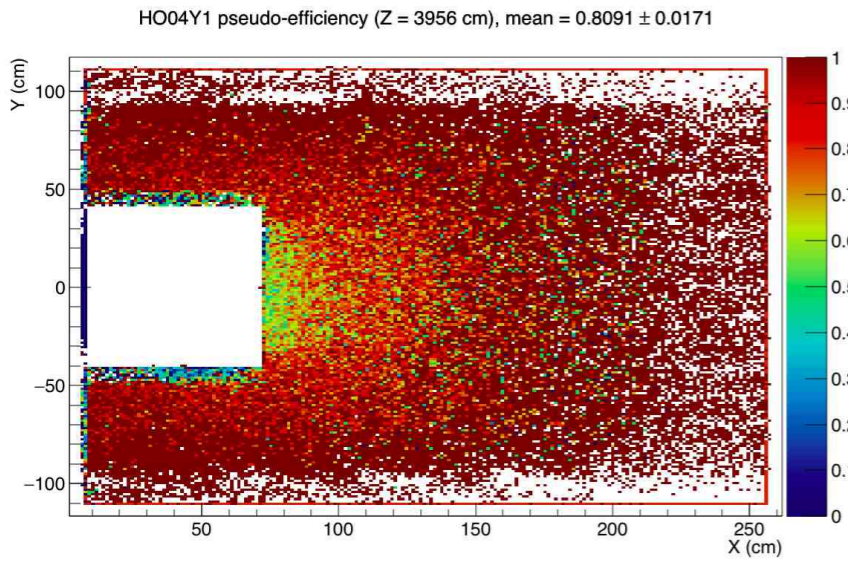


# HO04Y1

## 2015slot1RD

## 2018t8MC

## 2018t8RD

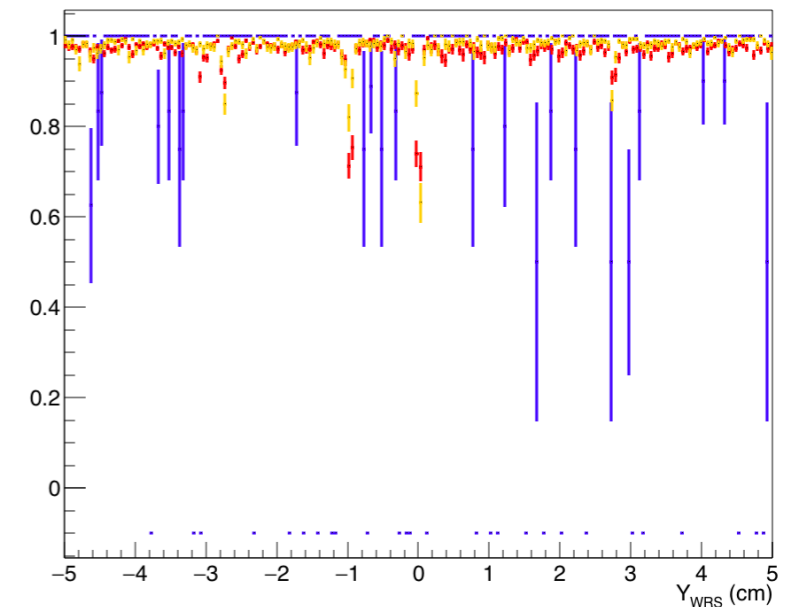
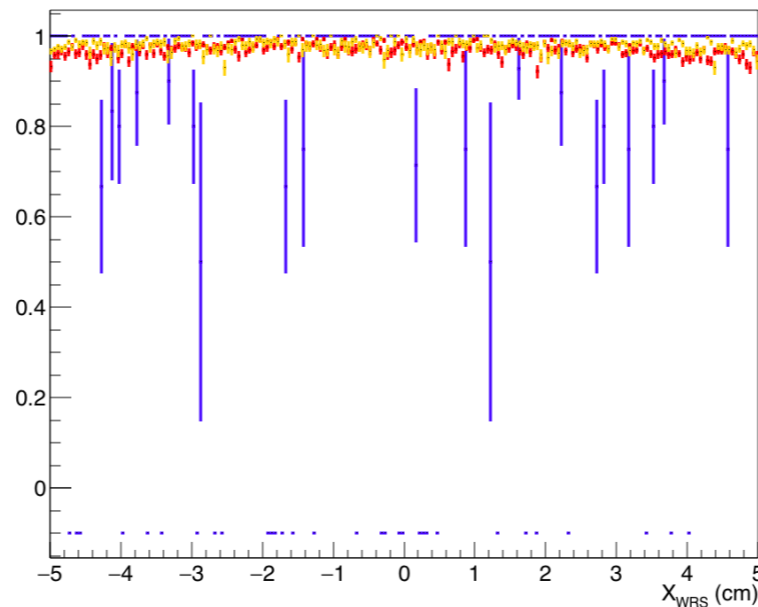
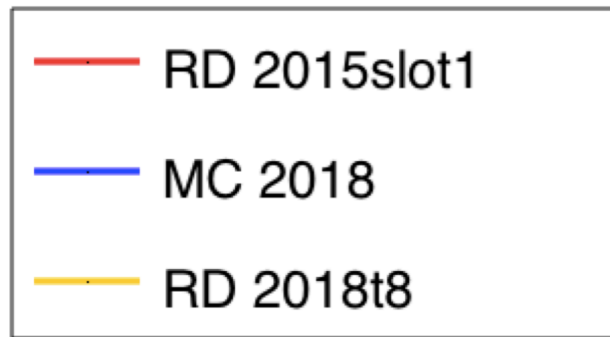
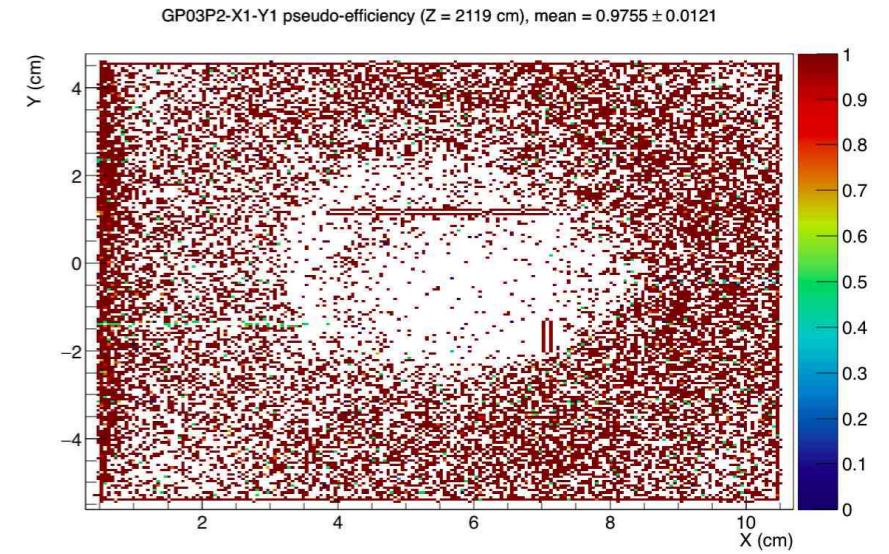
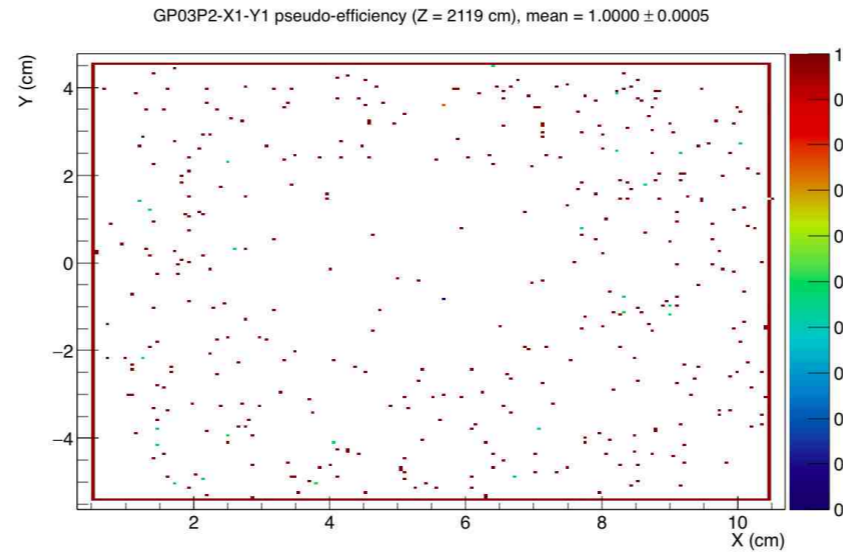
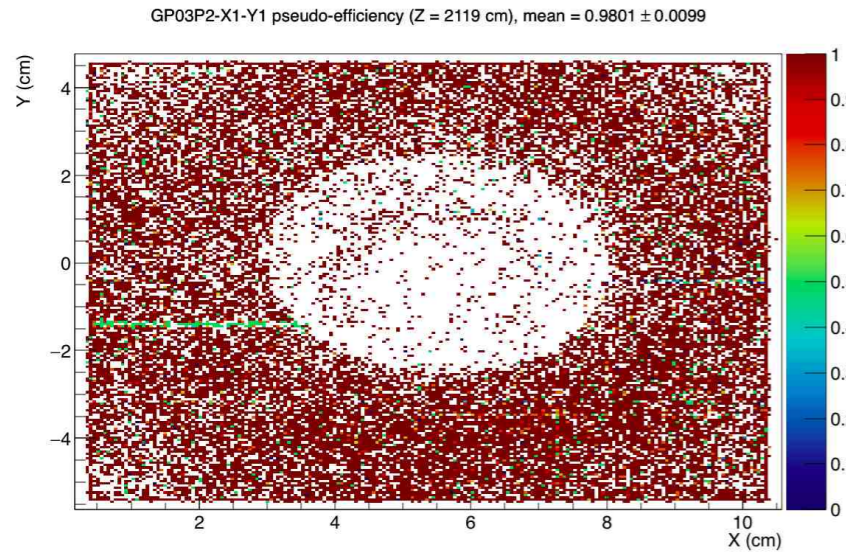


# GP03P2-X1-Y1

## 2015slot1RD

## 2018t8MC

## 2018t8RD



**Seems that mean pseudo-efficiency (=1) is associated to MC.**

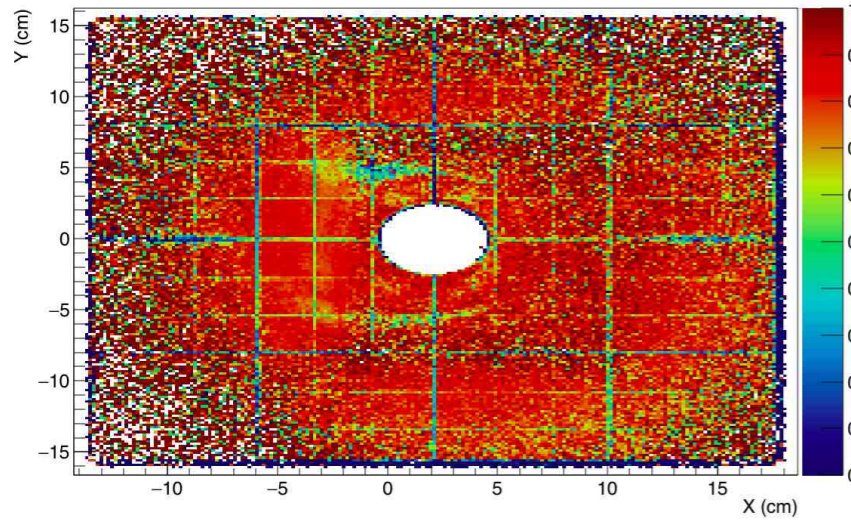
# GM06X1-Y1

2015slot1RD

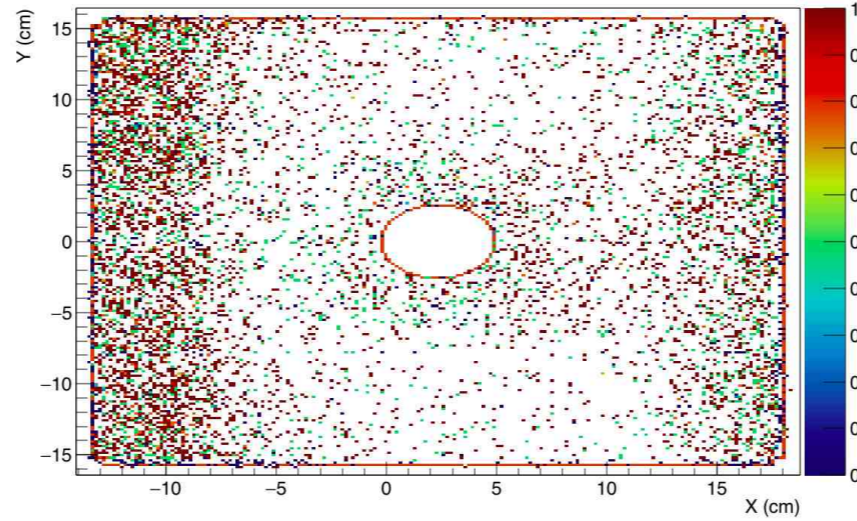
2018t8MC

2018t8RD

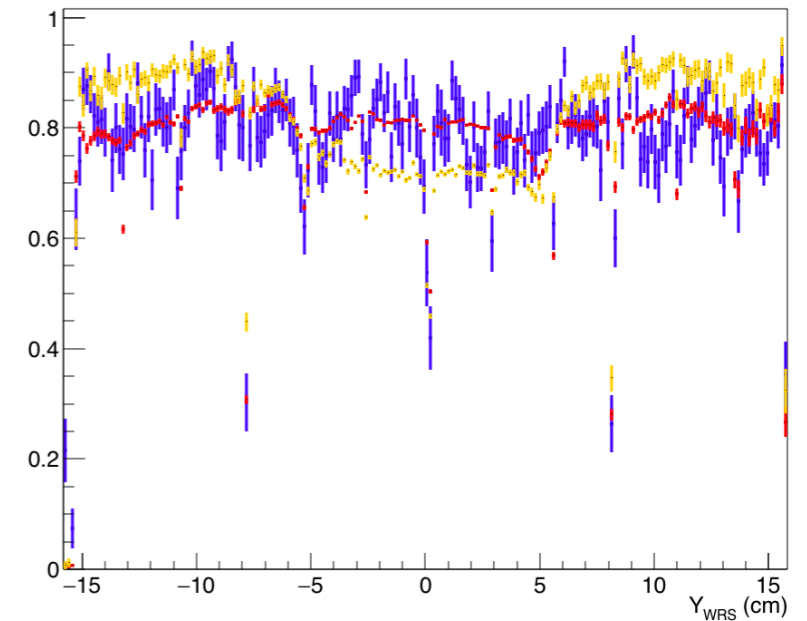
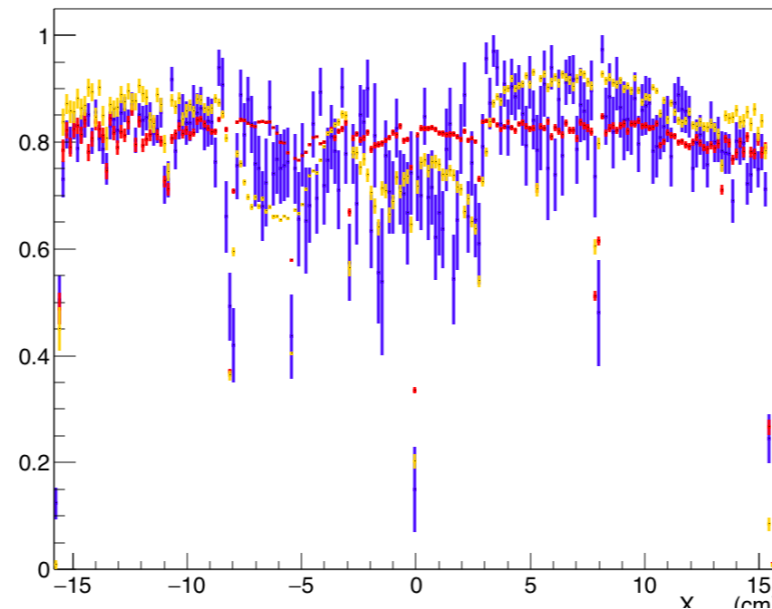
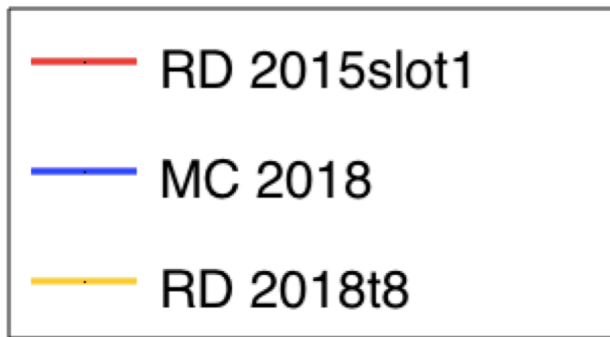
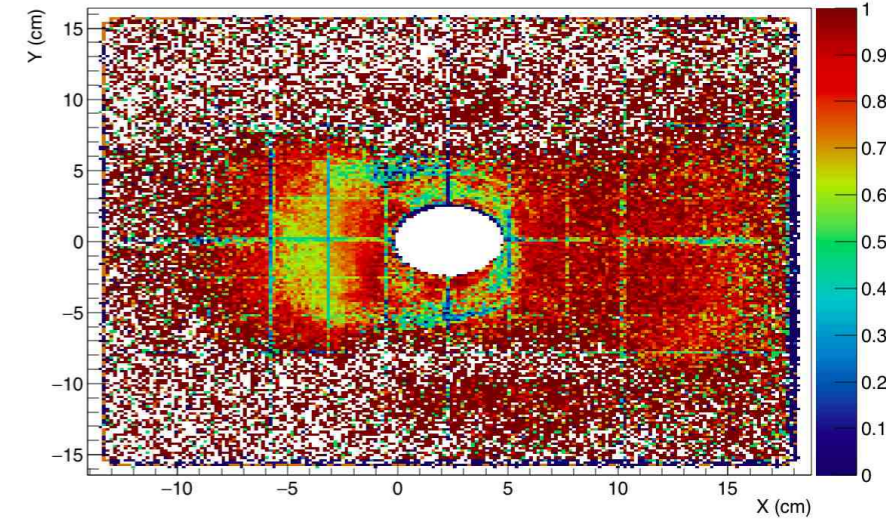
GM06X1-Y1 pseudo-efficiency (Z = 1595 cm), mean =  $0.7550 \pm 0.0064$



GM06X1-Y1 pseudo-efficiency (Z = 1595 cm), mean =  $0.7308 \pm 0.0870$



GM06X1-Y1 pseudo-efficiency (Z = 1595 cm), mean =  $0.7394 \pm 0.0090$



Empty psEfts of MC data are in other GEMs(GM04 - GM10)

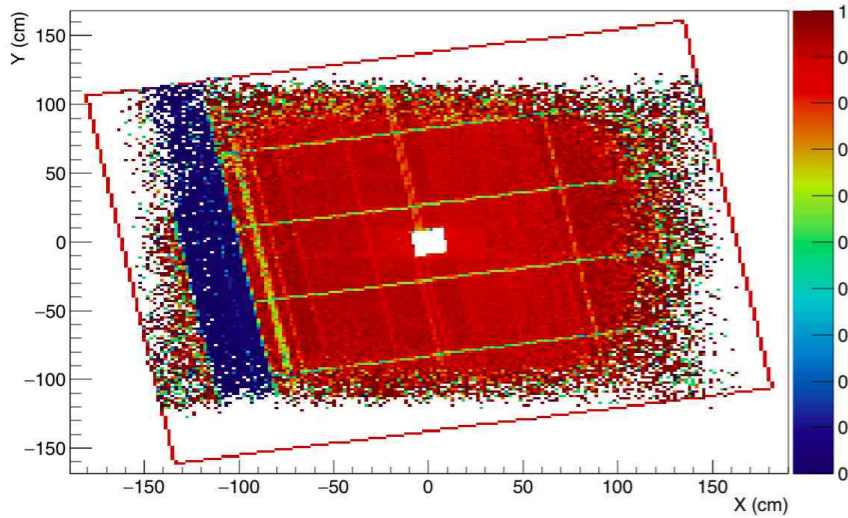
# ST03U1

## 2015slot1RD

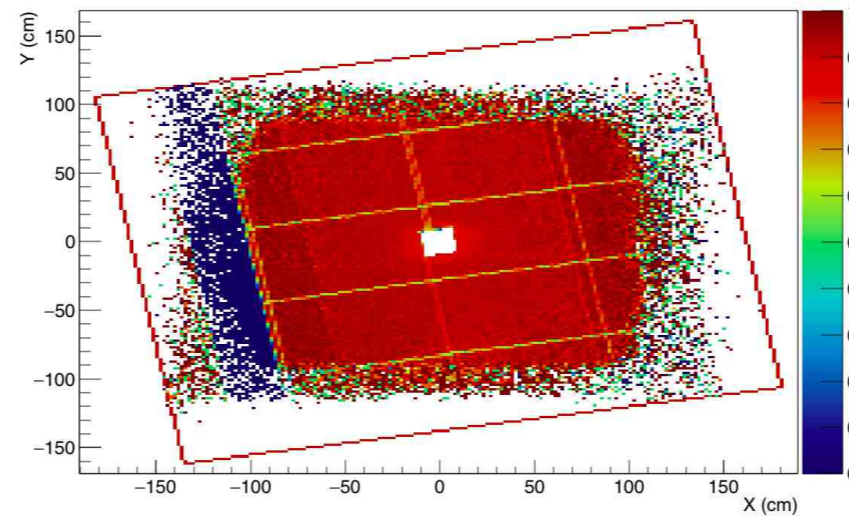
## 2018t8MC

## 2018t8RD

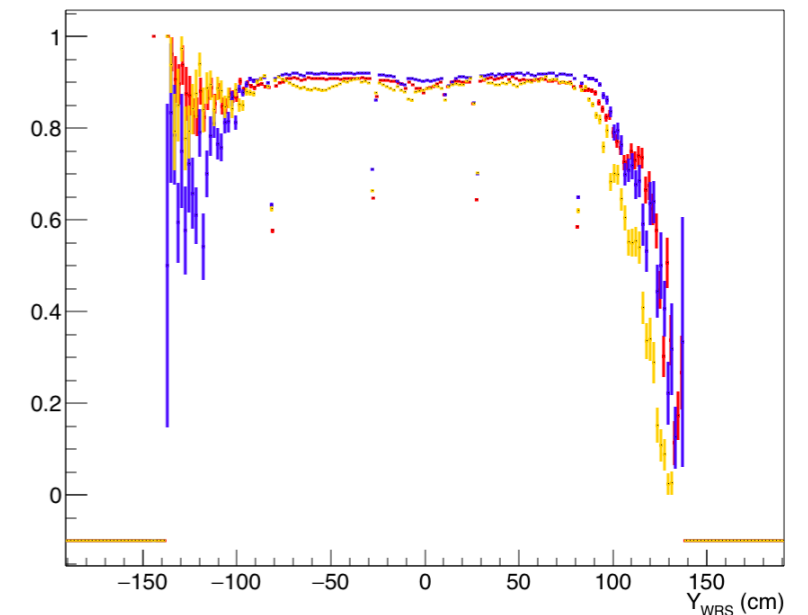
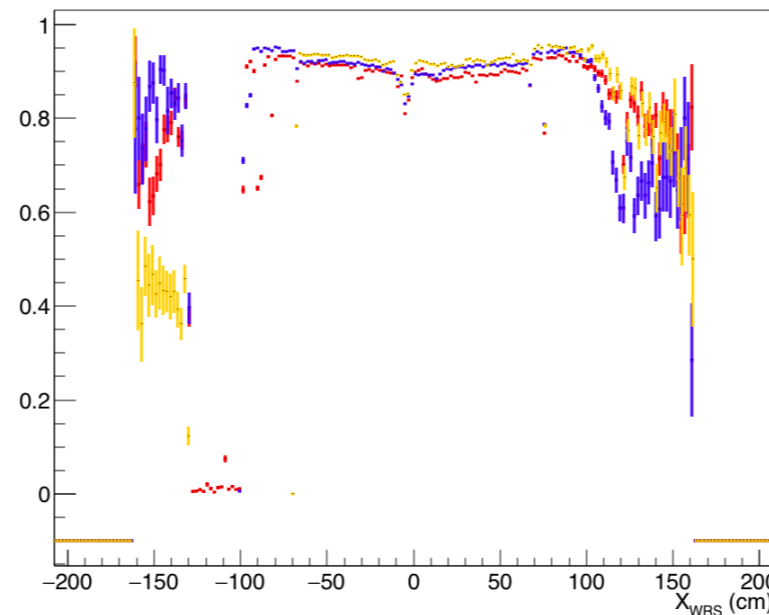
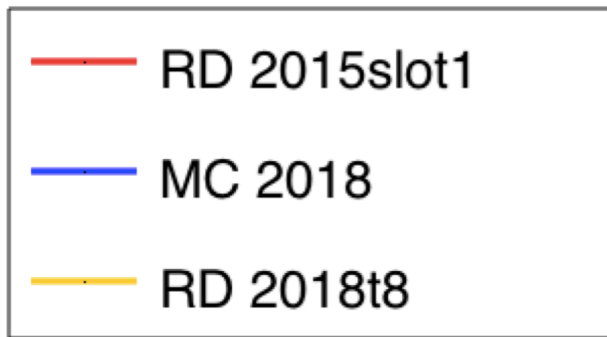
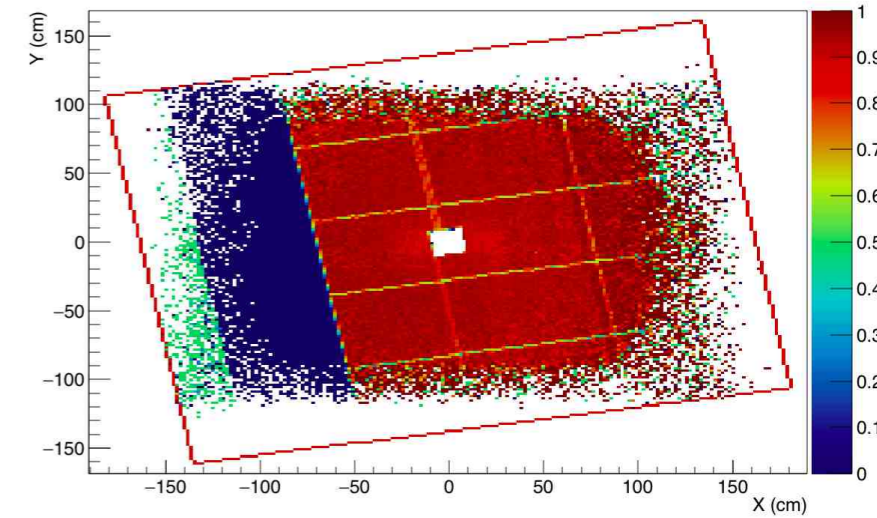
ST03U1 pseudo-efficiency (Z = 544 cm), mean =  $0.8877 \pm 0.0029$



