

# SPD MEETING

## Results of simulation with the three magnetic systems – a comparison

Gribowski A.

Ivanov A.

Kovalenko A.

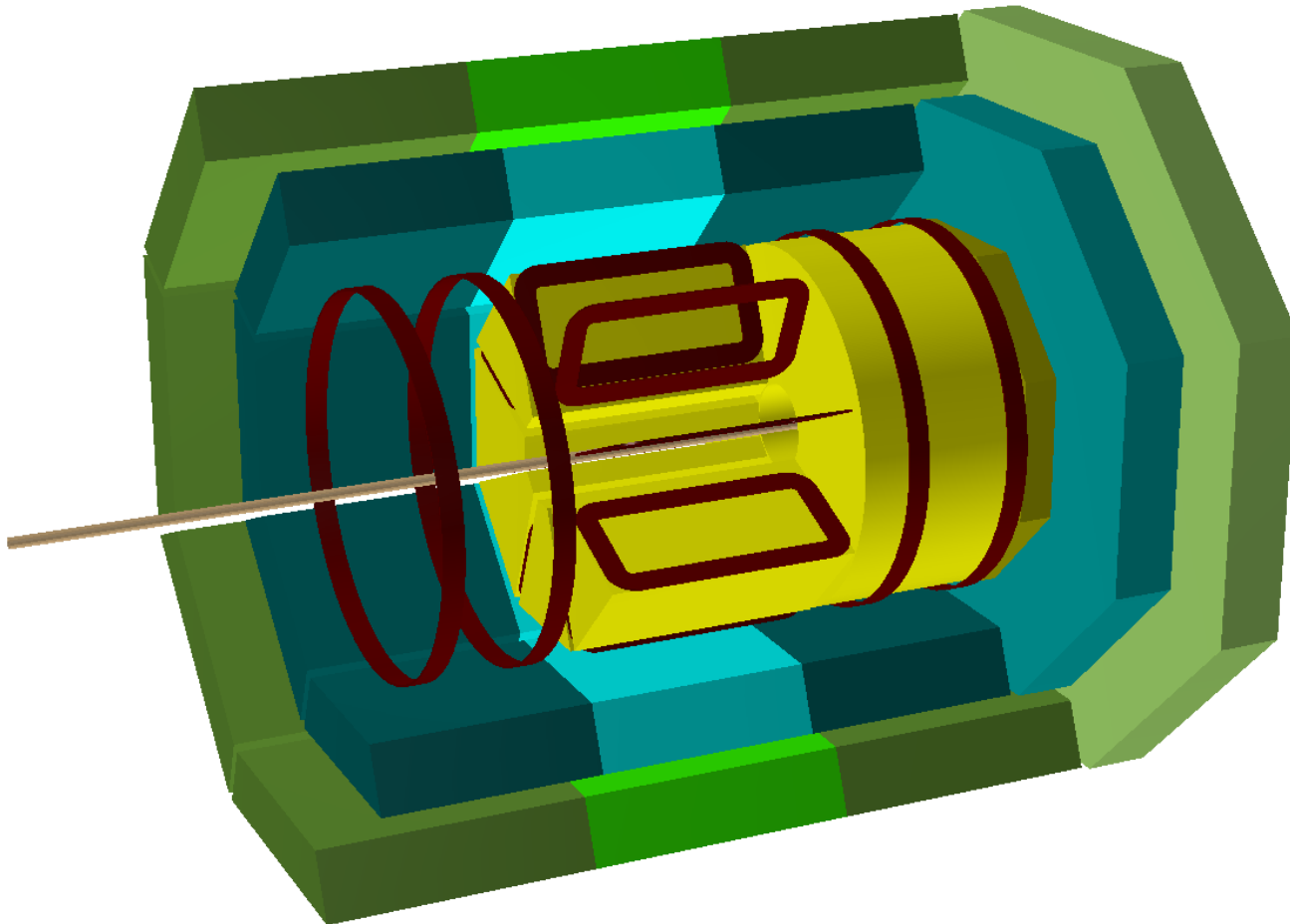
Perepelkin E.

*Tools:* SPDRoot + Pythia 6 - <https://git.jinr.ru/grias/spdroot>

*Data:* Hybrid Solenoidal and Toroidal SPD set-up with one million events; p – p collision with  $\sqrt{s} = 26$  GeV.