ST03U1 pseudo-efficiency (Z = 543 cm), mean =  $0.8959 \pm 0.0035$



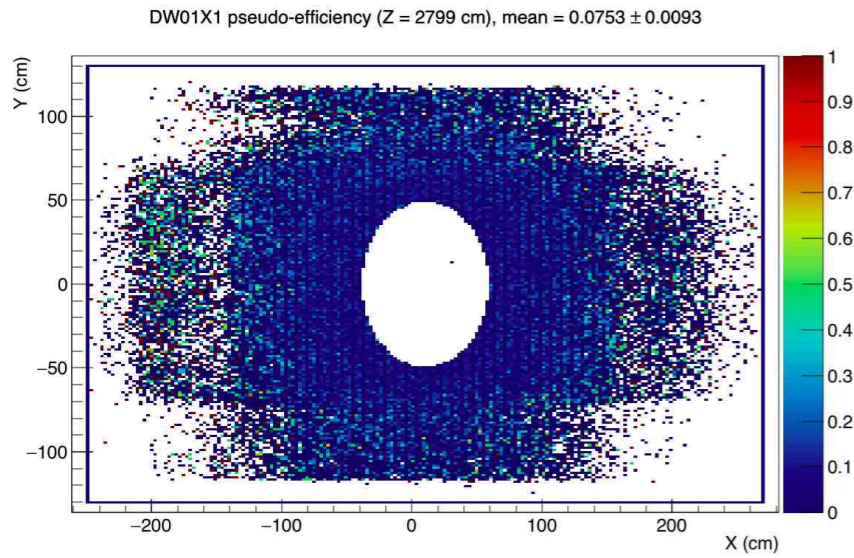
ST03U1 pseudo-efficiency (Z = 543 cm), mean =  $0.8883 \pm 0.0035$



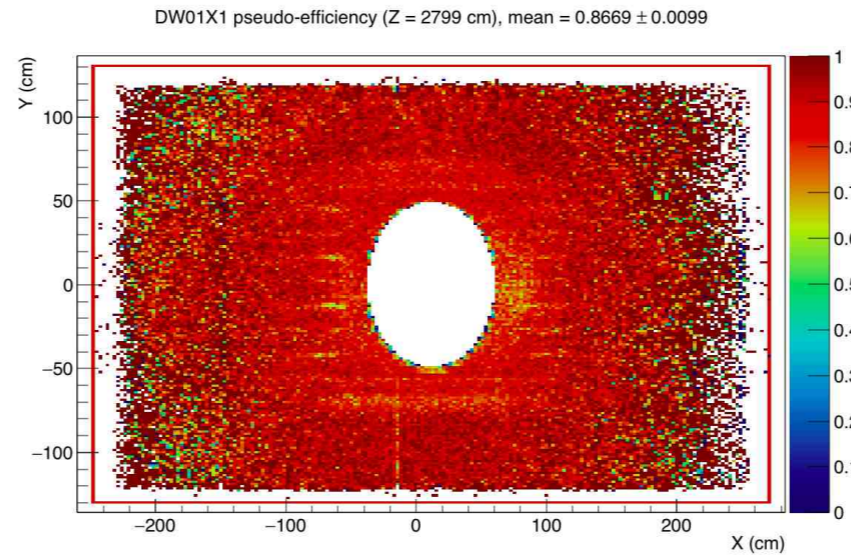
**Inactive area is smaller in MC than in 2018RD. Incorrect application of efficiency?**

# DW01X1

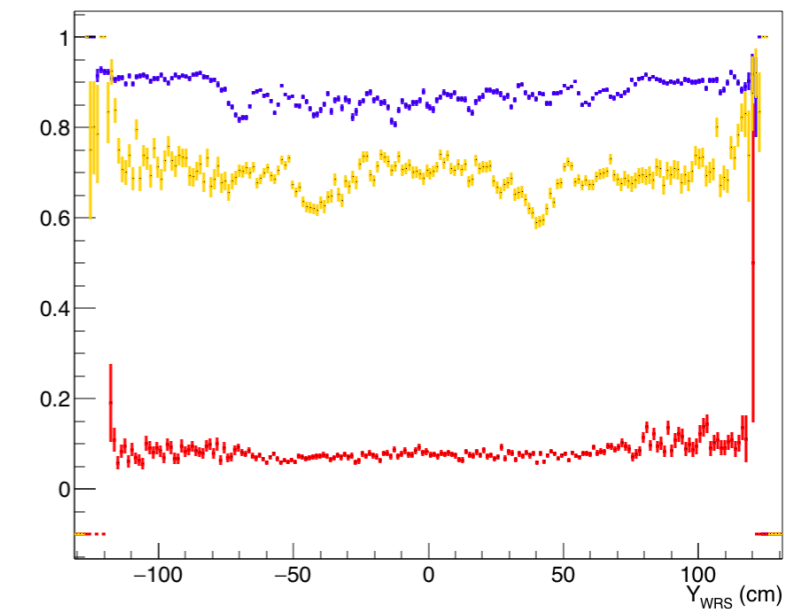
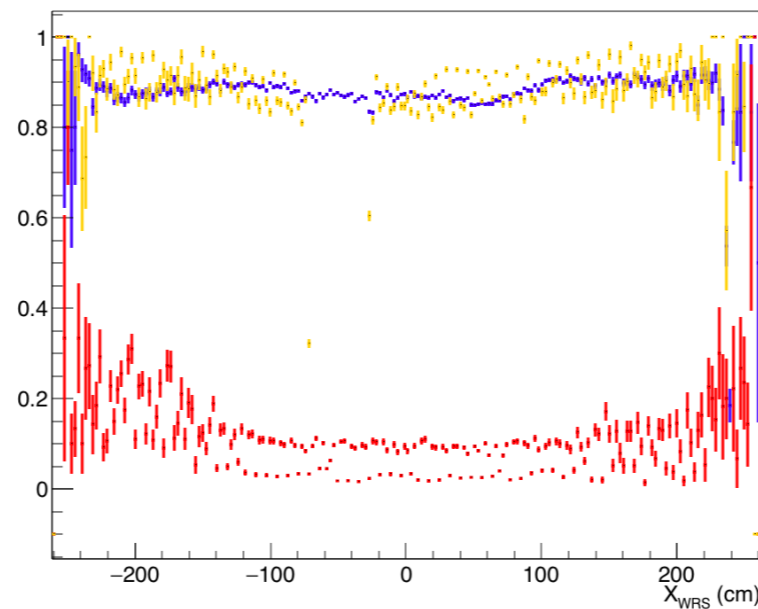
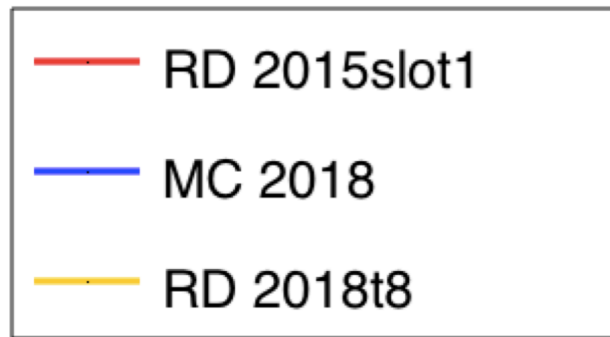
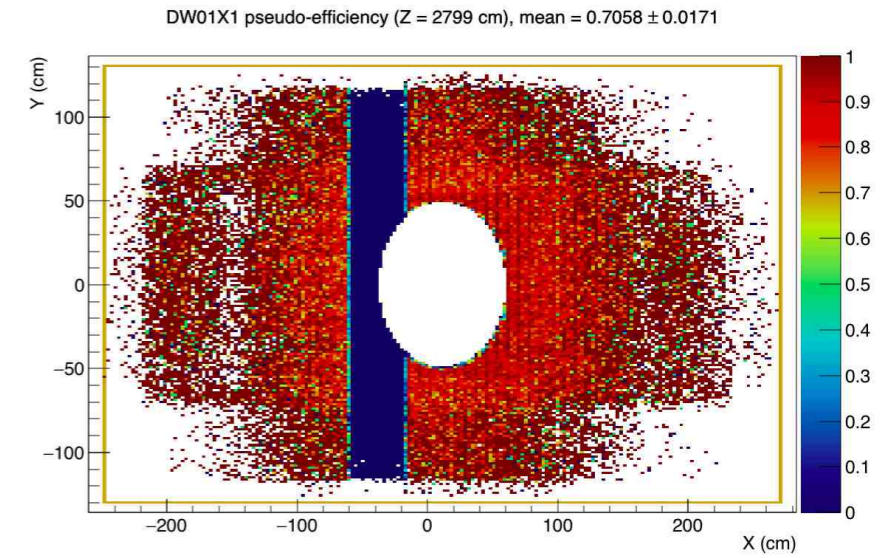
## 2015slot1RD



## 2018t8MC



## 2018t8RD



**Inactive area is not present in MC**



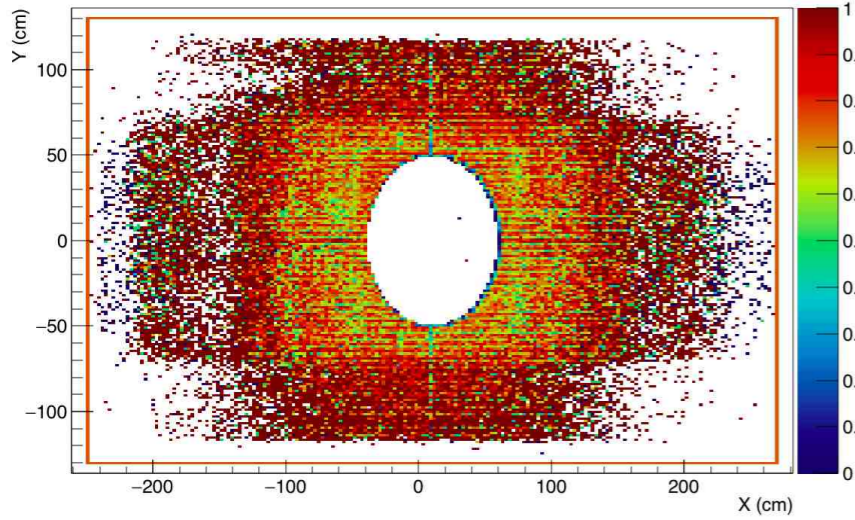
# DW01Y1

## 2015slot1RD

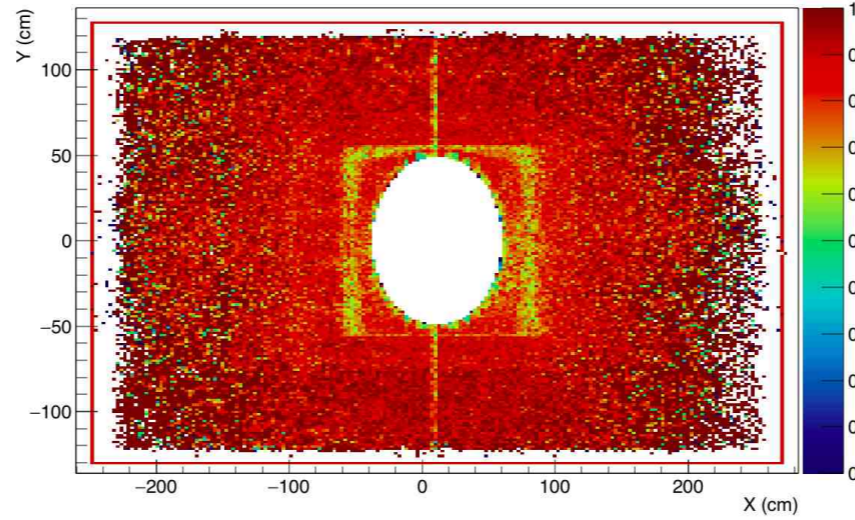
## 2018t8MC

## 2018t8RD

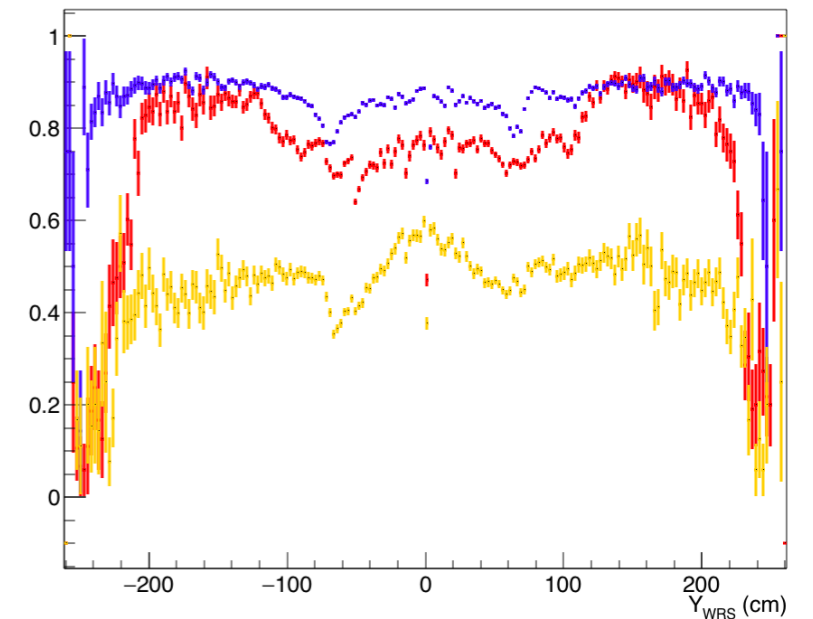
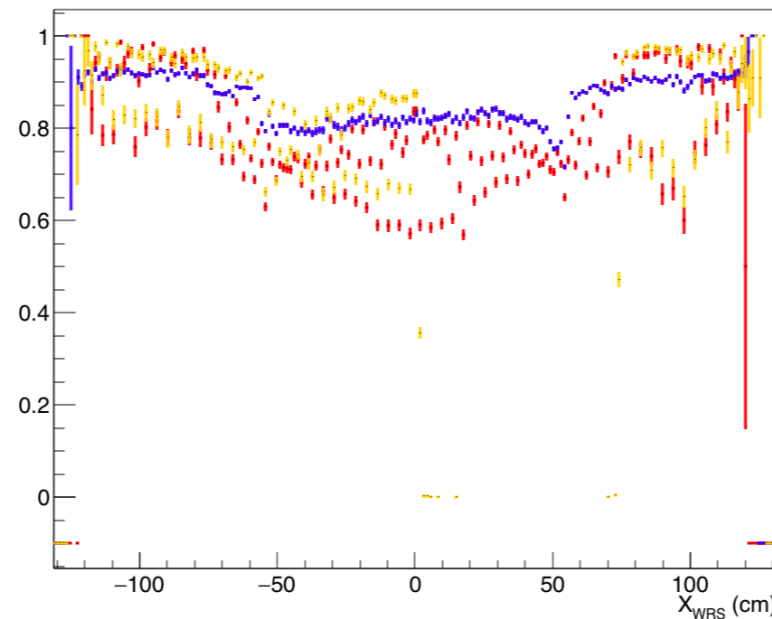
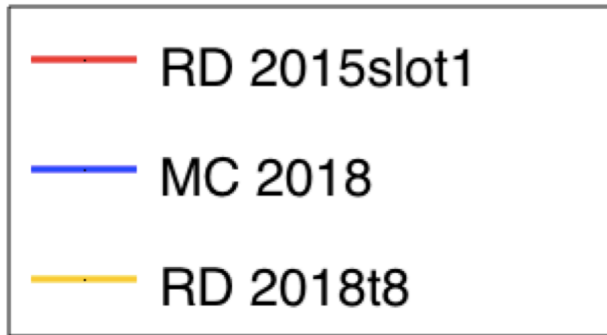
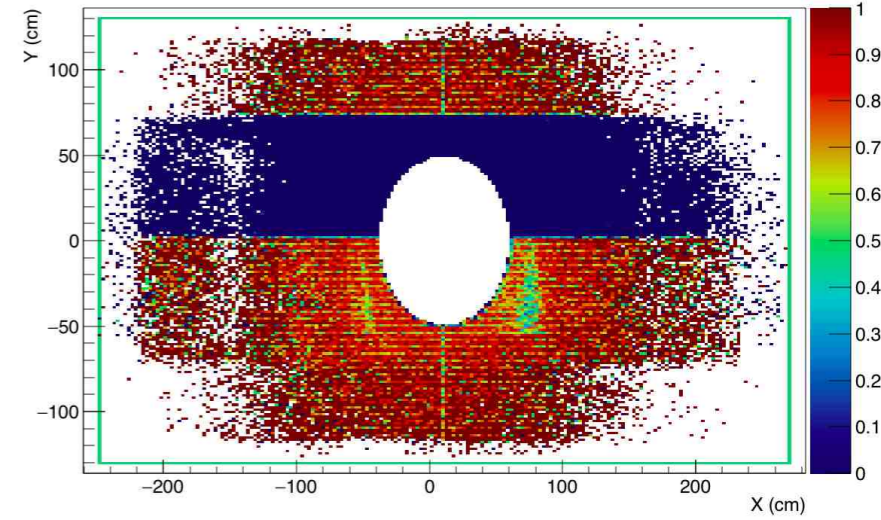
DW01Y1 pseudo-efficiency (Z = 2805 cm), mean =  $0.7572 \pm 0.0152$



DW01Y1 pseudo-efficiency (Z = 2805 cm), mean =  $0.8402 \pm 0.0106$



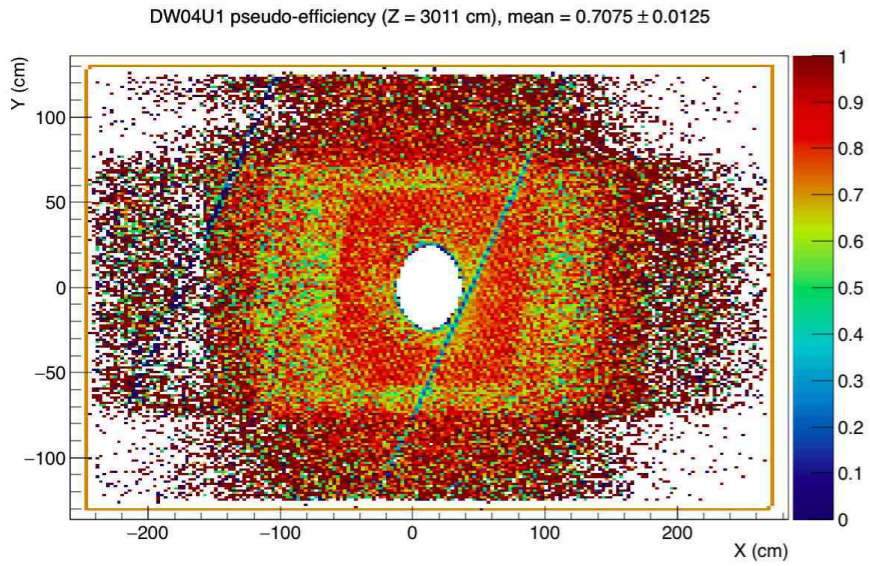
DW01Y1 pseudo-efficiency (Z = 2805 cm), mean =  $0.4979 \pm 0.0187$