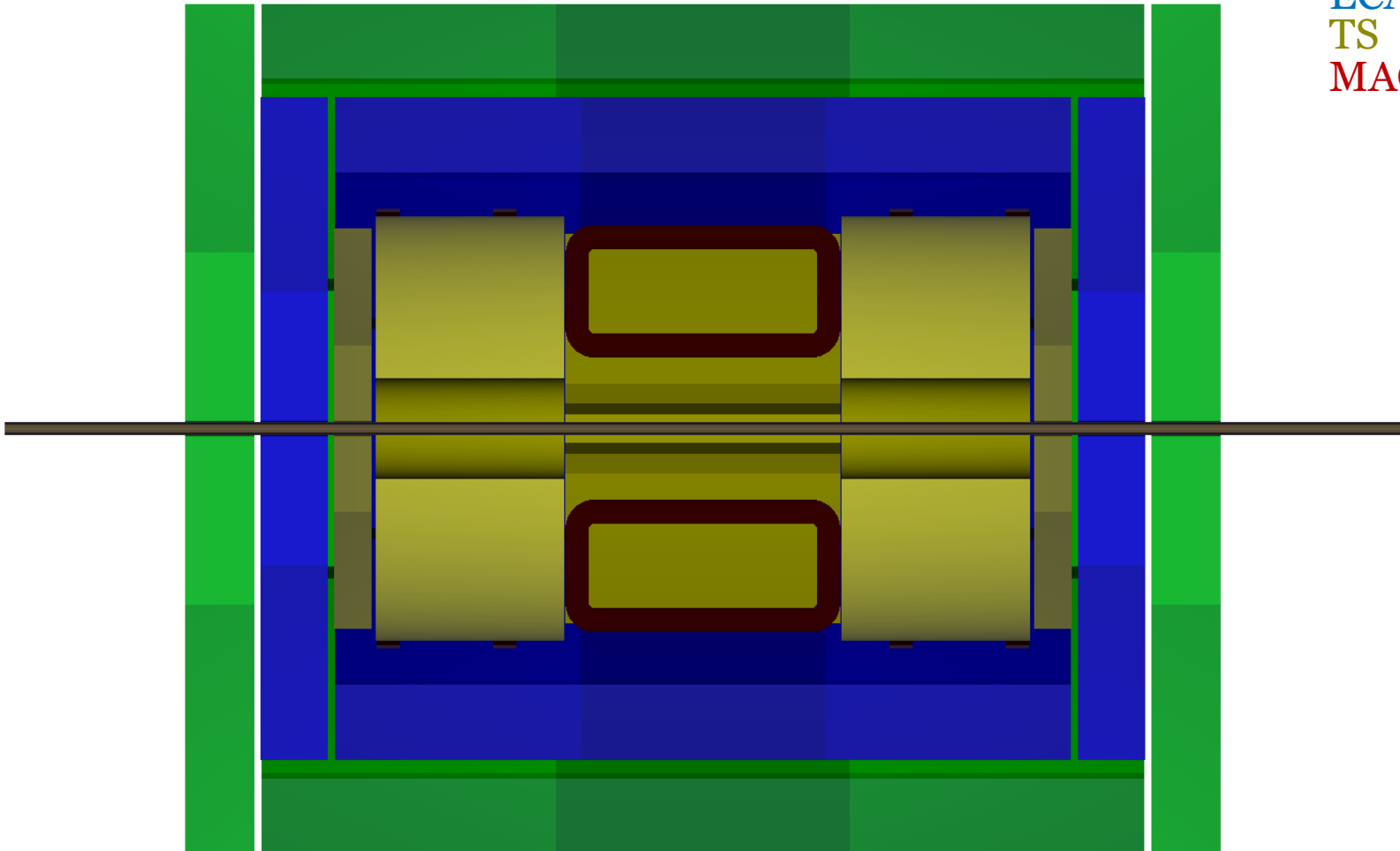
- Minimum bias

RS  
ECAL  
TS  
MAGNET

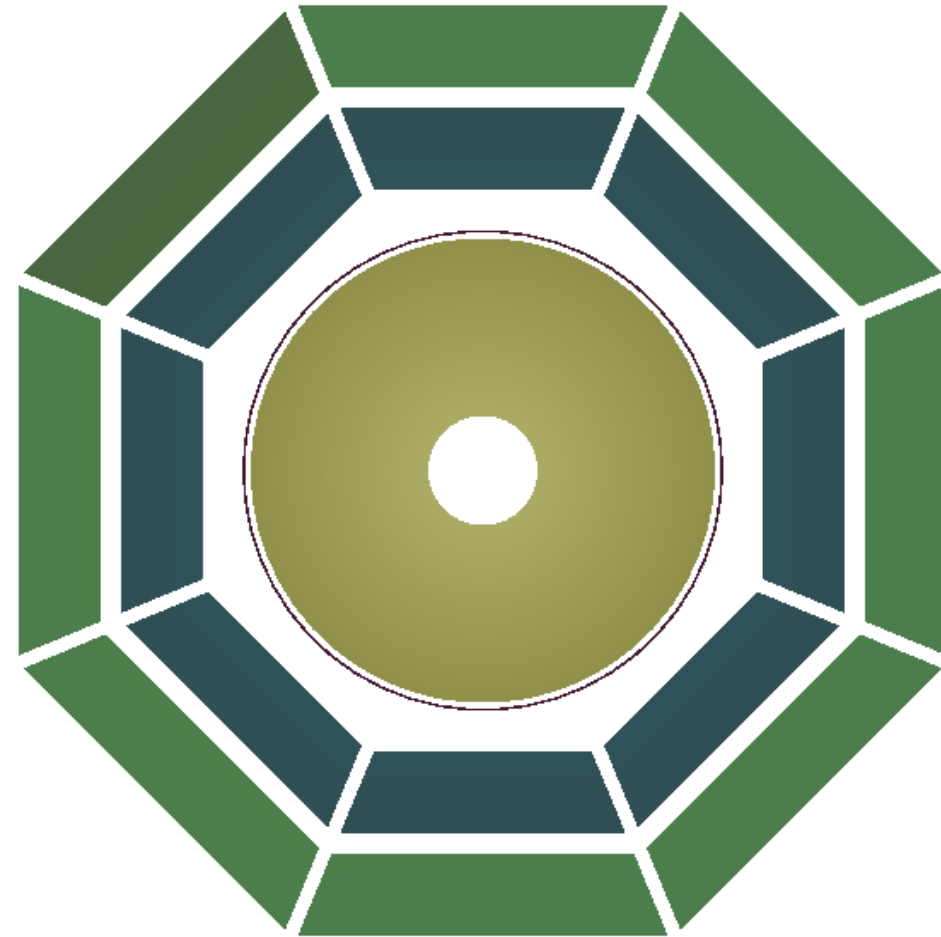


## New composition

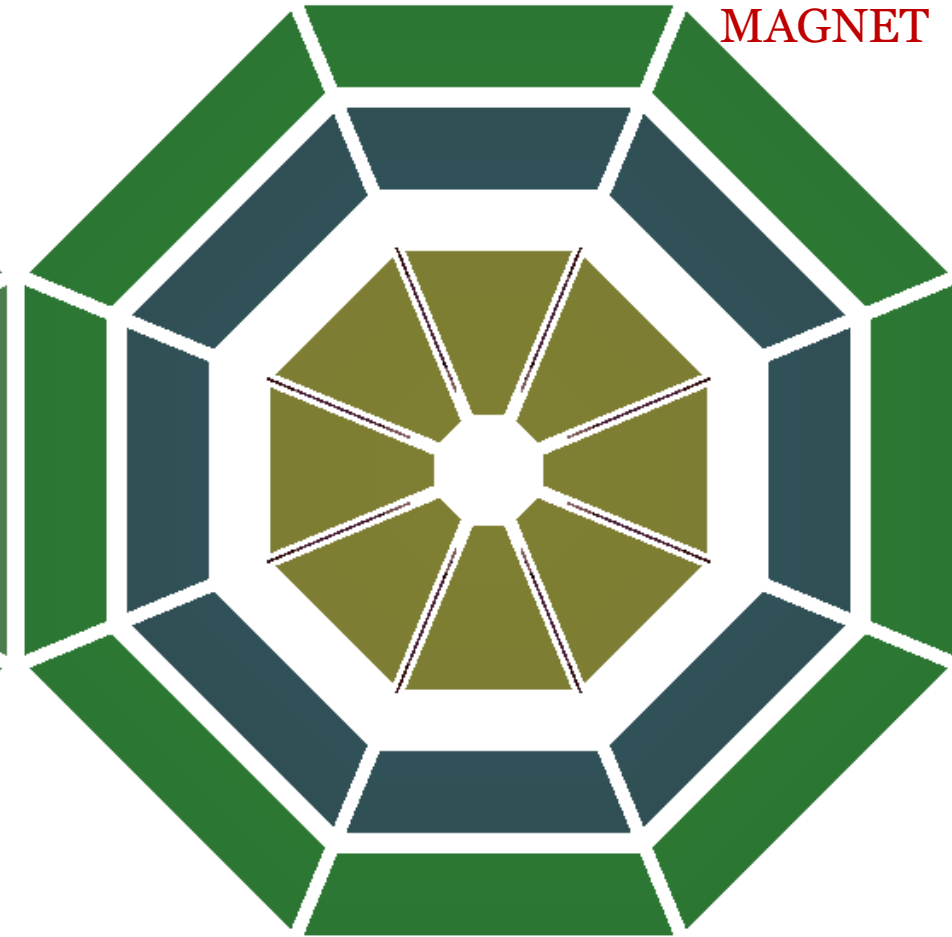
RS  