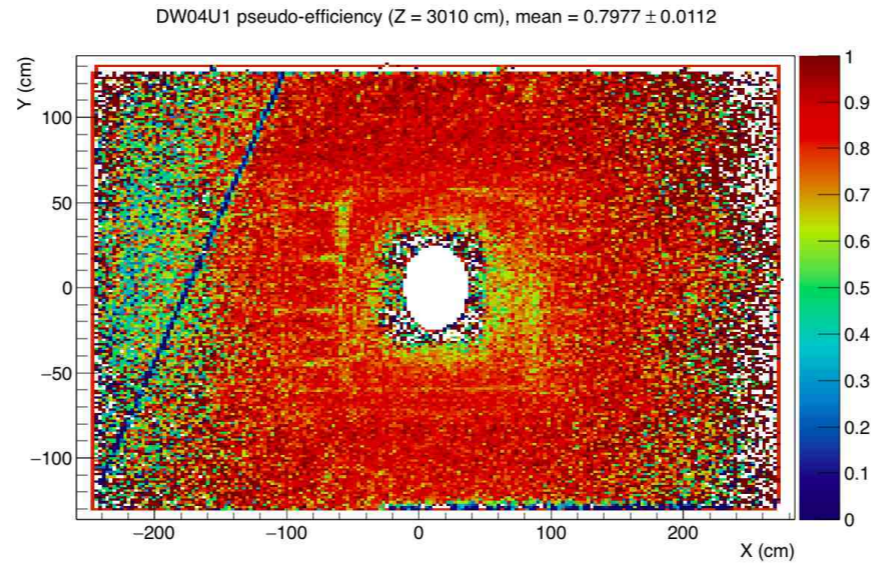
**Inactive area is not present in MC**

# DW04U1

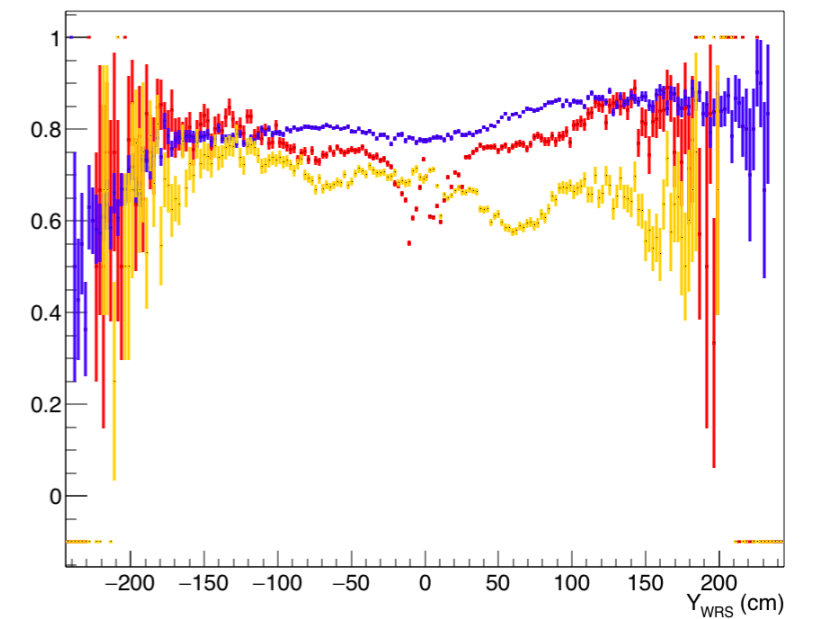
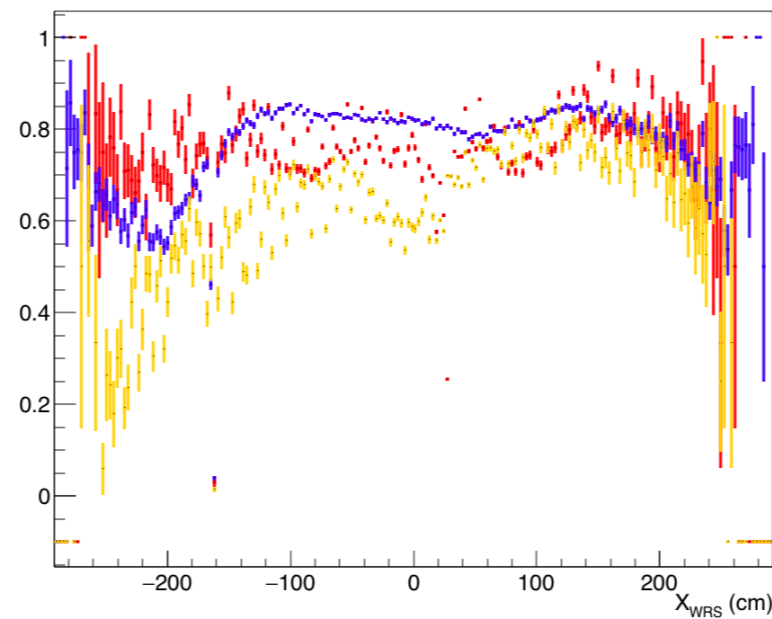
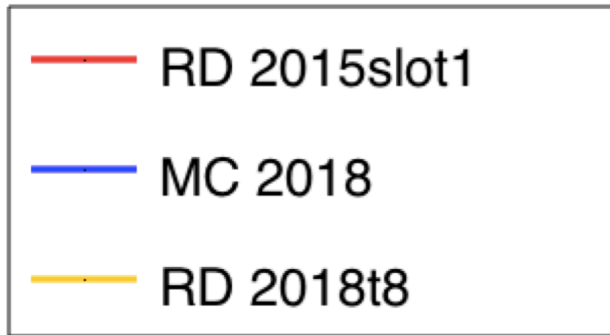
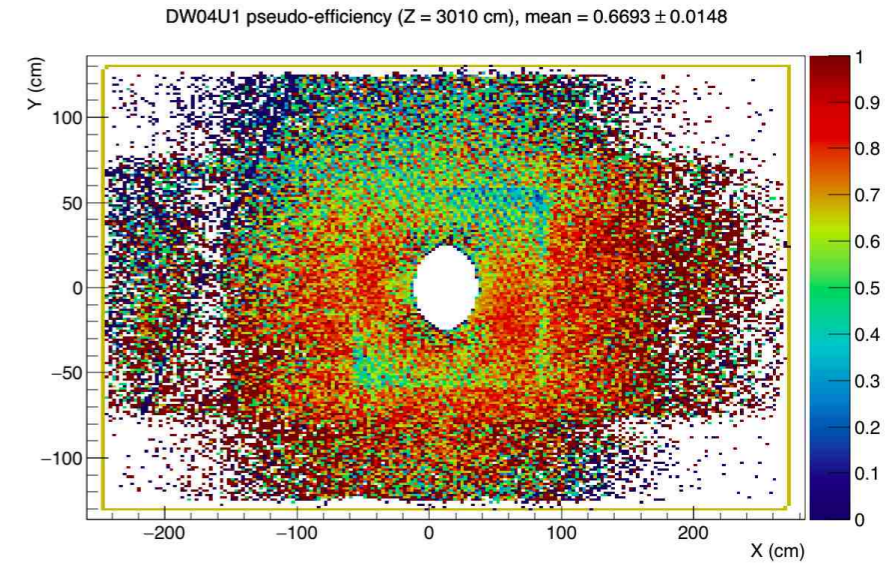
## 2015slot1RD



## 2018t8MC



## 2018t8RD



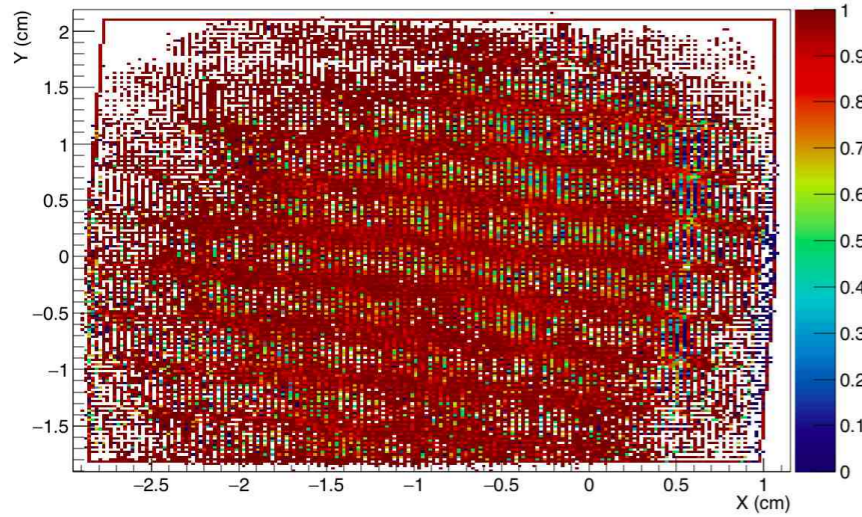
# FI01X1

## 2015slot1RD

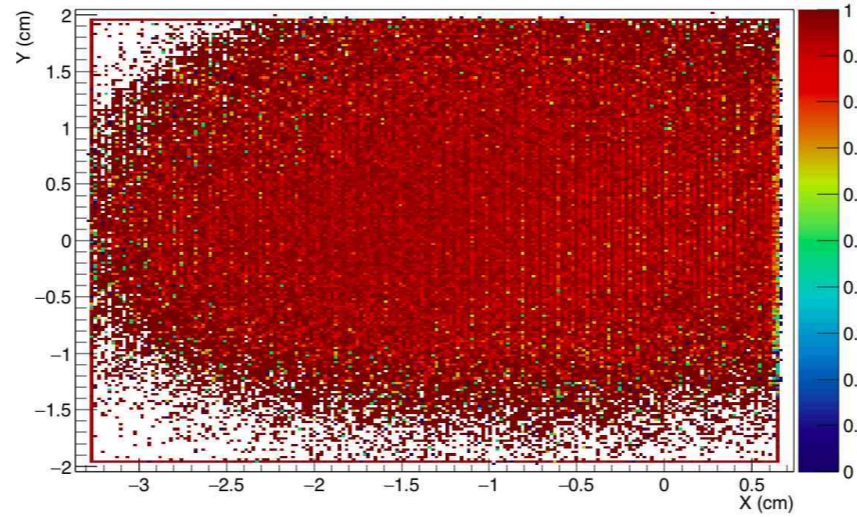
## 2018t8MC

## 2018t8RD

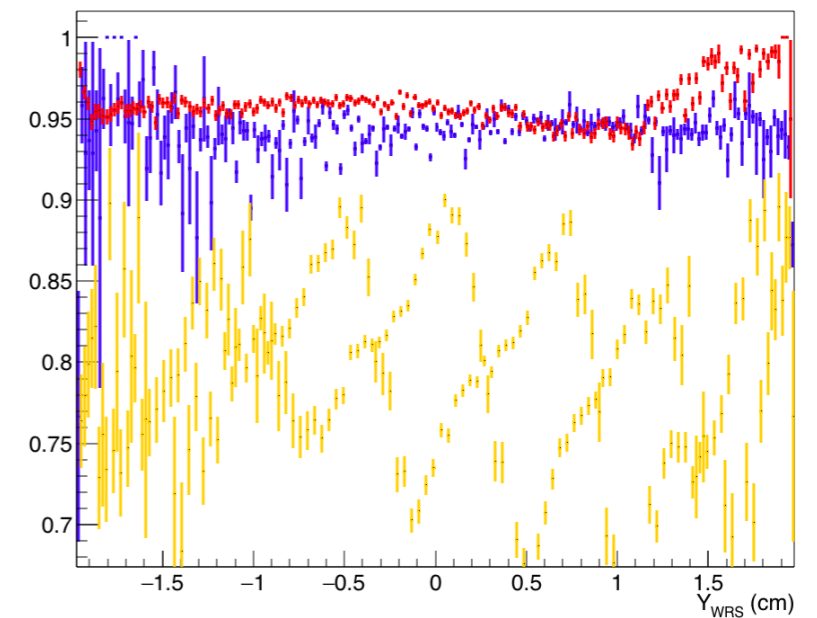
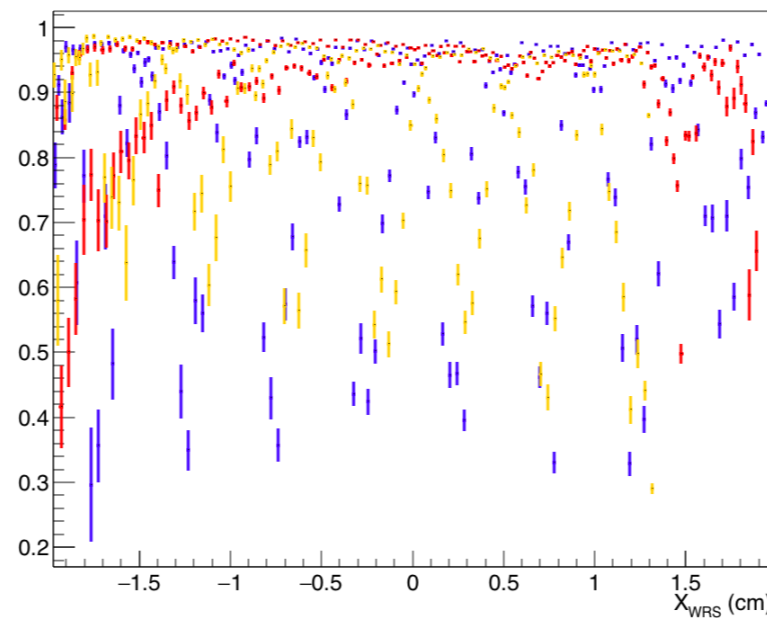
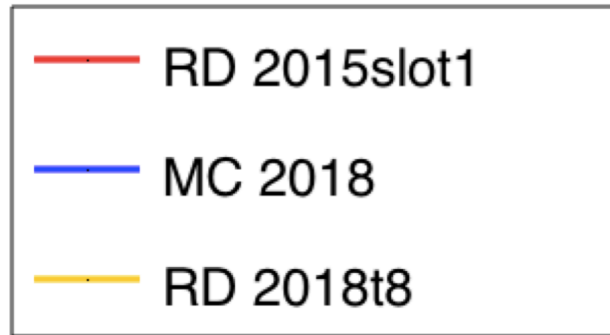
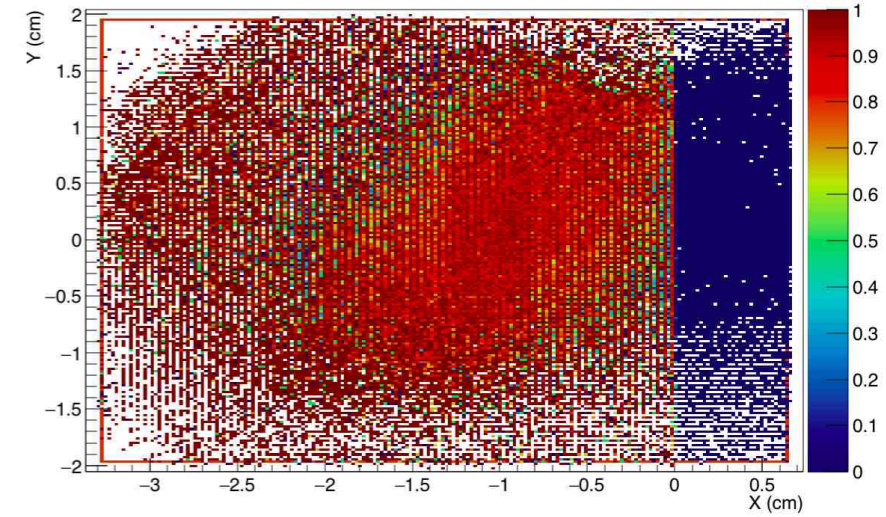
FI01X1 pseudo-efficiency (Z = -748 cm), mean =  $0.9575 \pm 0.0037$



FI01X1 pseudo-efficiency (Z = -760 cm), mean =  $0.9384 \pm 0.0057$



FI01X1 pseudo-efficiency (Z = -760 cm), mean =  $0.7863 \pm 0.0089$



**Inactive area is not present in MC**

# FI04Y1

## 2015slot1RD

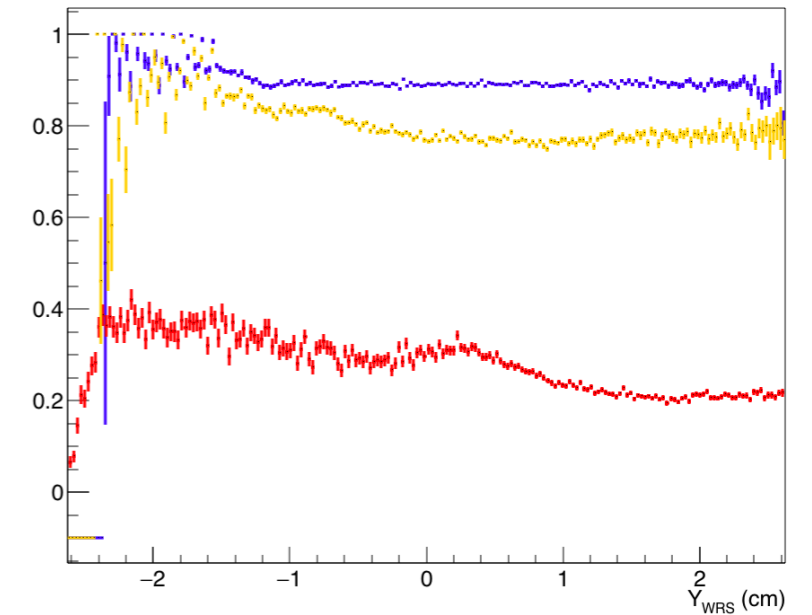
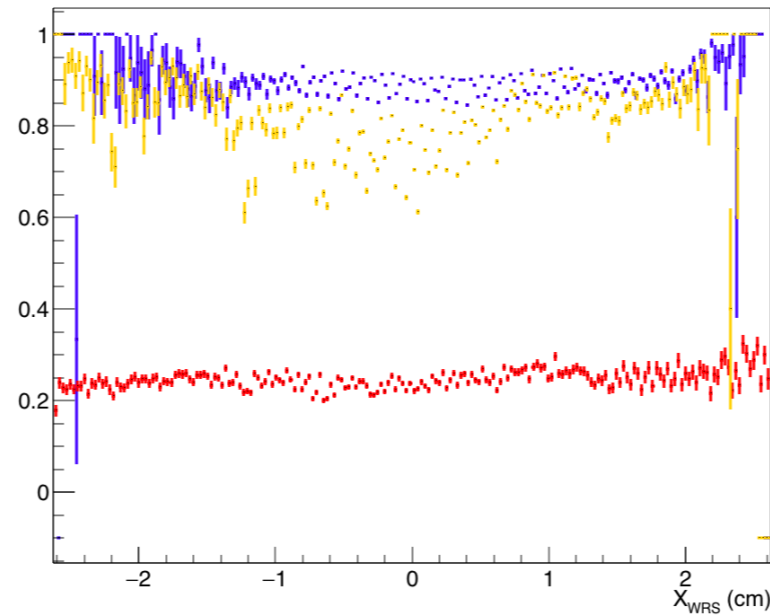
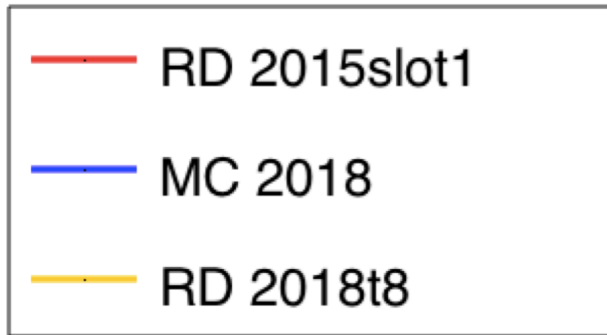
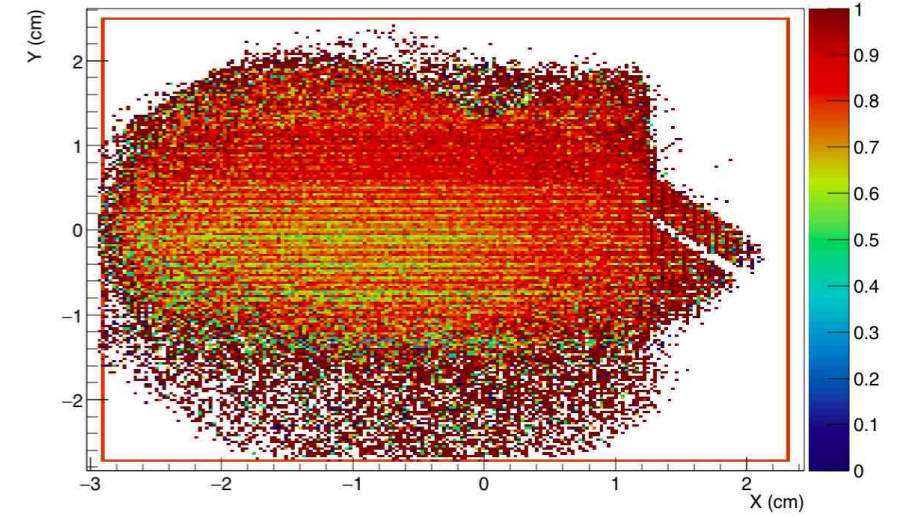
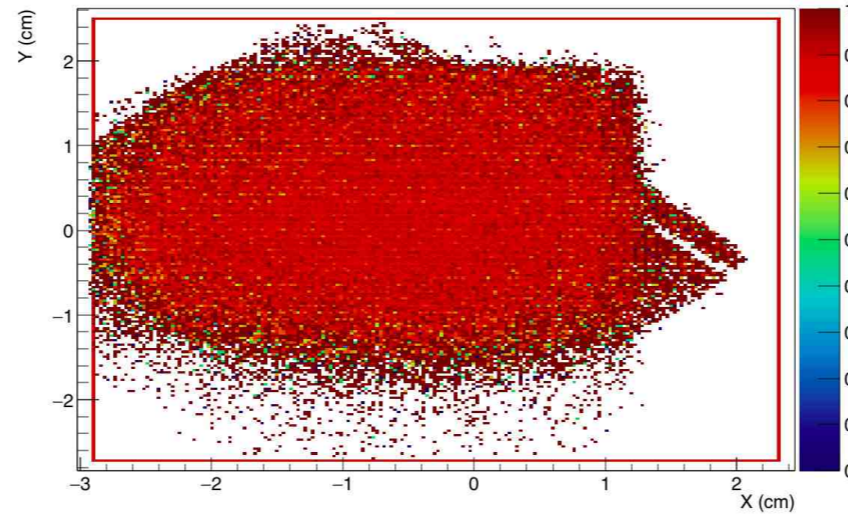
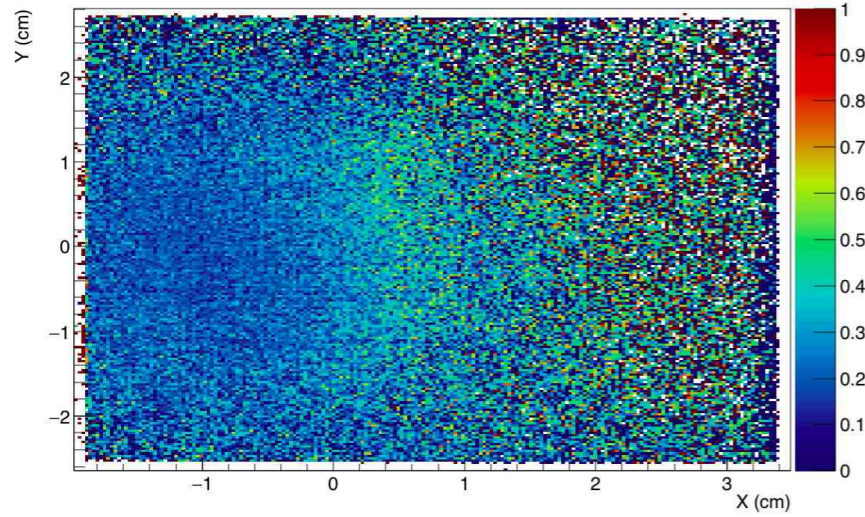
## 2018t8MC

## 2018t8RD

FI04Y1 pseudo-efficiency ( $Z = 214$  cm), mean =  $0.2455 \pm 0.0107$

FI04Y1 pseudo-efficiency ( $Z = -561$  cm), mean =  $0.8953 \pm 0.0071$

FI04Y1 pseudo-efficiency ( $Z = -561$  cm), mean =  $0.8021 \pm 0.0084$



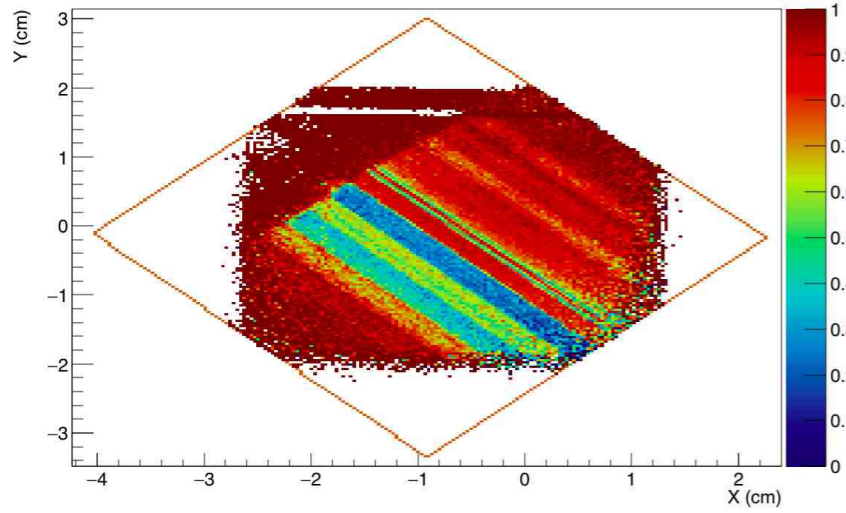
# F15U1

## 2015slot1RD

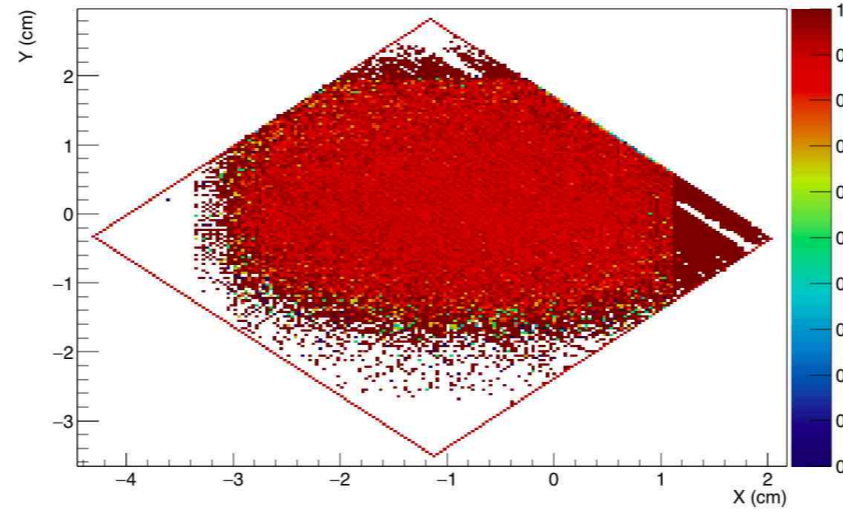
## 2018t8MC

## 2018t8RD

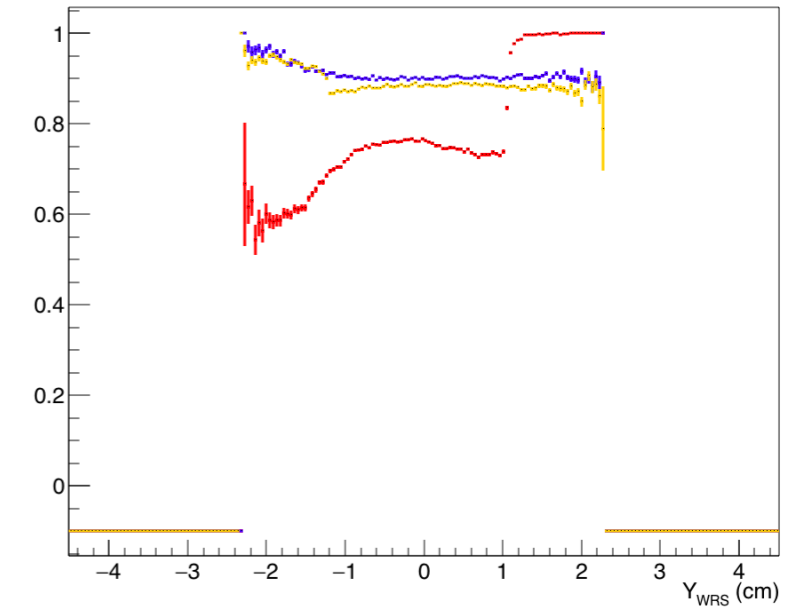
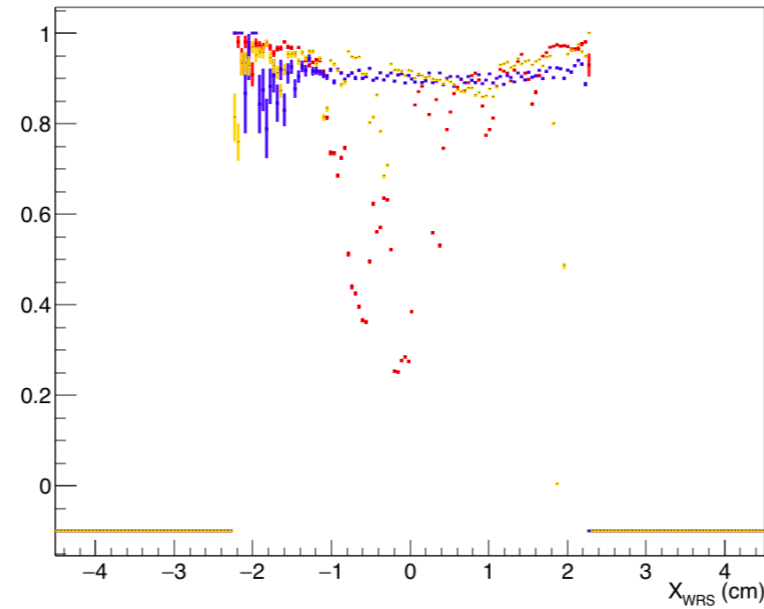
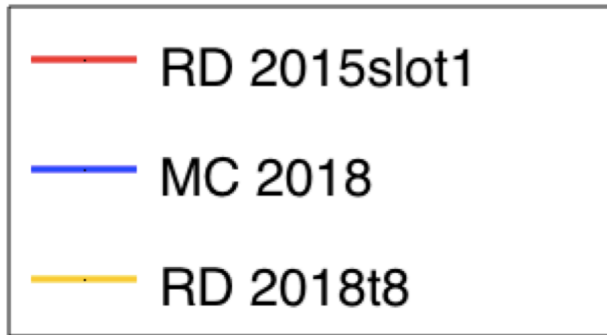
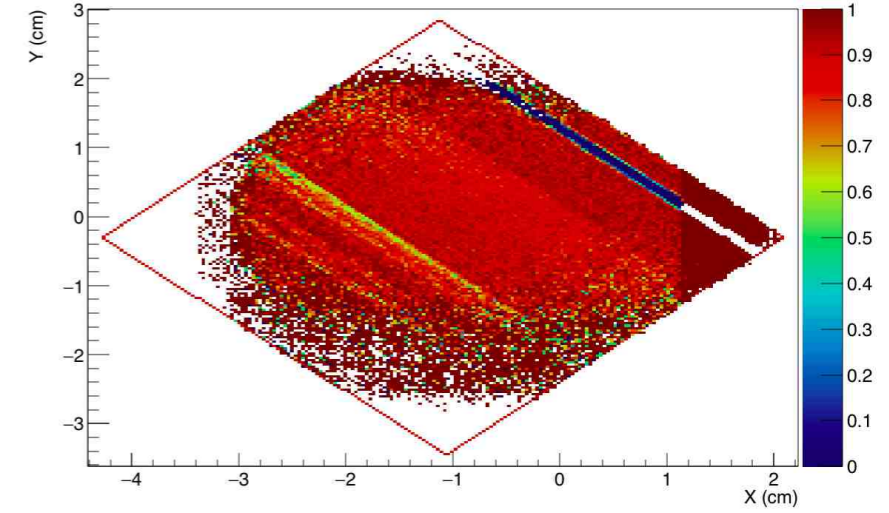
F15U1 pseudo-efficiency (Z = -626 cm), mean =  $0.8218 \pm 0.0070$



F15U1 pseudo-efficiency (Z = -627 cm), mean =  $0.8930 \pm 0.0073$



F15U1 pseudo-efficiency (Z = -627 cm), mean =  $0.8849 \pm 0.0068$



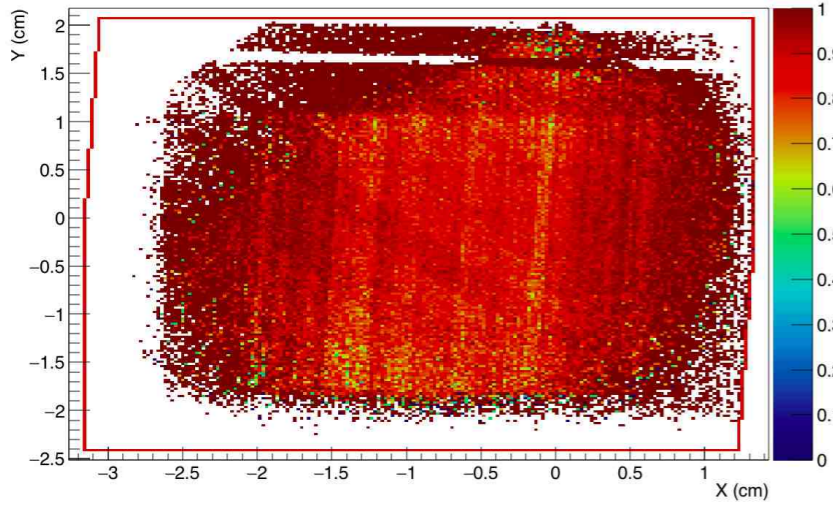
# FI15X1

## 2015slot1RD

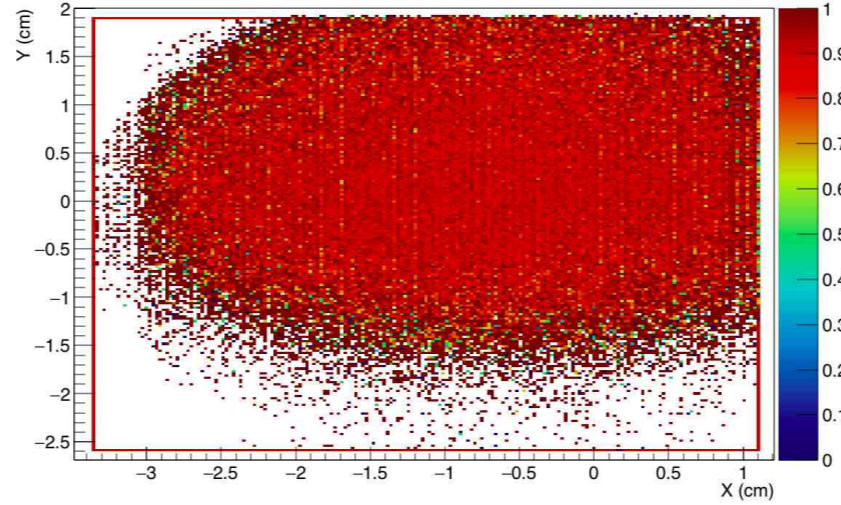
## 2018t8MC

## 2018t8RD

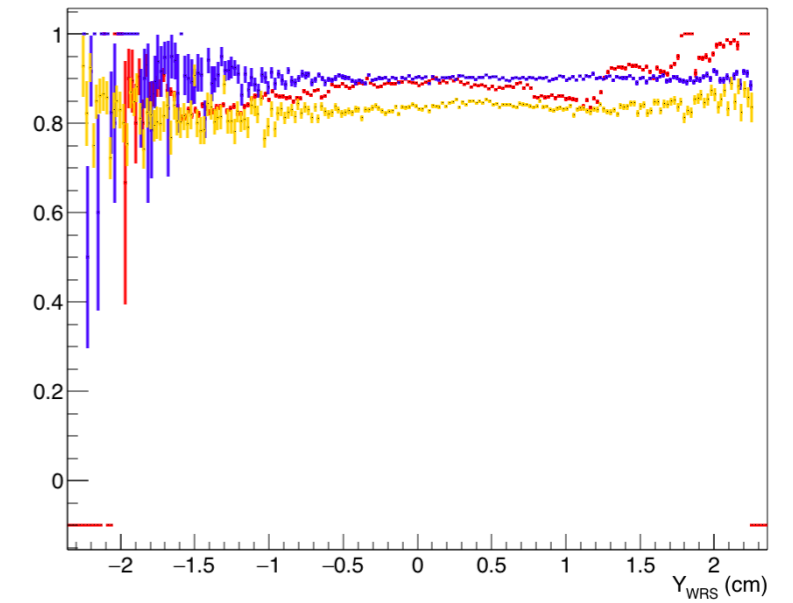
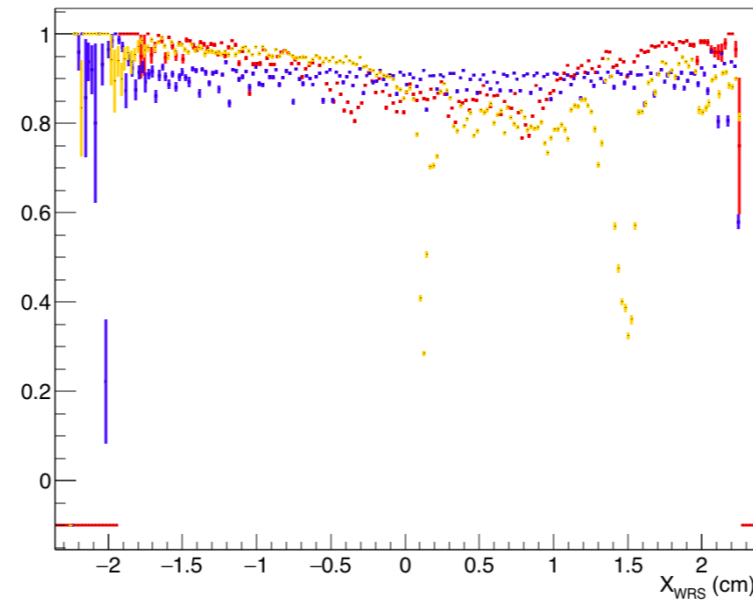
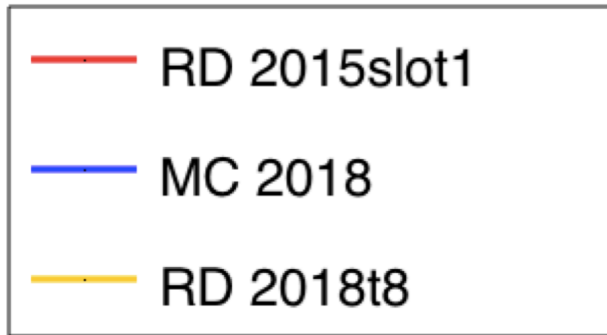
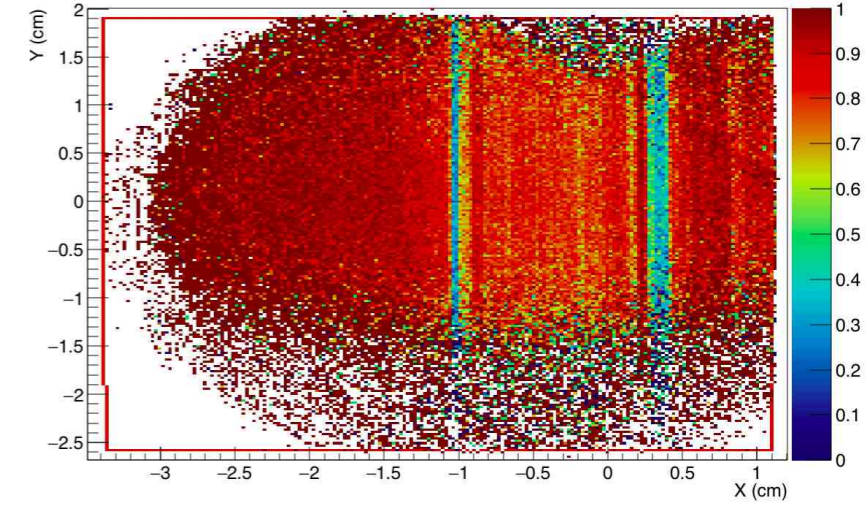
FI15X1 pseudo-efficiency (Z = -625 cm), mean =  $0.9404 \pm 0.0043$



FI15X1 pseudo-efficiency (Z = -627 cm), mean =  $0.9089 \pm 0.0068$



FI15X1 pseudo-efficiency (Z = -627 cm), mean =  $0.8437 \pm 0.0078$



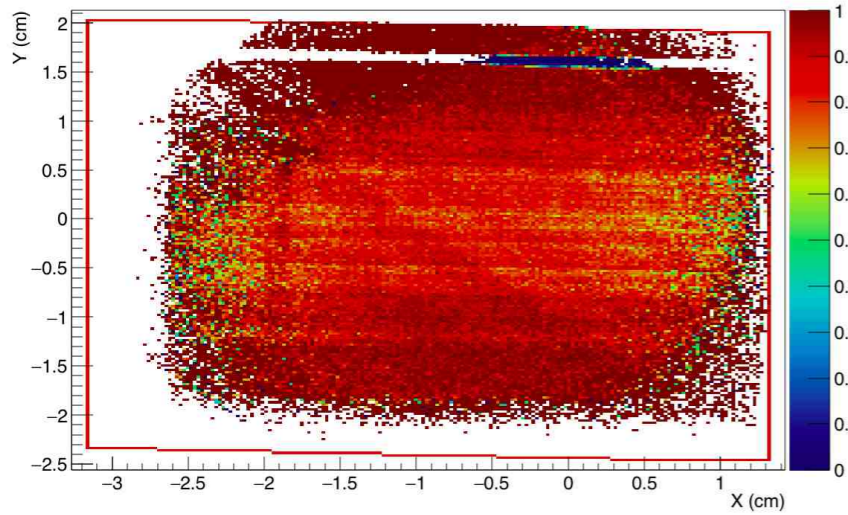
# FI15Y1

## 2015slot1RD

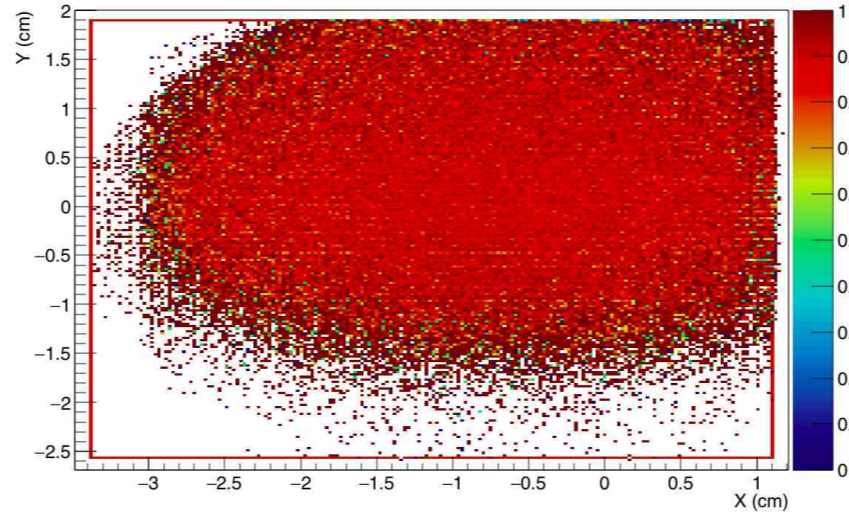
## 2018t8MC

## 2018t8RD

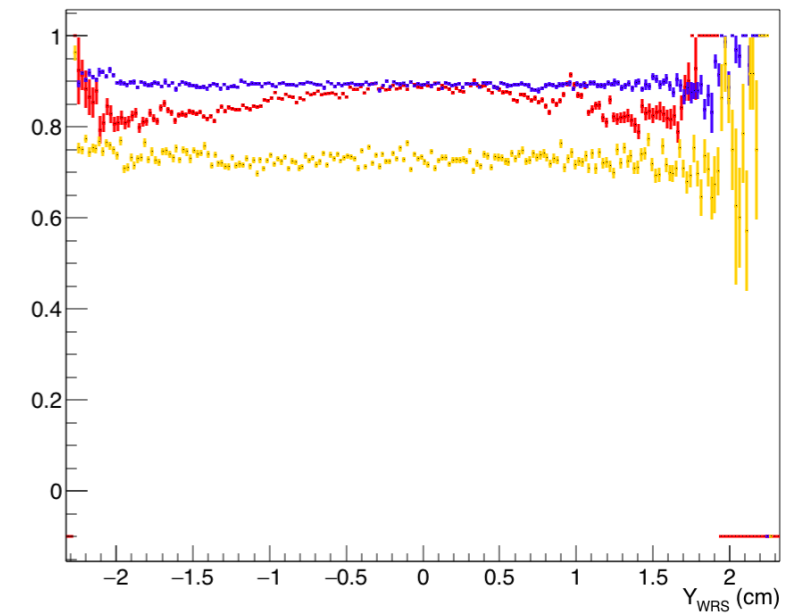
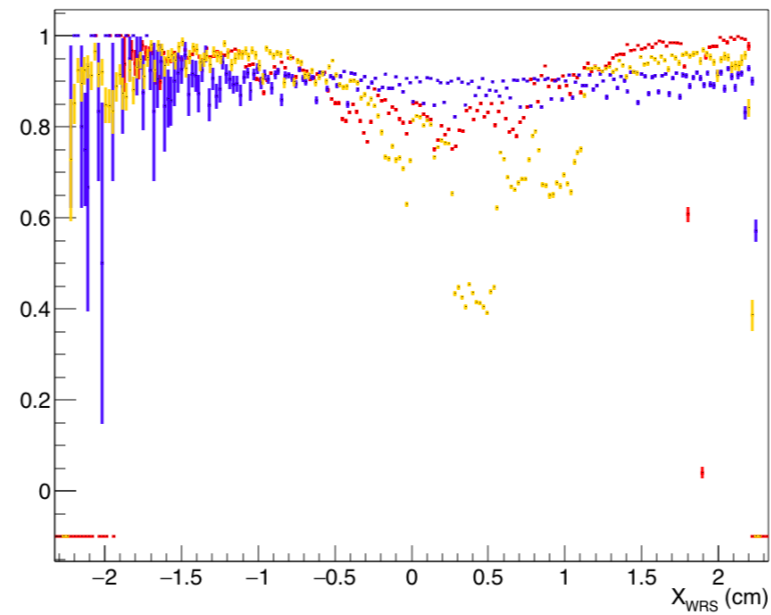
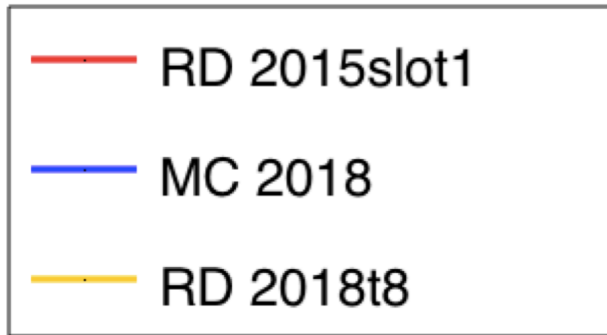
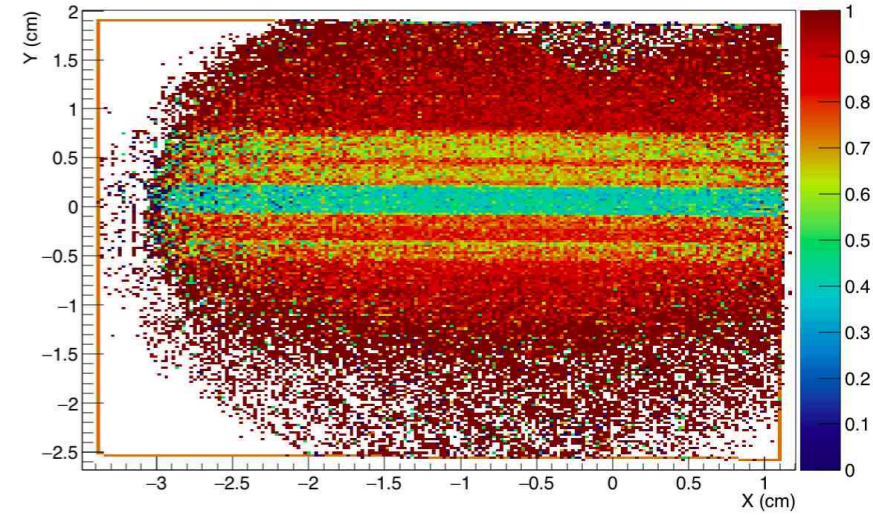
FI15Y1 pseudo-efficiency ( $Z = -624$  cm), mean =  $0.9203 \pm 0.0050$