ECAL  
TS  
MAGNET



## Solenoidal part



## Toroidal part



RS  
ECAL  
TS  
MAGNET

# Particles distributions

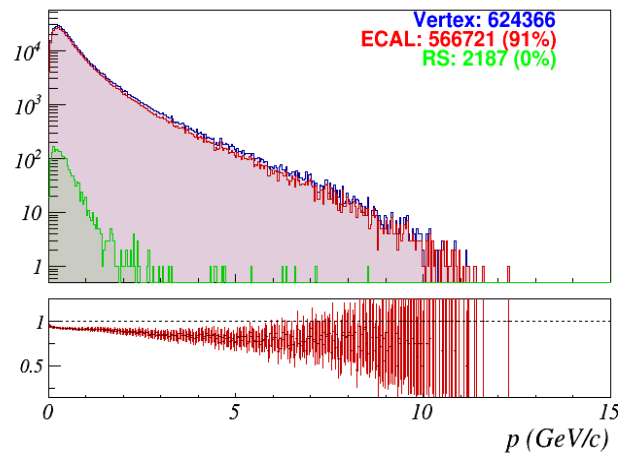
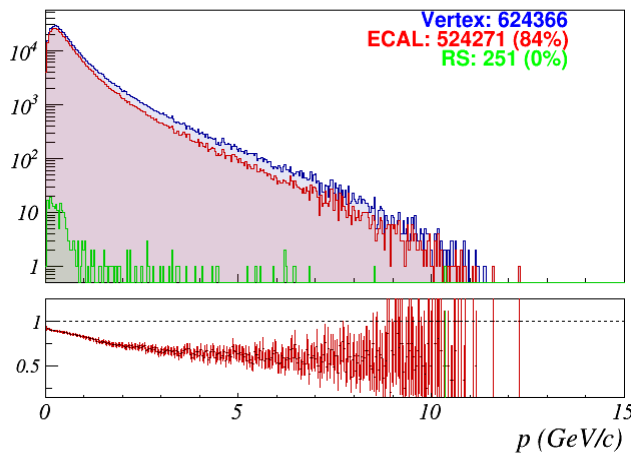