FI15Y1 pseudo-efficiency ( $Z = -626$  cm), mean =  $0.8990 \pm 0.0071$



FI15Y1 pseudo-efficiency ( $Z = -626$  cm), mean =  $0.7548 \pm 0.0092$

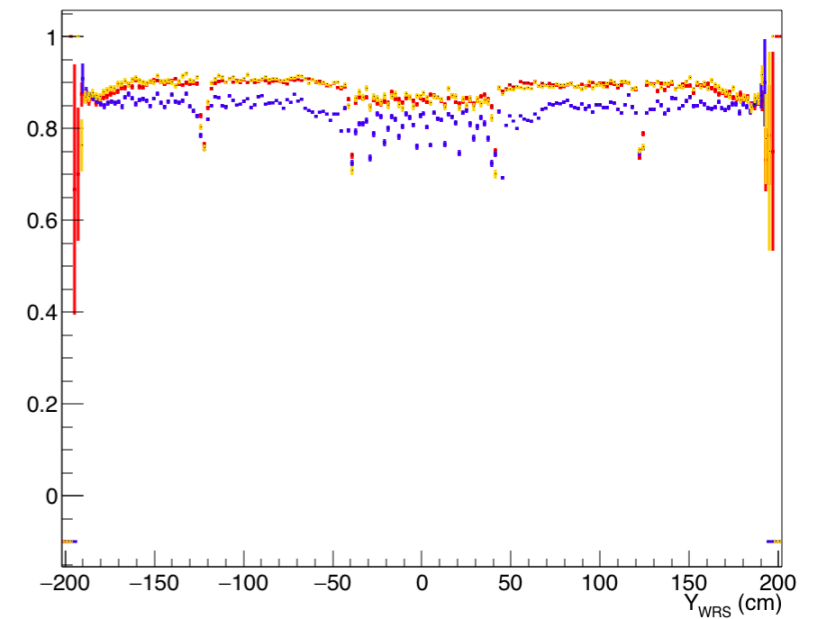
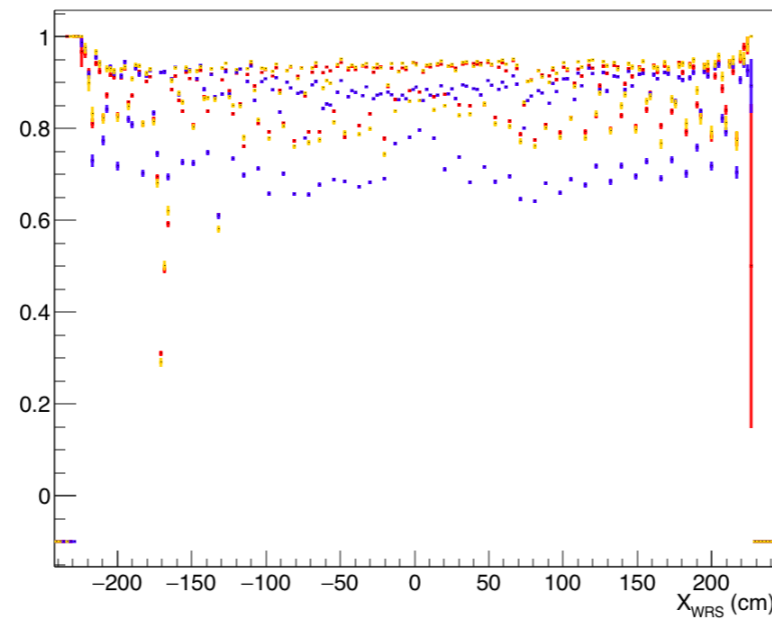
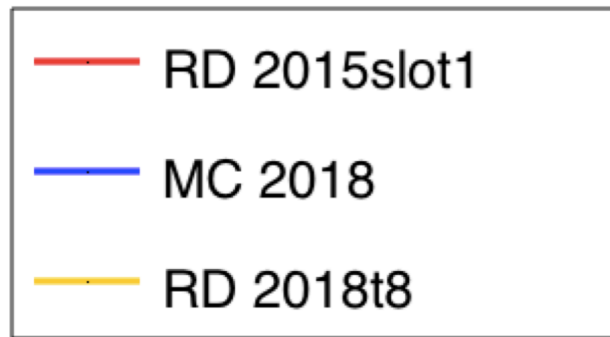
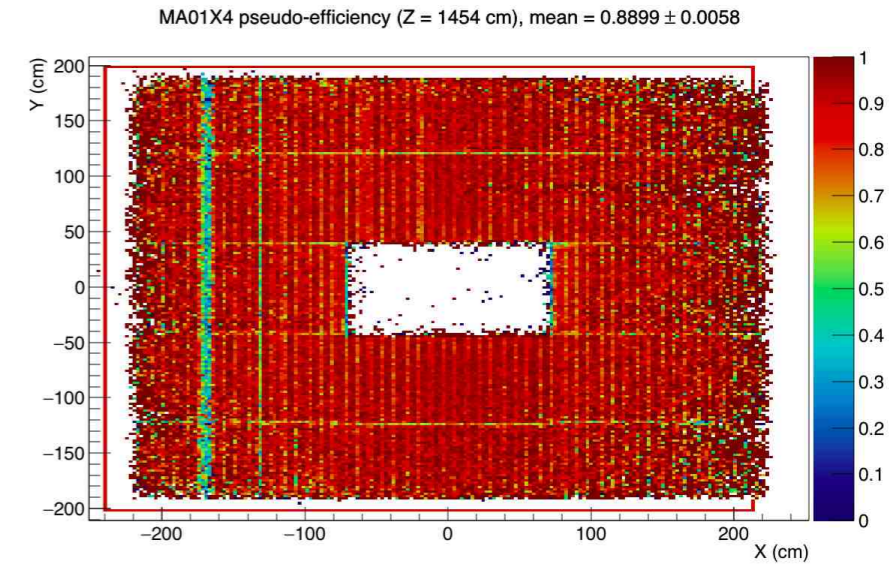
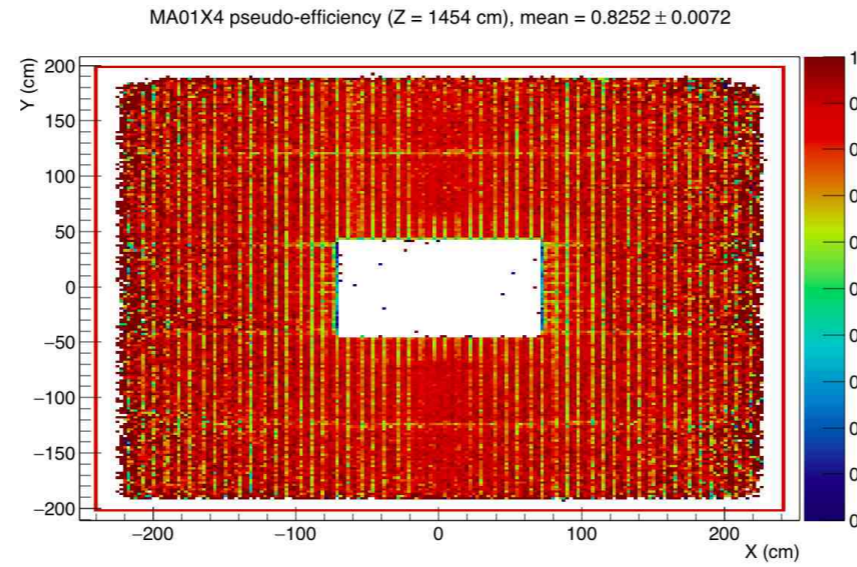
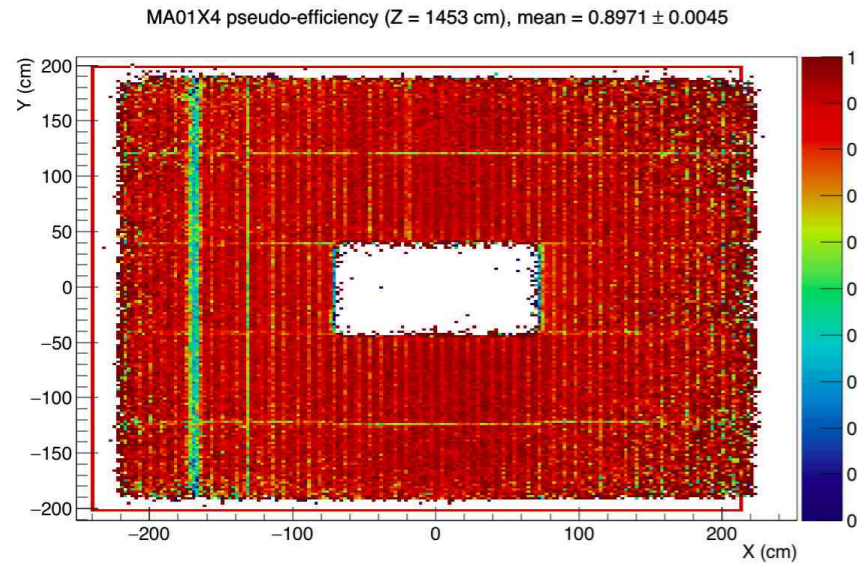


# MA01X4

## 2015slot1RD

## 2018t8MC

## 2018t8RD





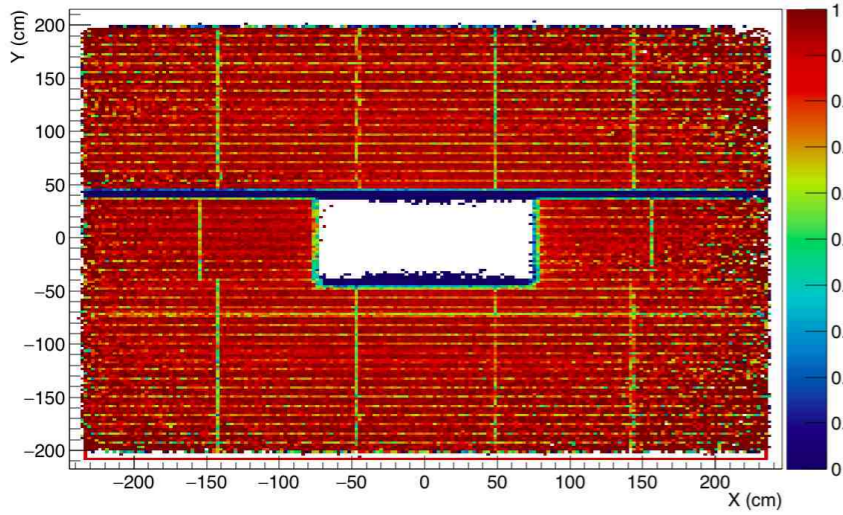
# MA02Y2

## 2015slot1RD

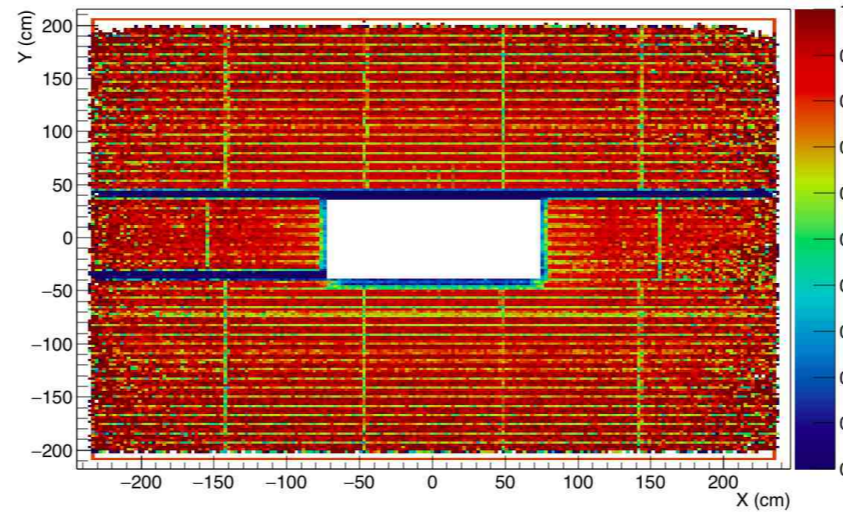
## 2018t8MC

## 2018t8RD

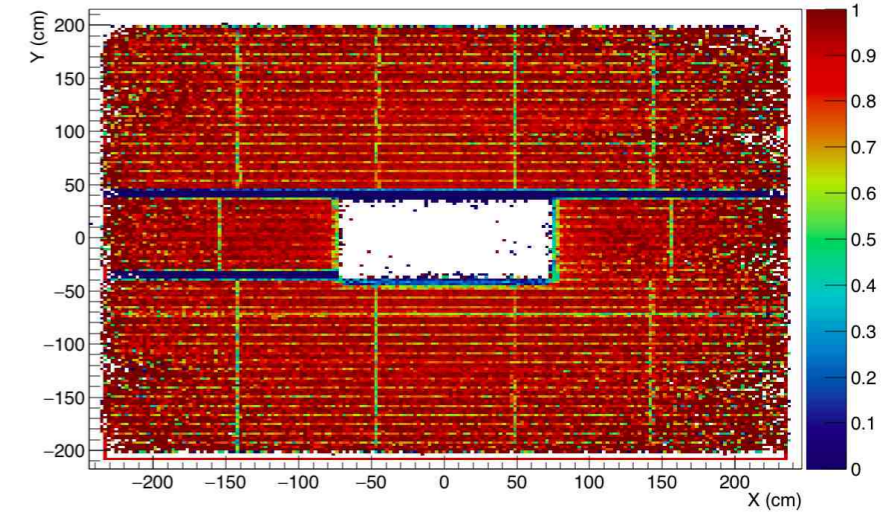
MA02Y2 pseudo-efficiency (Z = 1547 cm), mean =  $0.8637 \pm 0.0050$



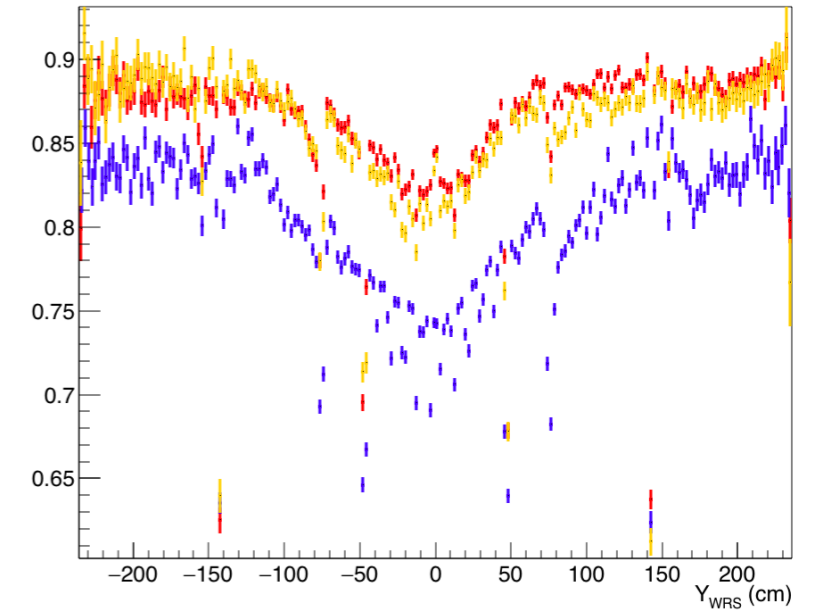
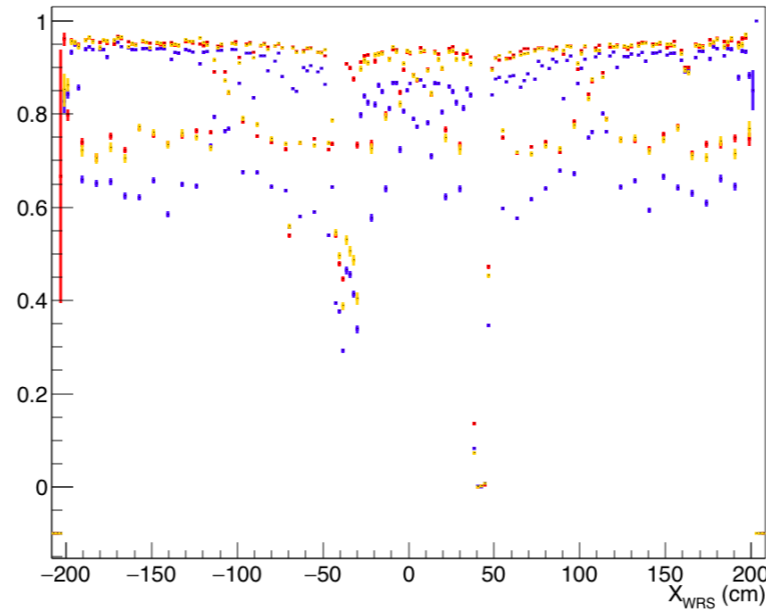
MA02Y2 pseudo-efficiency (Z = 1548 cm), mean =  $0.7641 \pm 0.0077$



MA02Y2 pseudo-efficiency (Z = 1548 cm), mean =  $0.8366 \pm 0.0066$



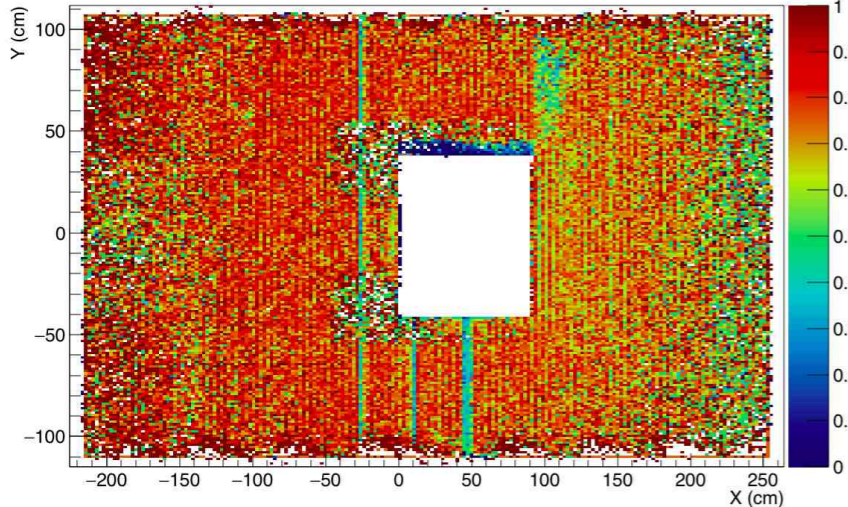
- RD 2015slot1
- MC 2018
- RD 2018t8



# MB02X2

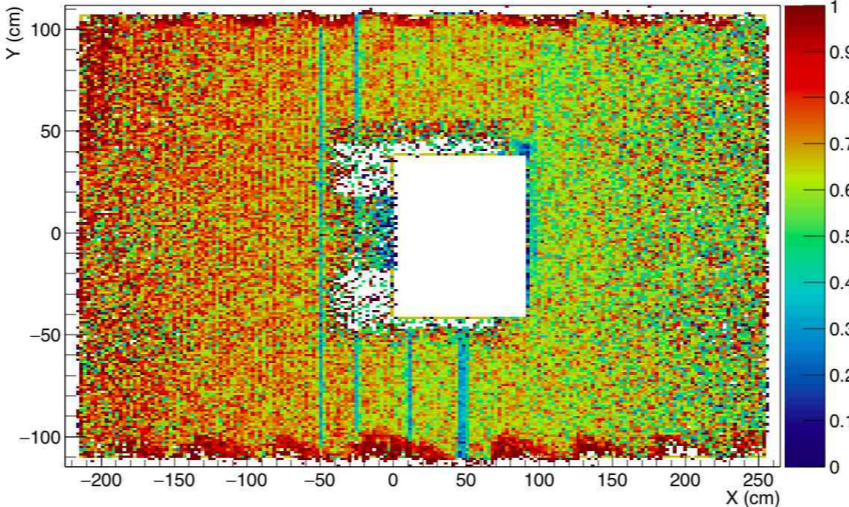
## 2015slot1RD

MB02X2 pseudo-efficiency (Z = 4452 cm), mean =  $0.7512 \pm 0.0107$



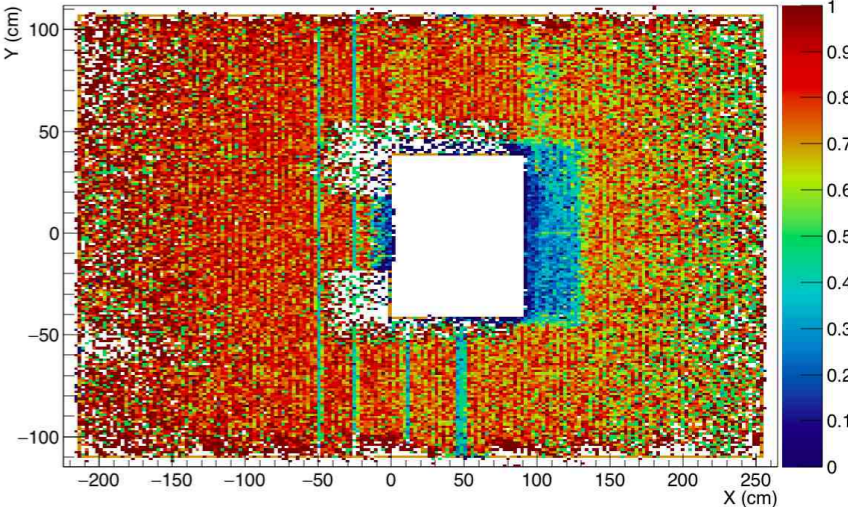
## 2018t8MC

MB02X2 pseudo-efficiency (Z = 4453 cm), mean =  $0.6528 \pm 0.0124$



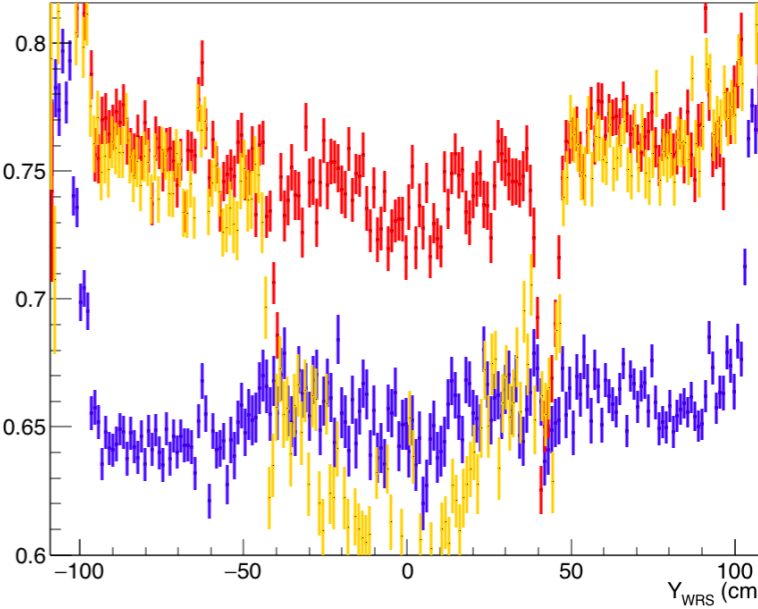
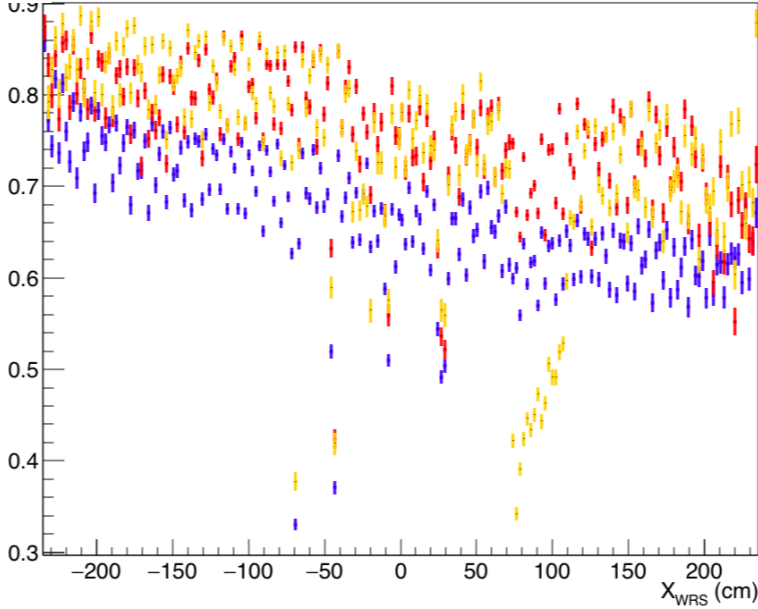
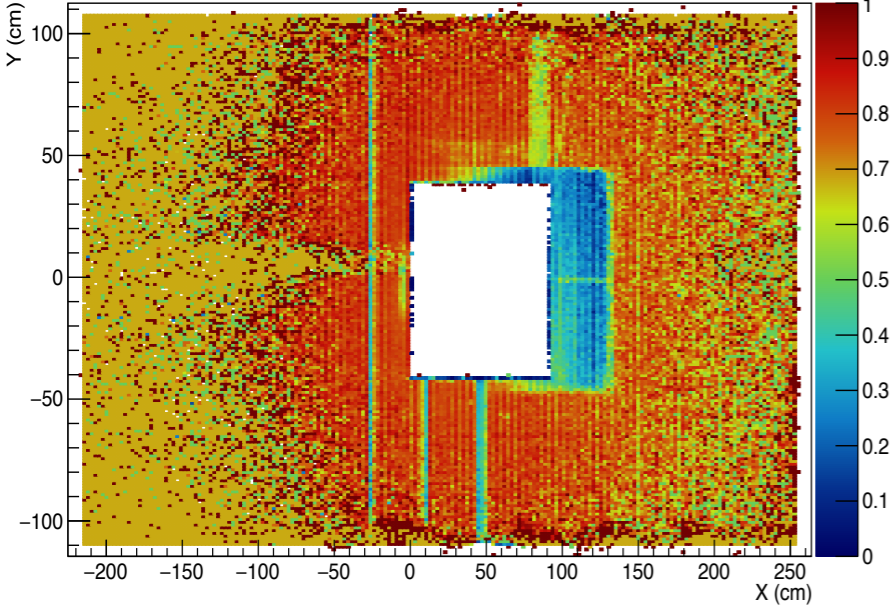
## 2018t8RD

MB02X2 pseudo-efficiency (Z = 4452 cm), mean =  $0.6752 \pm 0.0130$



## 2016RD

MB02X2 pseudo-efficiency (Z = 4452 cm), mean =  $0.6684 \pm 0.0099$



The same problem as in 2016MC?

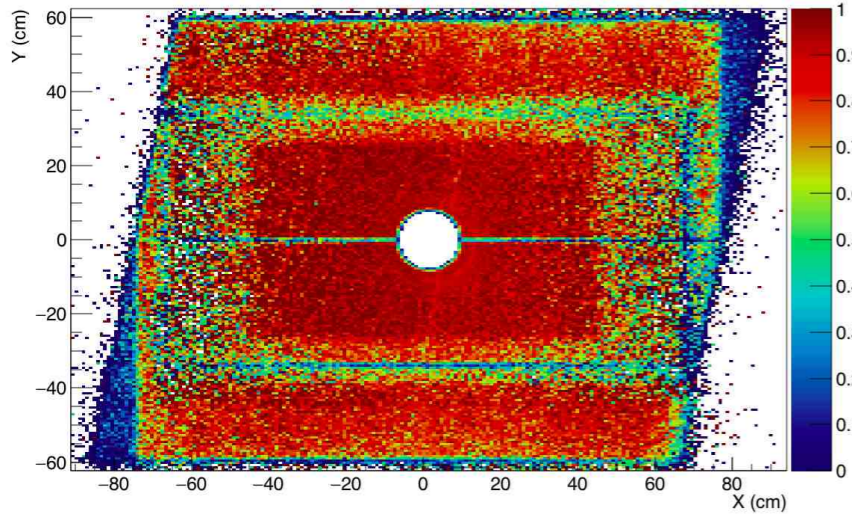
# PA01V1

## 2015slot1RD

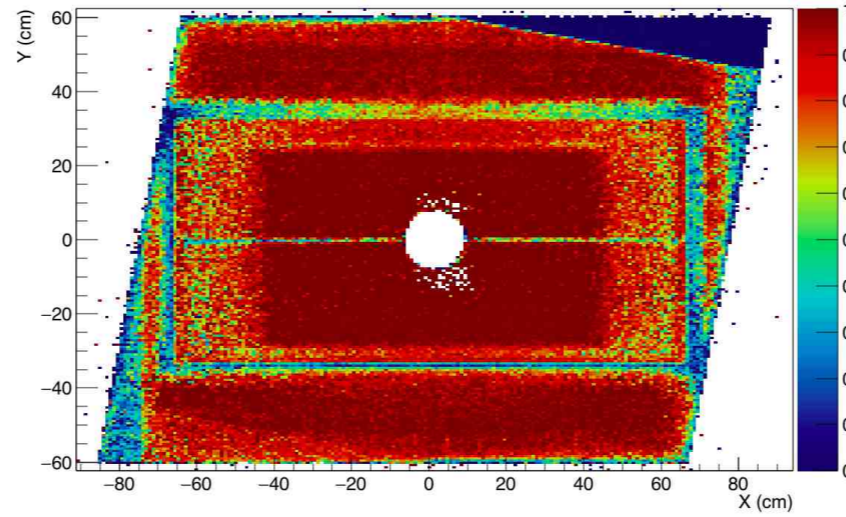
## 2018t8MC

## 2018t8RD

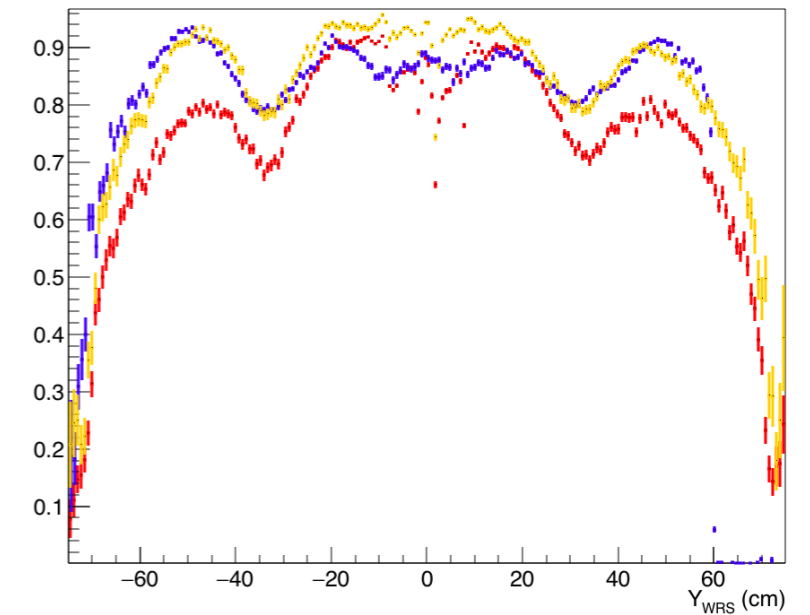
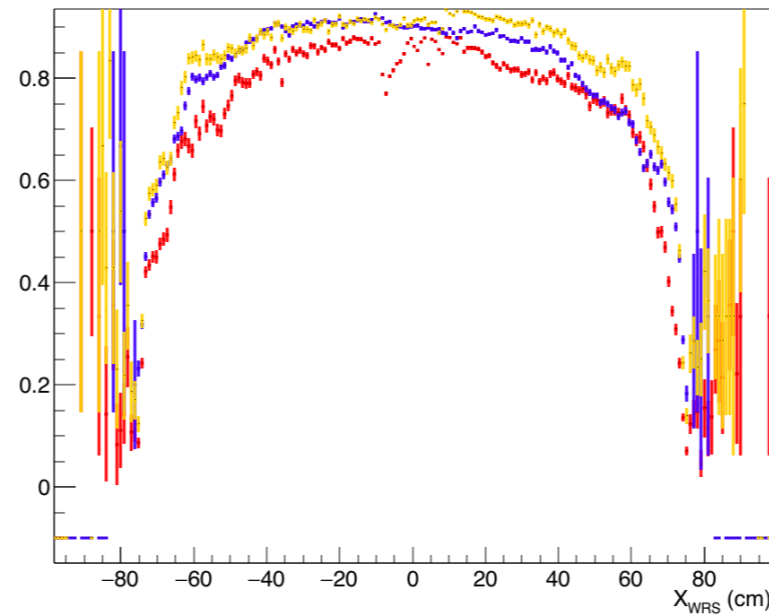
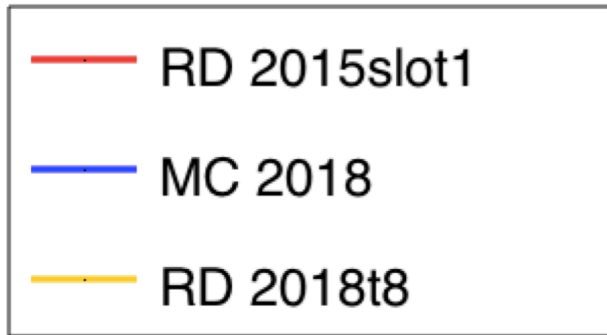
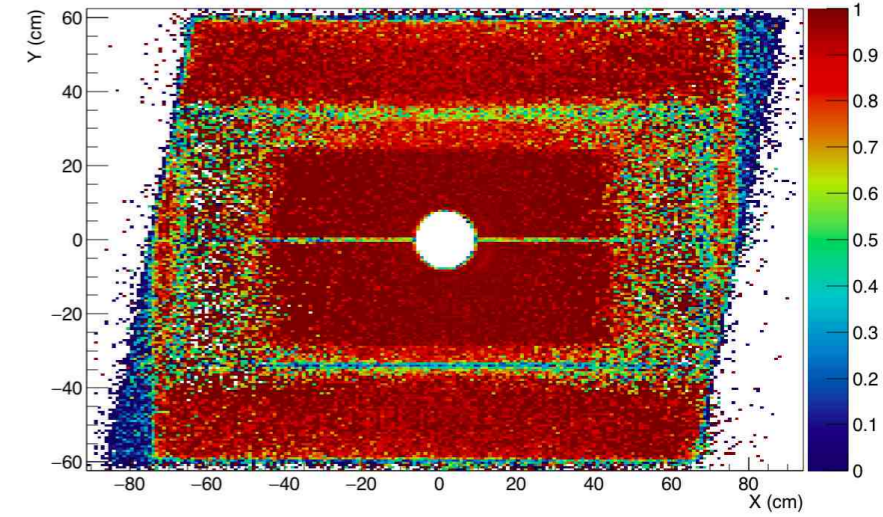
PA01V1 pseudo-efficiency (Z = 1390 cm), mean =  $0.7951 \pm 0.0084$



PA01V1 pseudo-efficiency (Z = 1390 cm), mean =  $0.8331 \pm 0.0099$



PA01V1 pseudo-efficiency (Z = 1390 cm), mean =  $0.8861 \pm 0.0082$



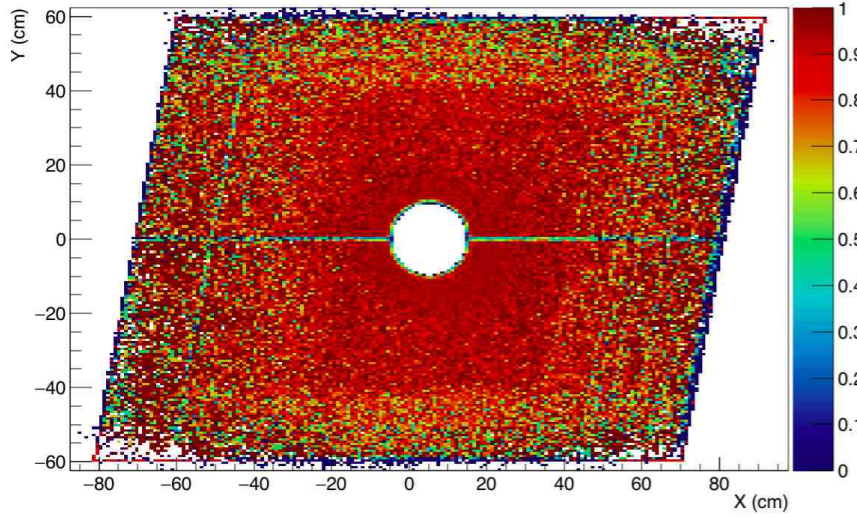
# PA03V1

## 2015slot1RD

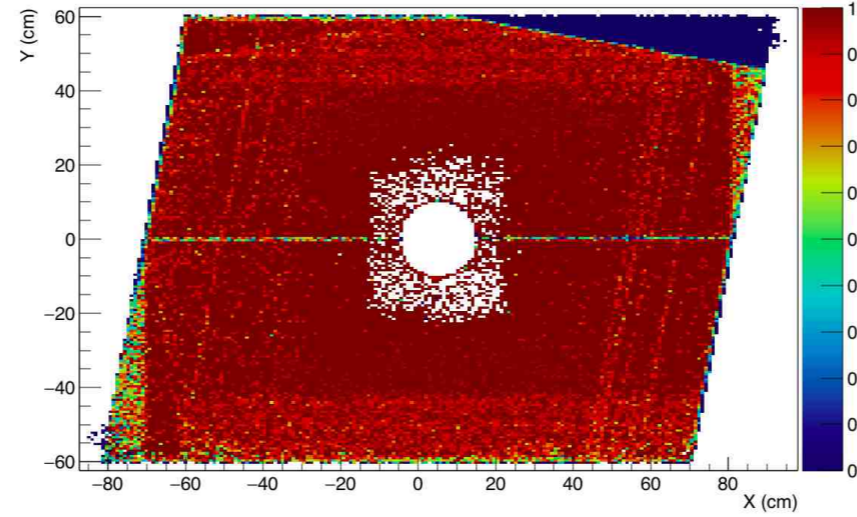
## 2018t8MC

## 2018t8RD

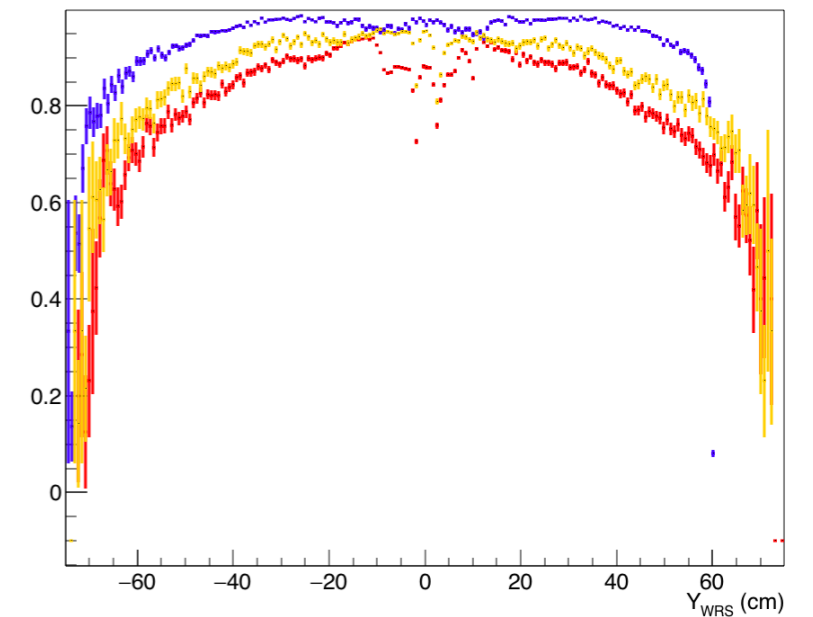
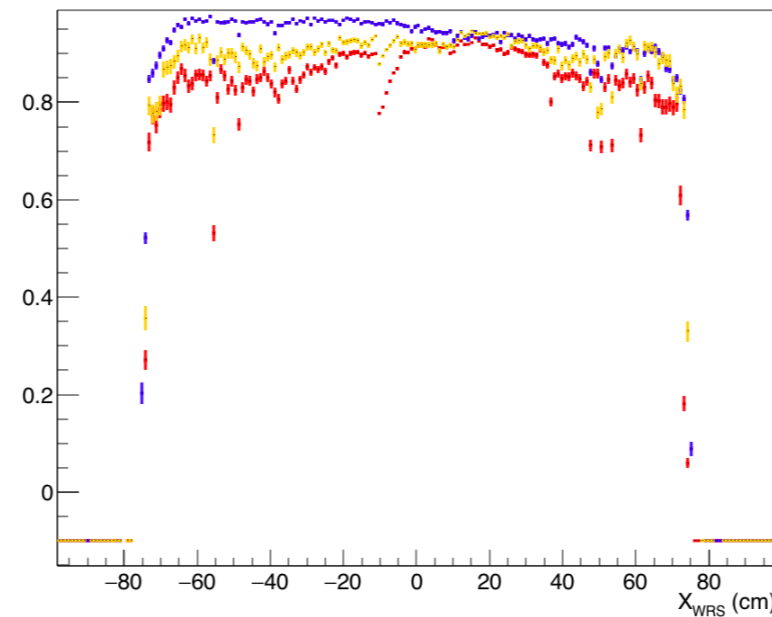
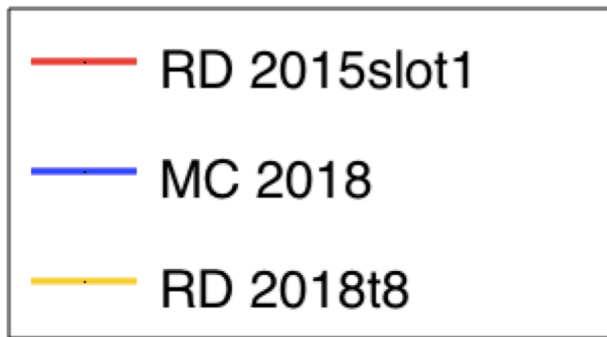
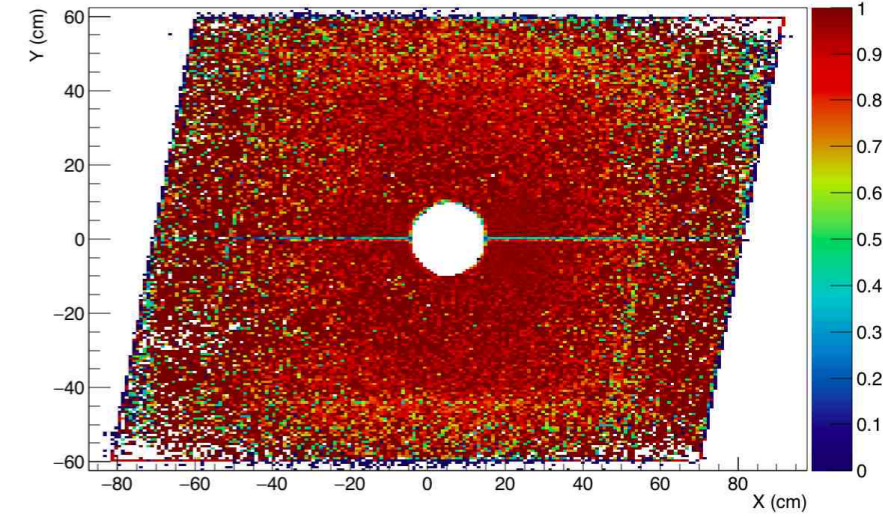
PA03V1 pseudo-efficiency (Z = 2046 cm), mean =  $0.8793 \pm 0.0078$