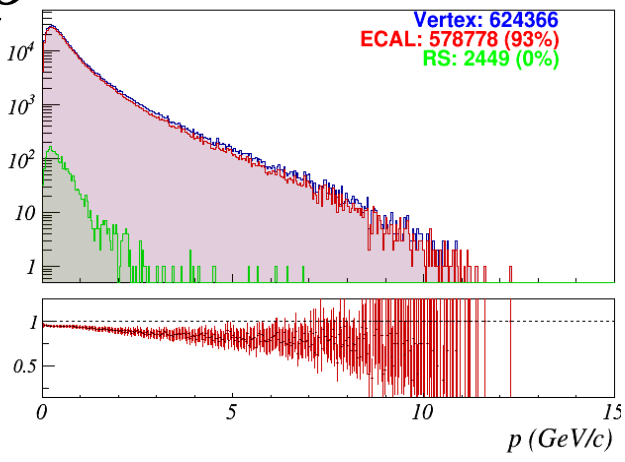


# Solenoid

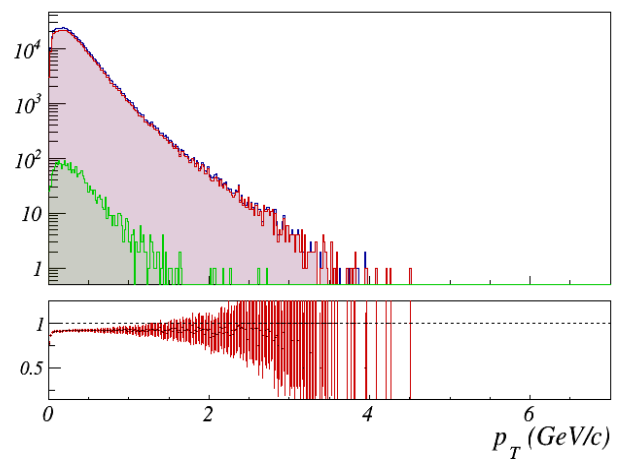
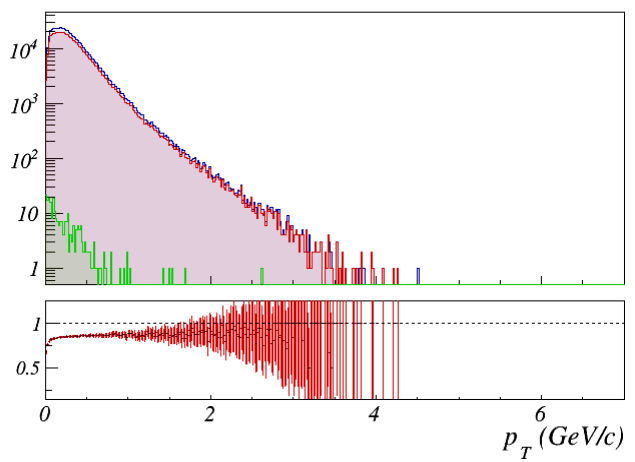
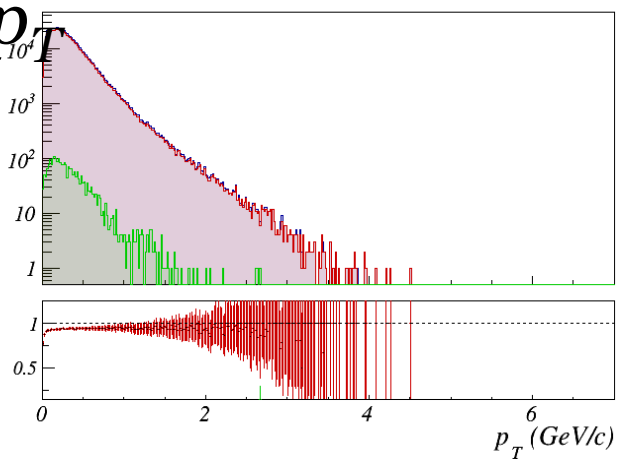
# Toroid

# Hybrid

$p$



$p_T$



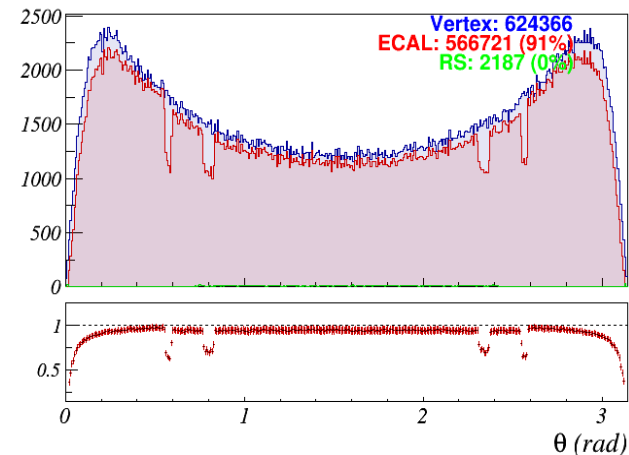
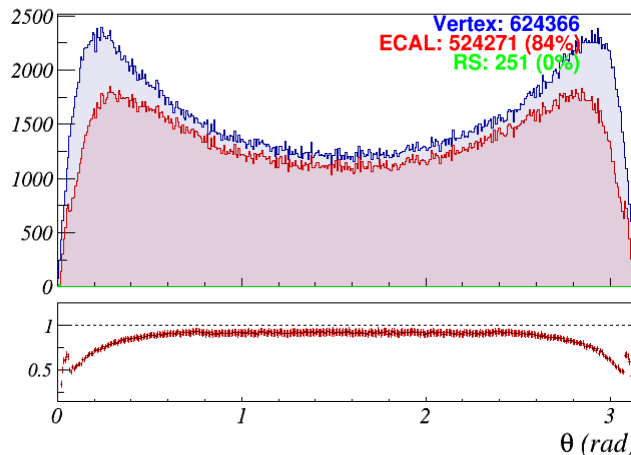
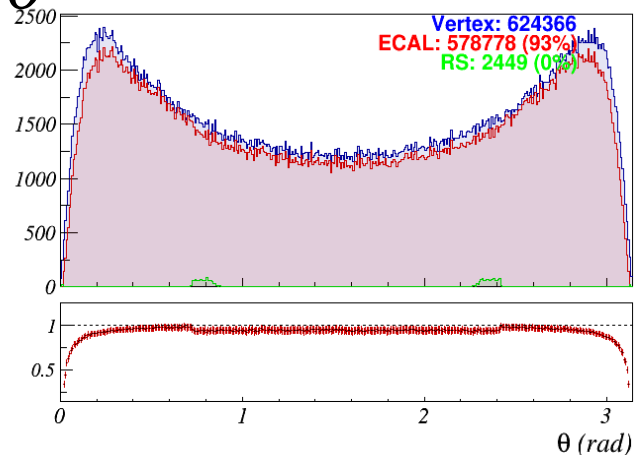
	Solenoid	Toroid	Hybrid
ECAL	93%	84%	91%