PA03V1 pseudo-efficiency (Z = 2046 cm), mean =  $0.9251 \pm 0.0095$



PA03V1 pseudo-efficiency (Z = 2046 cm), mean =  $0.9372 \pm 0.0078$



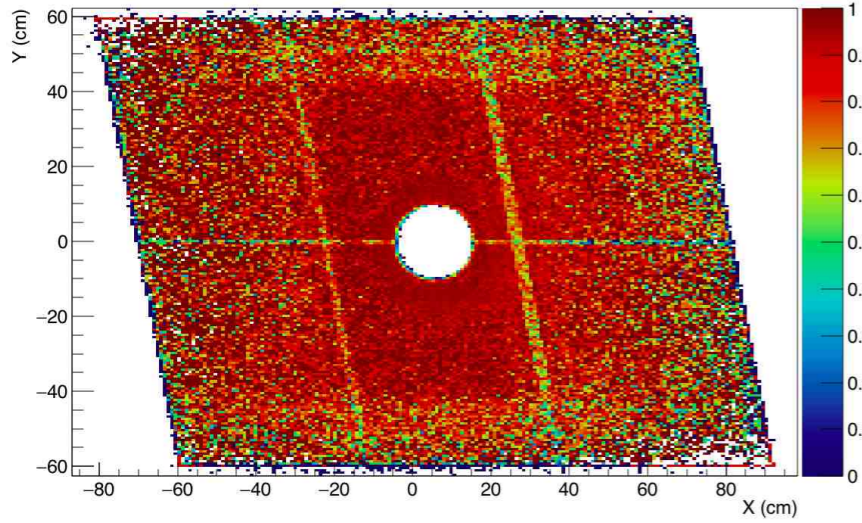
# PA05U1

## 2015slot1RD

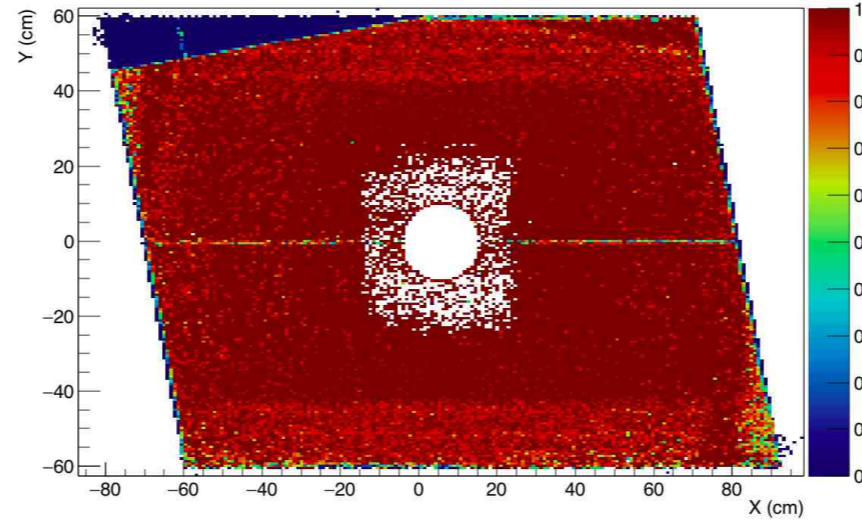
## 2018t8MC

## 2018t8RD

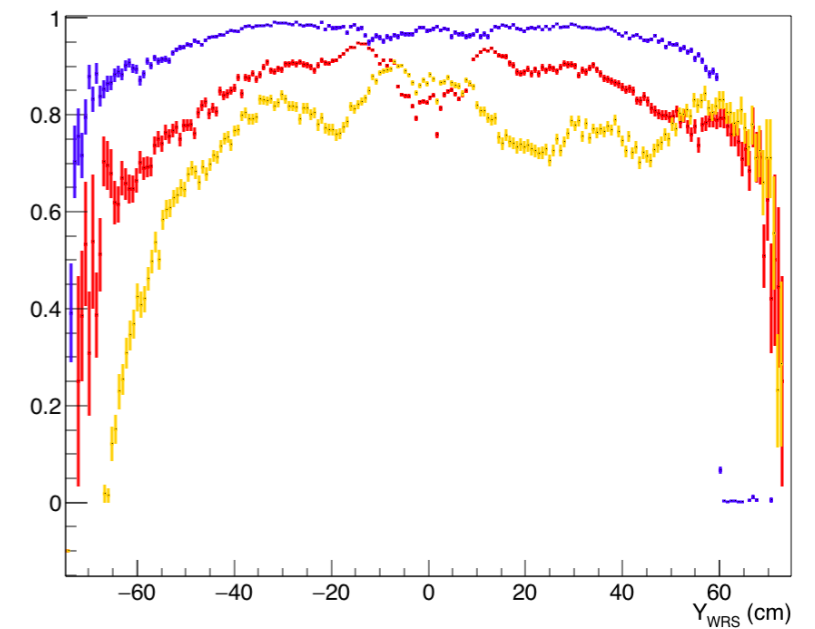
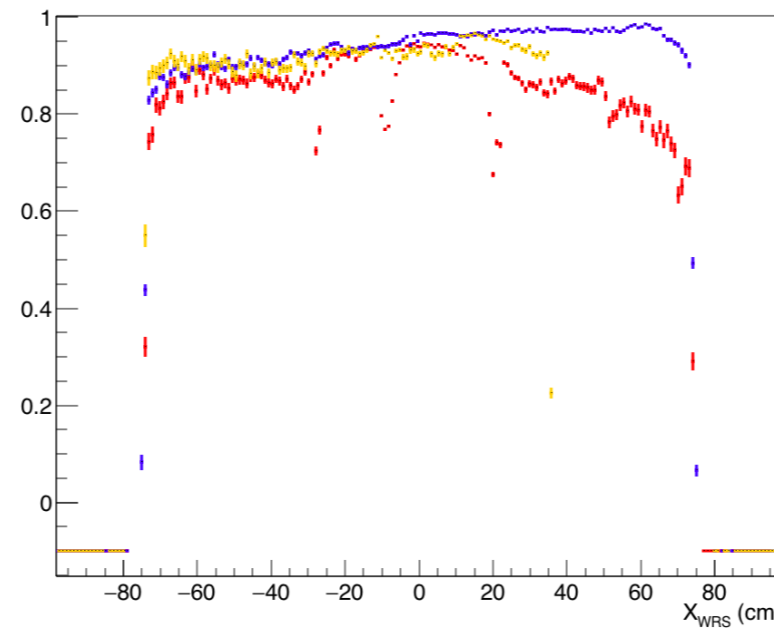
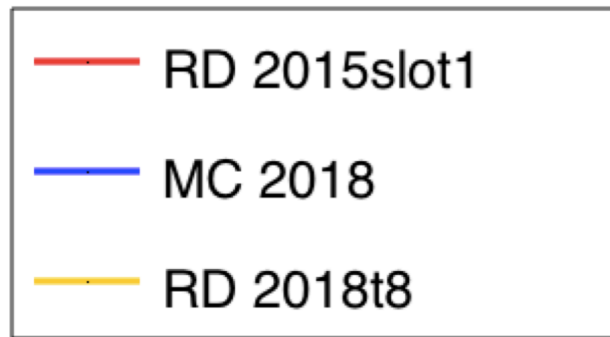
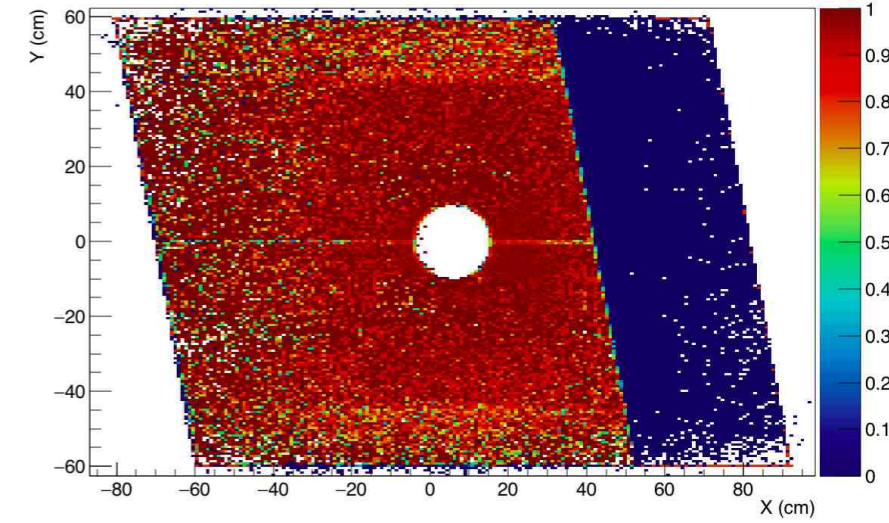
PA05U1 pseudo-efficiency (Z = 2102 cm), mean =  $0.8903 \pm 0.0074$



PA05U1 pseudo-efficiency (Z = 2102 cm), mean =  $0.9361 \pm 0.0090$



PA05U1 pseudo-efficiency (Z = 2102 cm), mean =  $0.7806 \pm 0.0134$



**Shadow from GMs?**

**Inactive area is not present in MC**

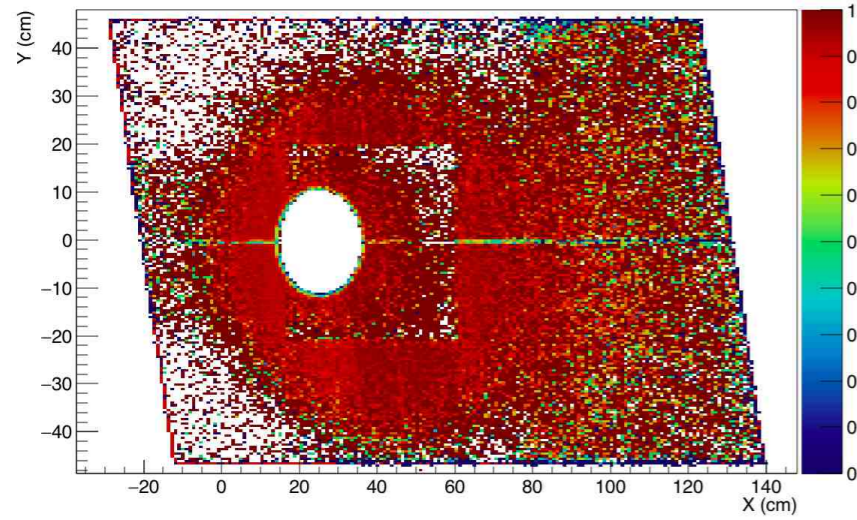
# PB01U1

## 2015slot1RD

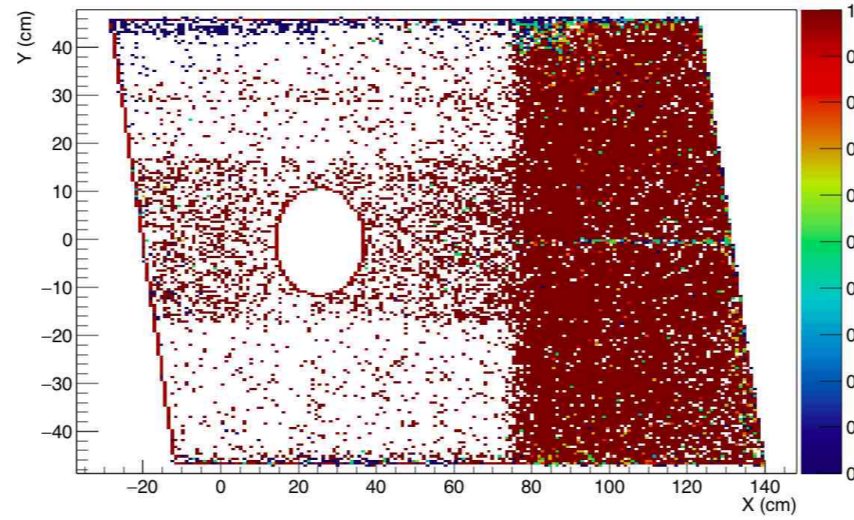
## 2018t8MC

## 2018t8RD

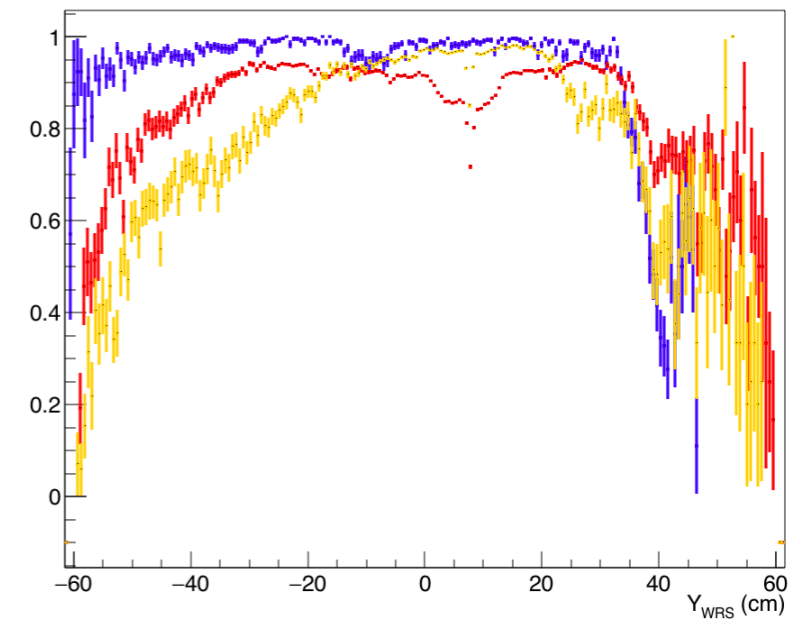
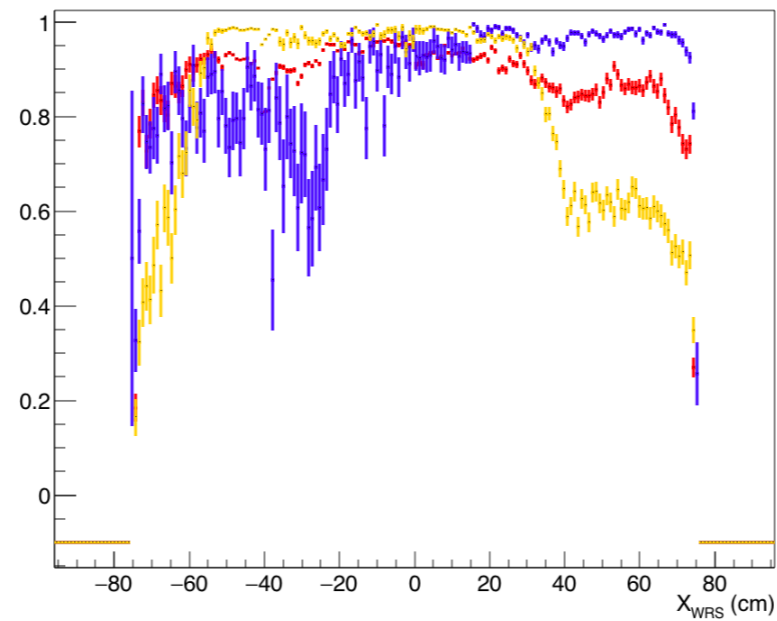
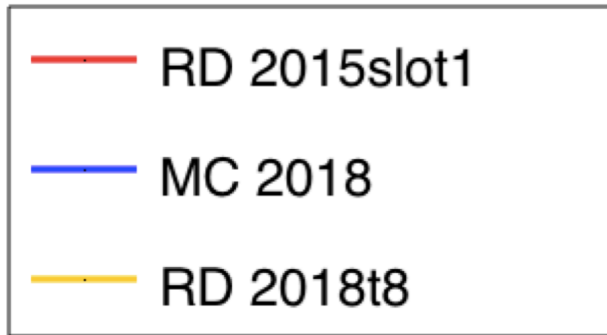
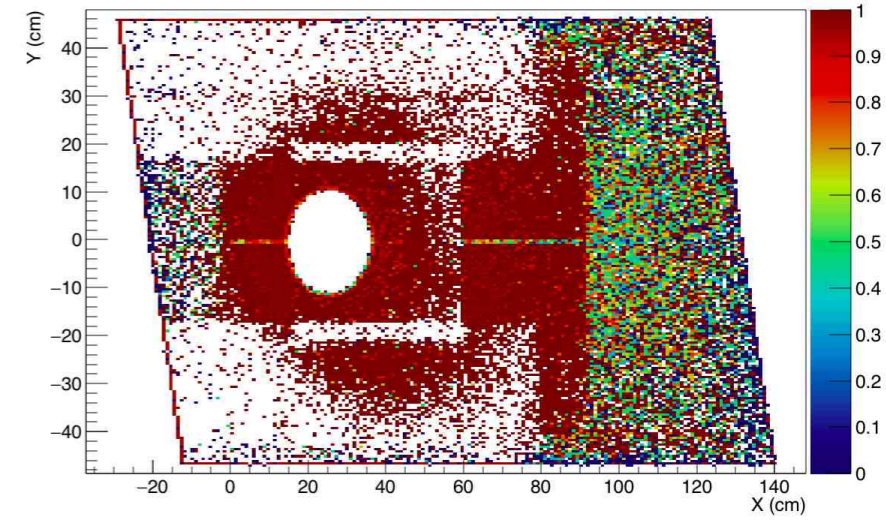
PB01U1 pseudo-efficiency (Z = 4191 cm), mean =  $0.8728 \pm 0.0072$



PB01U1 pseudo-efficiency (Z = 4191 cm), mean =  $0.9146 \pm 0.0309$



PB01U1 pseudo-efficiency (Z = 4191 cm), mean =  $0.9372 \pm 0.0074$



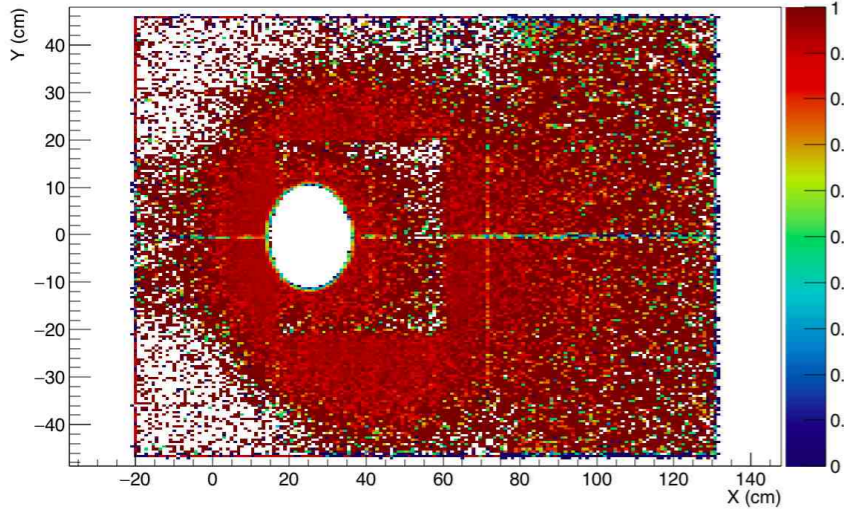
# PB01X1

## 2015slot1RD

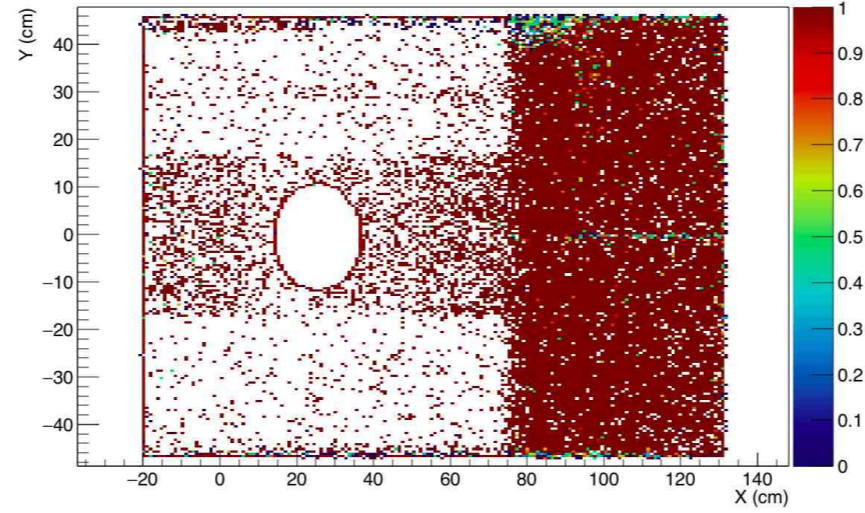
## 2018t8MC

## 2018t8RD

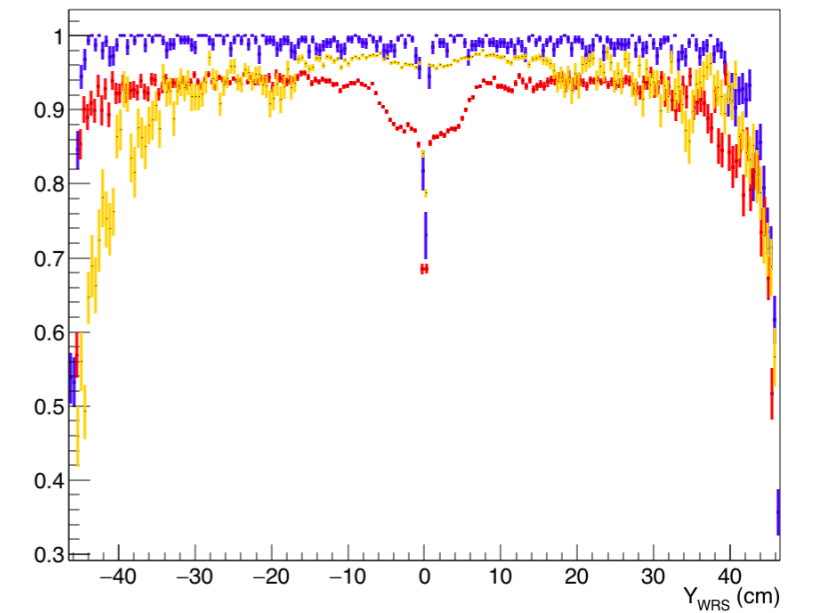
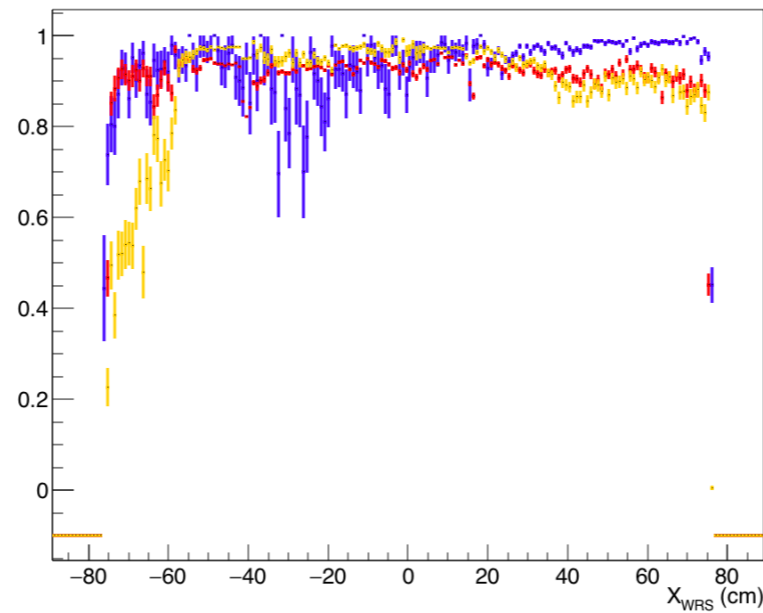
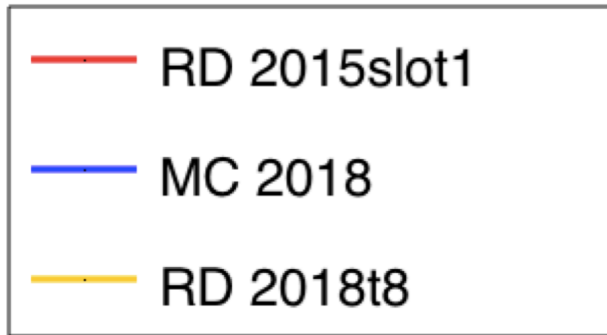
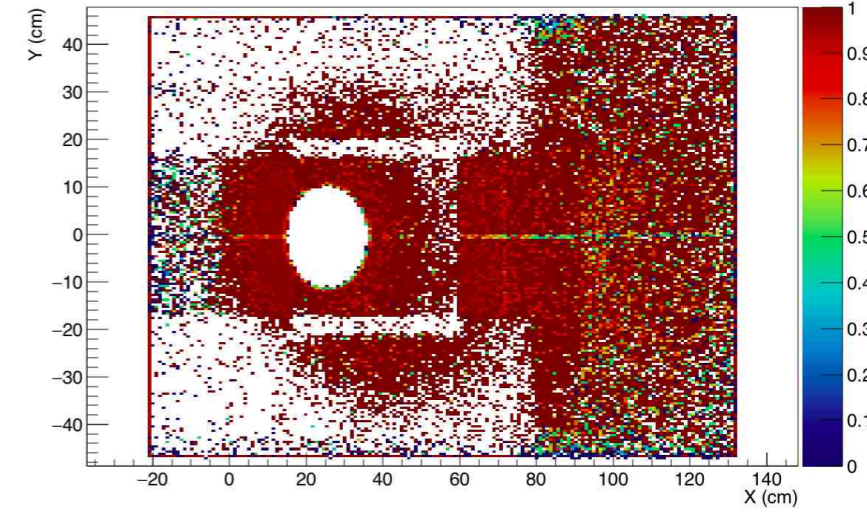
PB01X1 pseudo-efficiency (Z = 4190 cm), mean =  $0.8984 \pm 0.0065$