# Solenoid

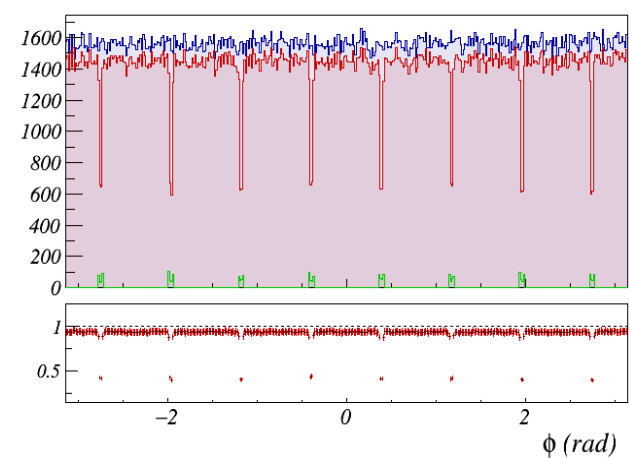
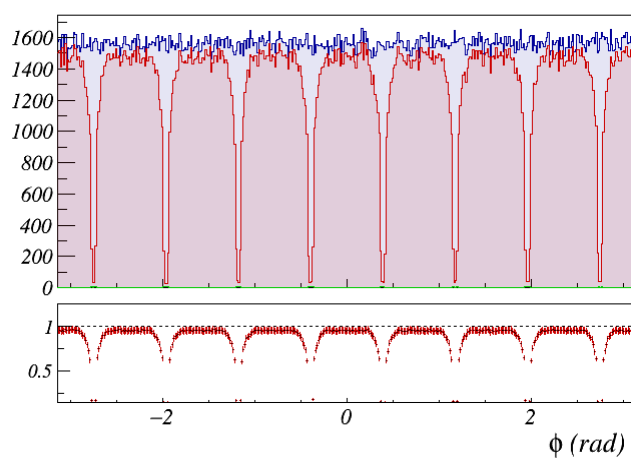
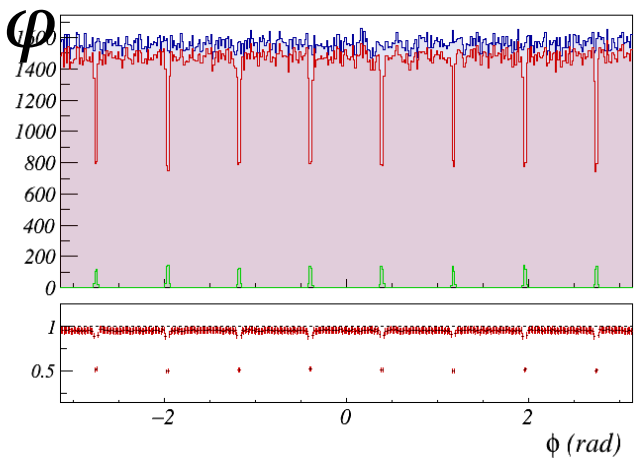
# Toroid

# Hybrid

$\theta$



$\phi$



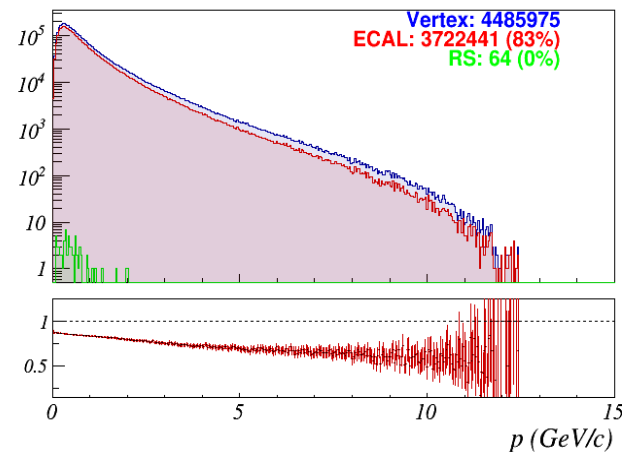
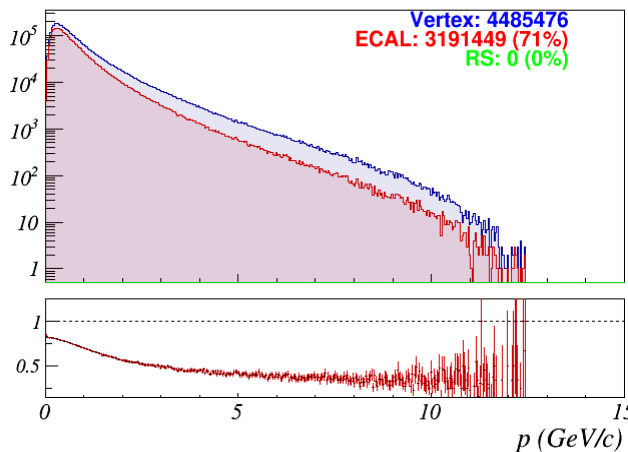
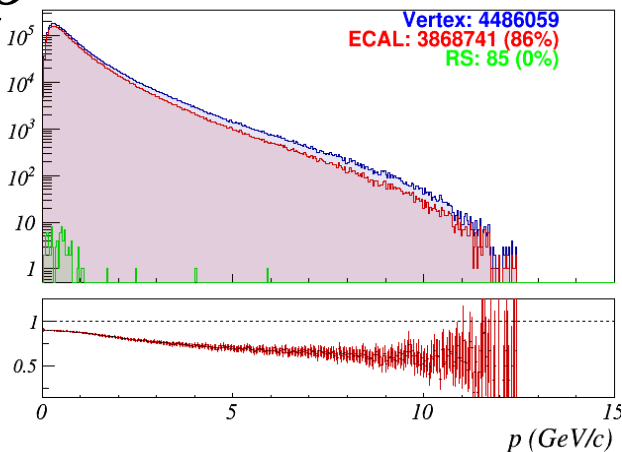
	Solenoid	Toroid	Hybrid
ECAL	93%	84%	91%

# Solenoid

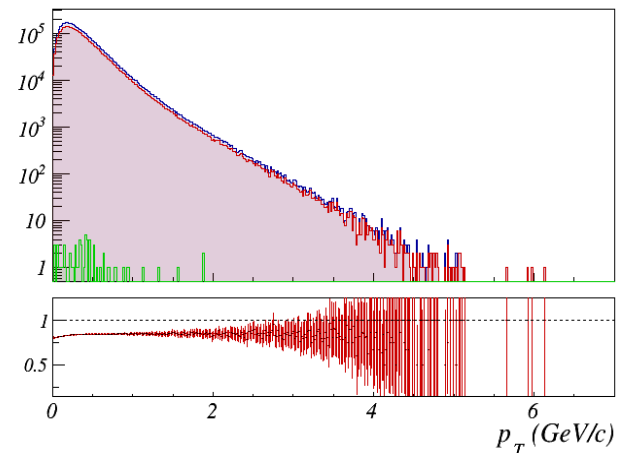
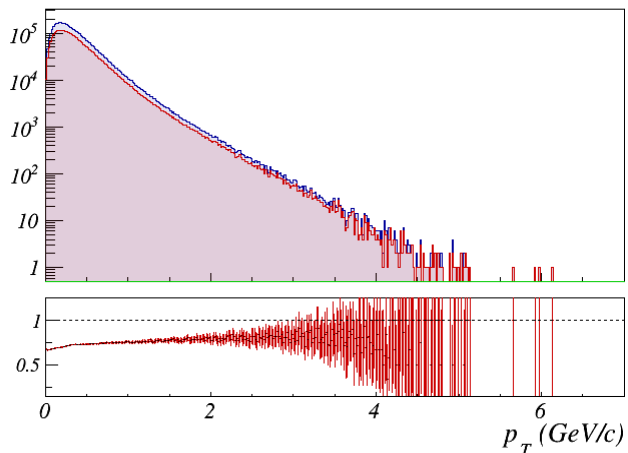
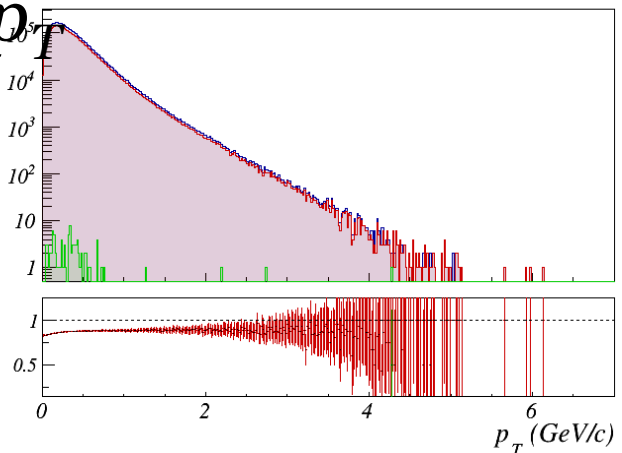
# Toroid