PB01X1 pseudo-efficiency (Z = 4190 cm), mean =  $0.9259 \pm 0.0291$



PB01X1 pseudo-efficiency (Z = 4190 cm), mean =  $0.9565 \pm 0.0062$



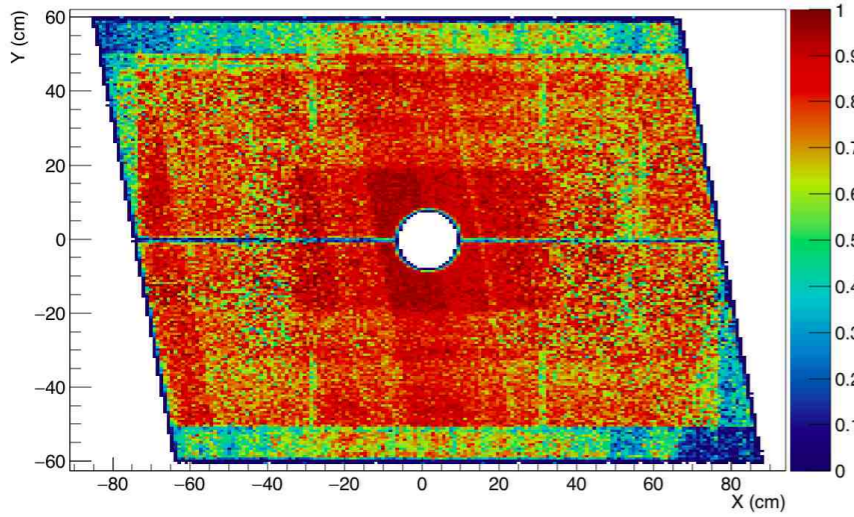
# PS01U1

## 2015slot1RD

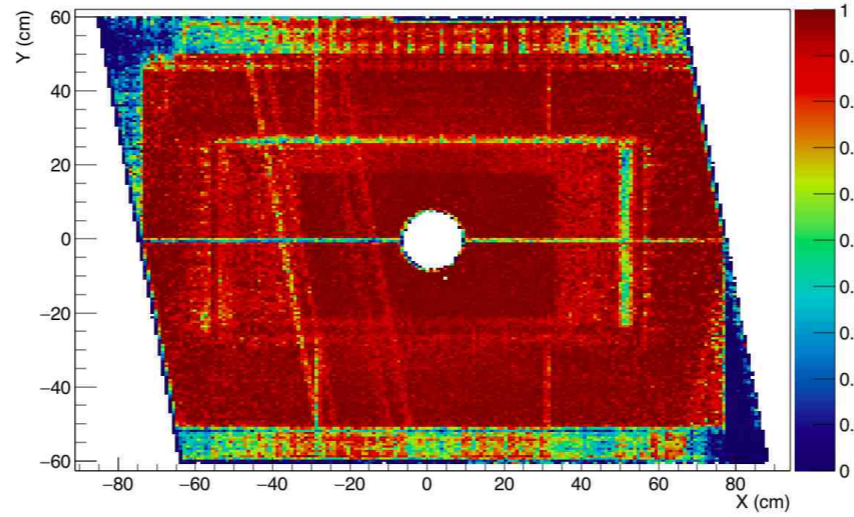
## 2018t8MC

## 2018t8RD

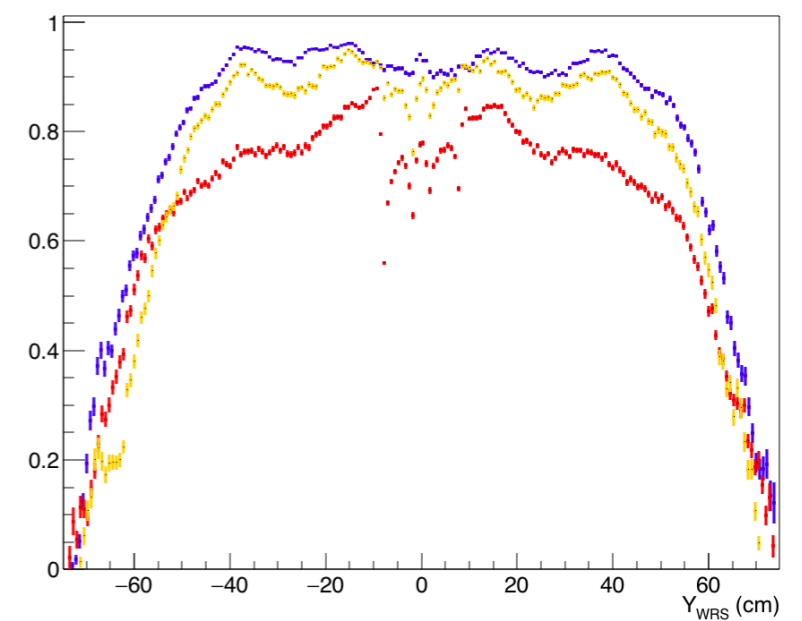
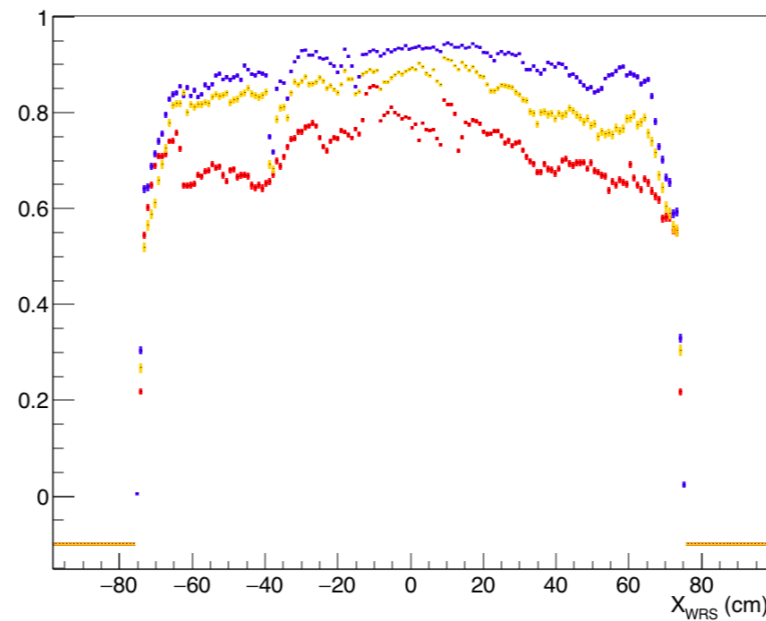
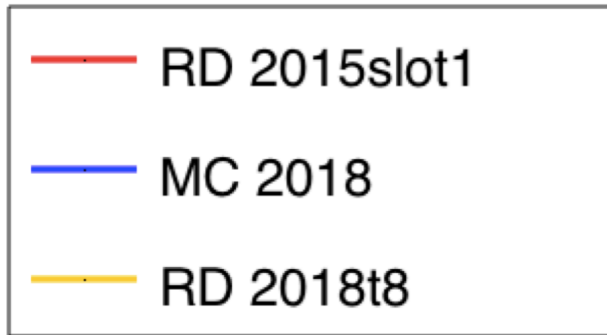
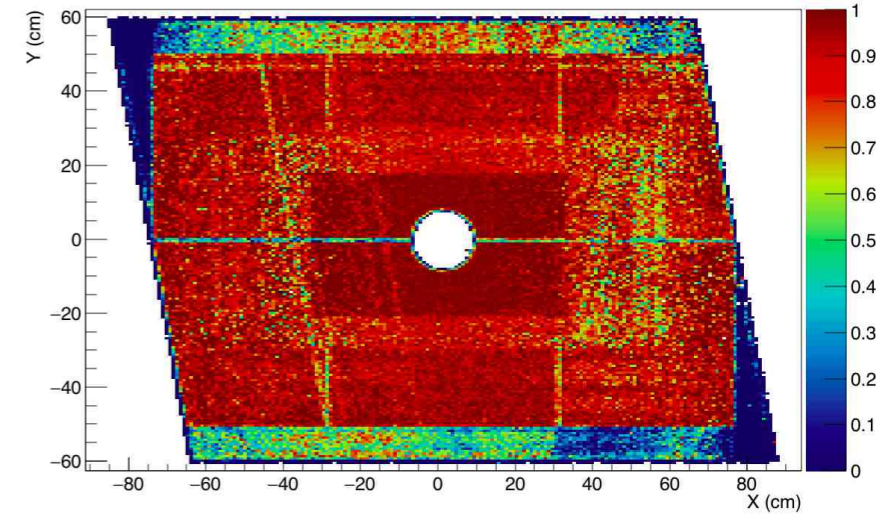
PS01U1 pseudo-efficiency (Z = 950 cm), mean =  $0.7254 \pm 0.0078$



PS01U1 pseudo-efficiency (Z = 950 cm), mean =  $0.8933 \pm 0.0067$



PS01U1 pseudo-efficiency (Z = 950 cm), mean =  $0.8397 \pm 0.0078$





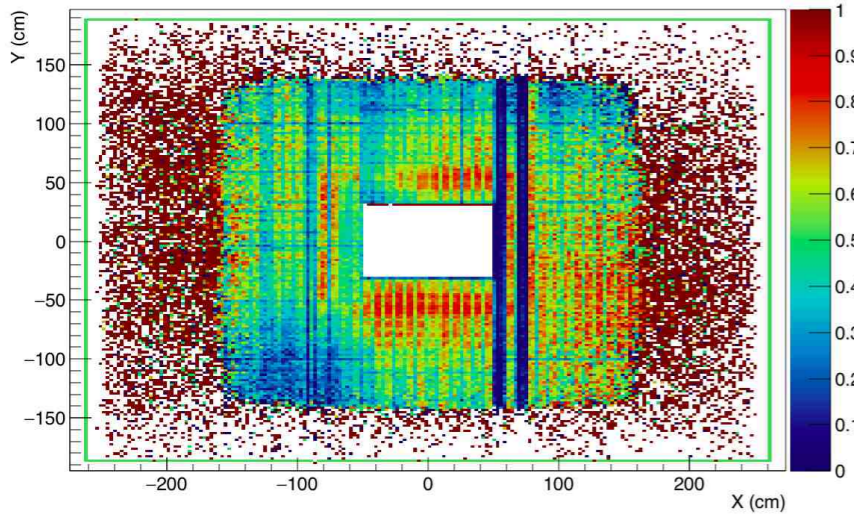
# DR01X1

2015slot1RD

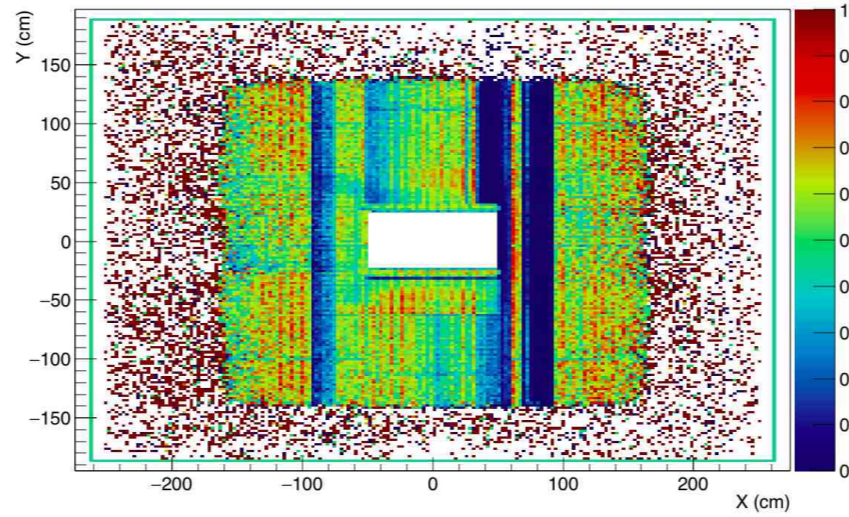
2018t8MC

2018t8RD

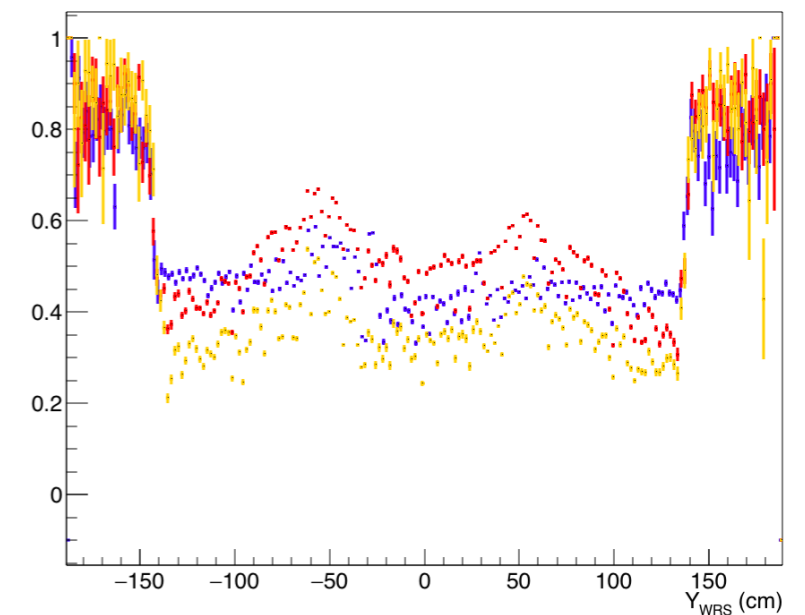
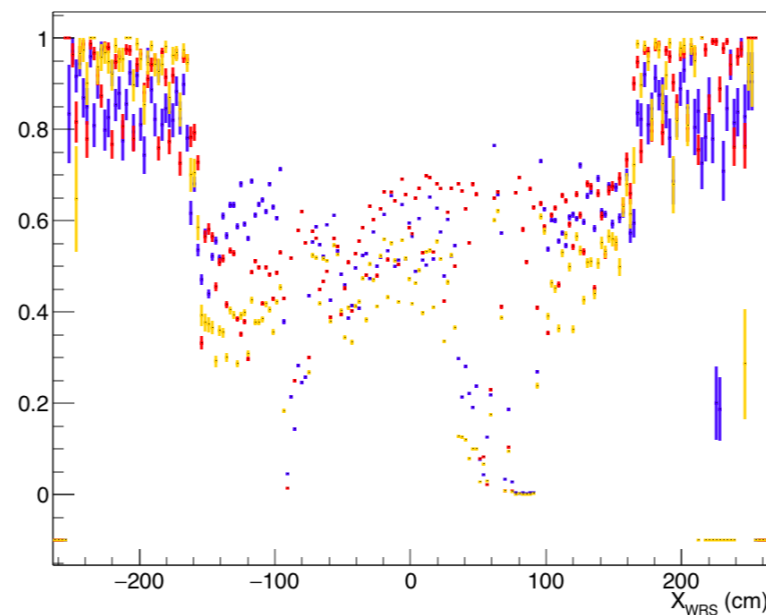
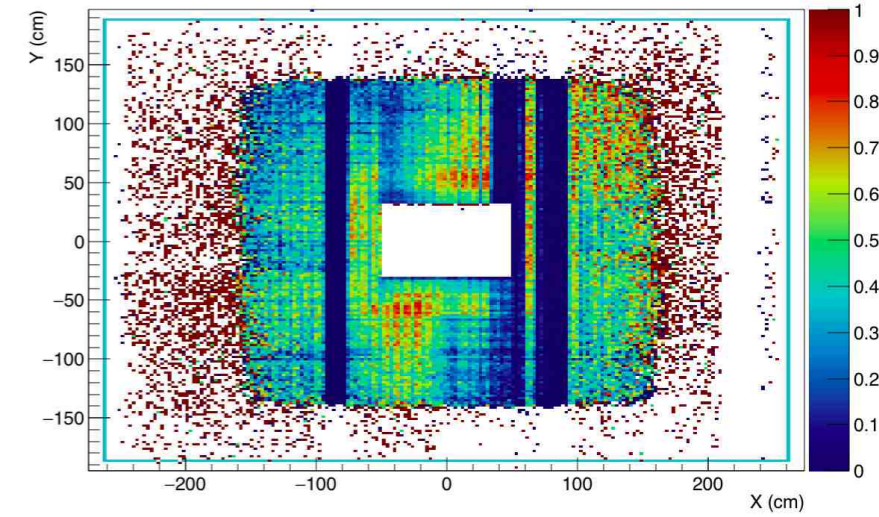
DR01X1 pseudo-efficiency (Z = 995 cm), mean =  $0.5284 \pm 0.0072$



DR01X1 pseudo-efficiency (Z = 995 cm), mean =  $0.4445 \pm 0.0089$



DR01X1 pseudo-efficiency (Z = 995 cm), mean =  $0.3600 \pm 0.0086$



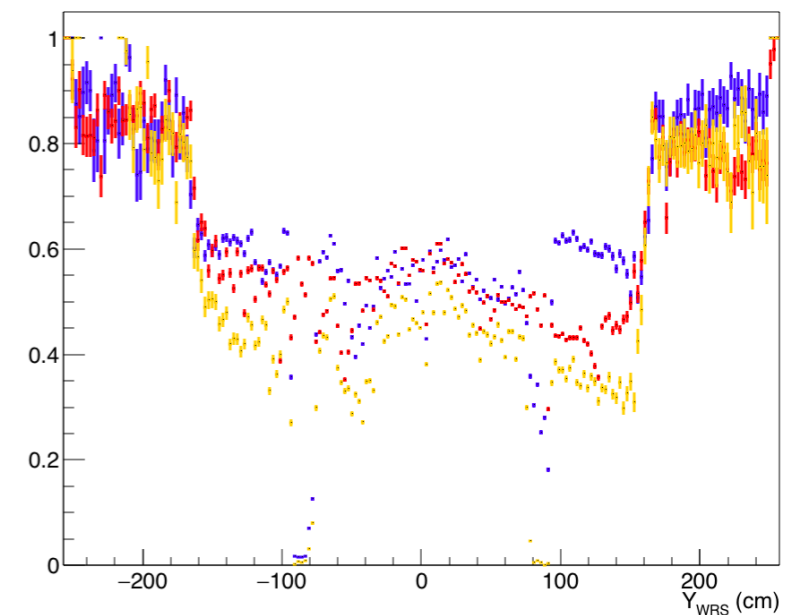
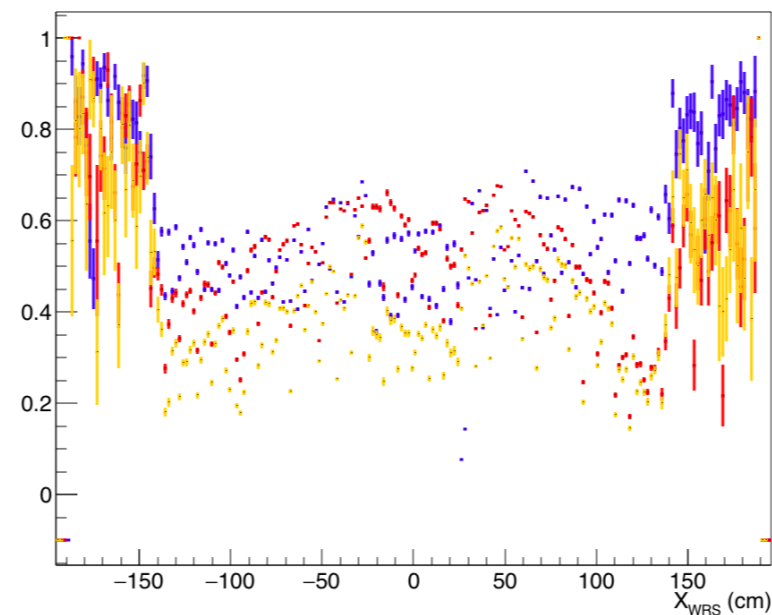
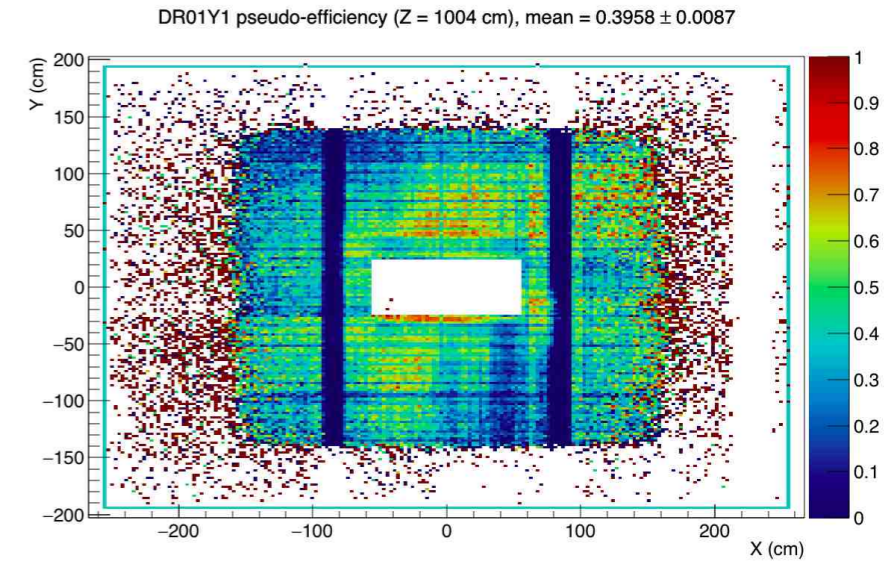
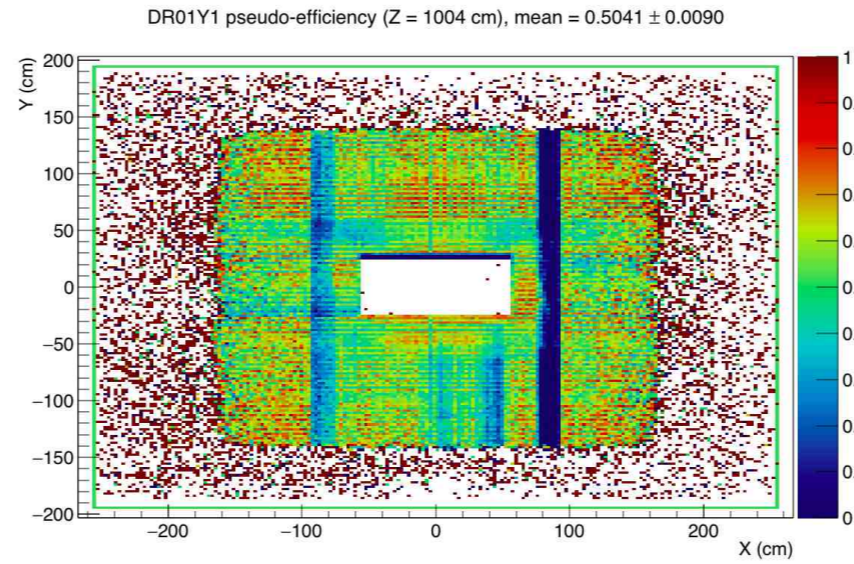
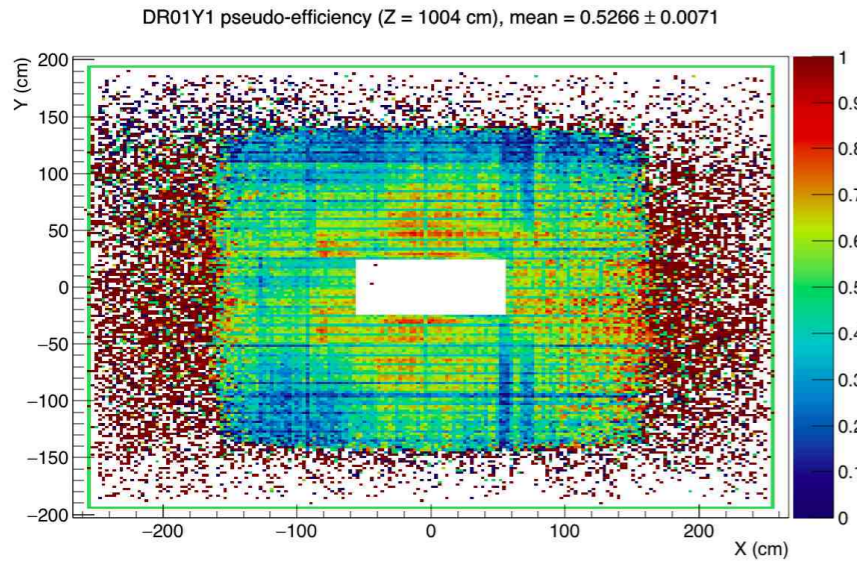
**The mean pseudo efficiency in 2018MC and 2018RD is not compatible.**

# DR01Y1

2015slot1RD

2018t8MC

2018t8RD



**The mean pseudo efficiency in 2018MC and 2018RD is not compatible.**