# Hybrid

$p$



$p_T$



	Solenoid	Toroid	Hybrid
ECAL	86%	71%	83%

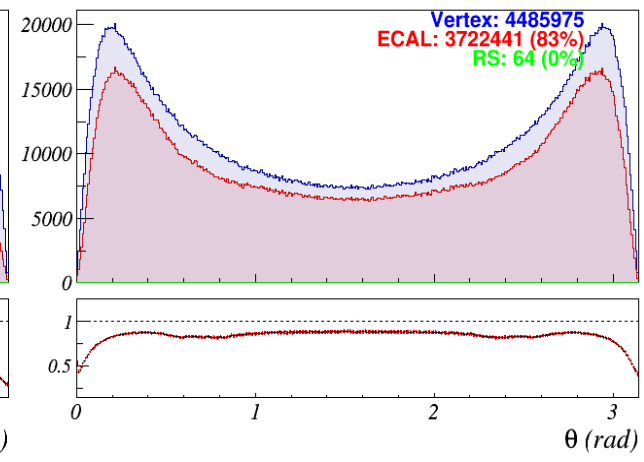
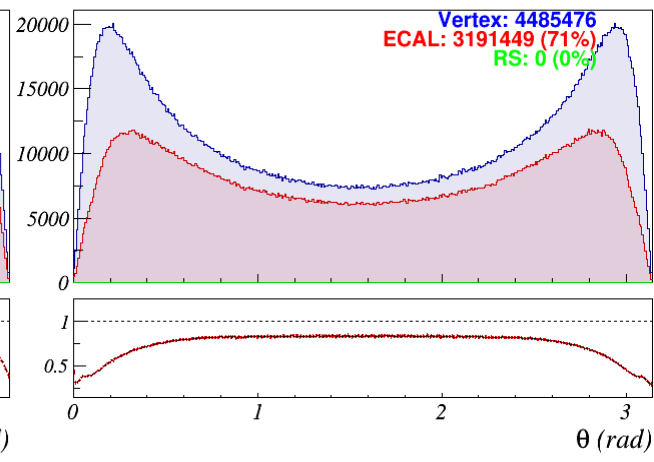
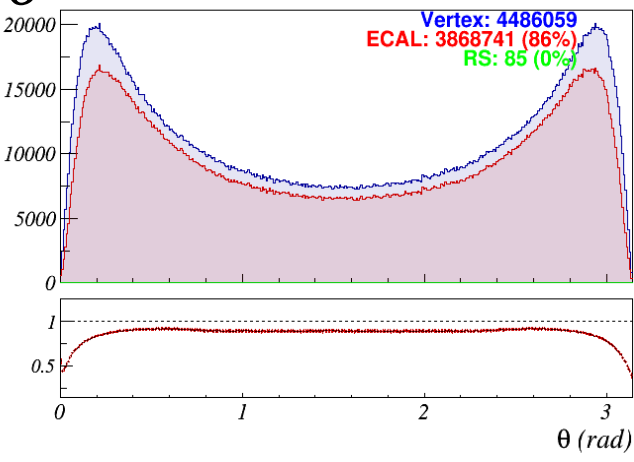


# Solenoid

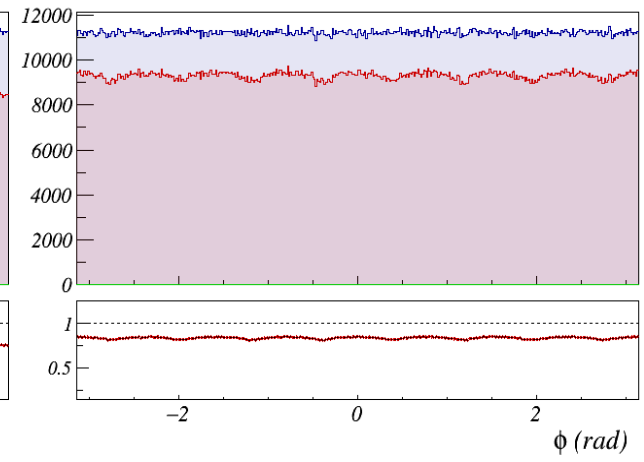
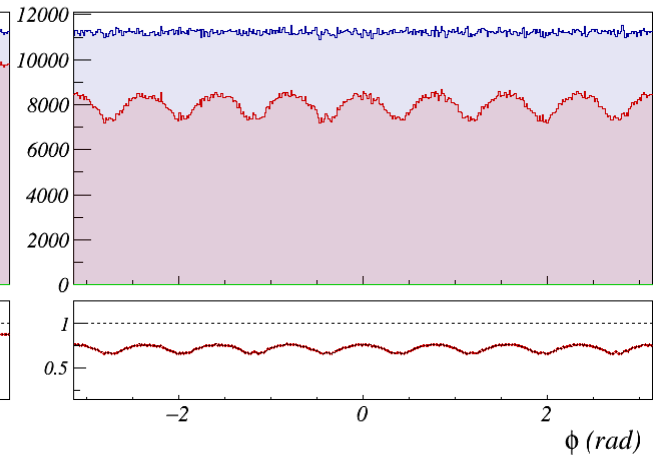
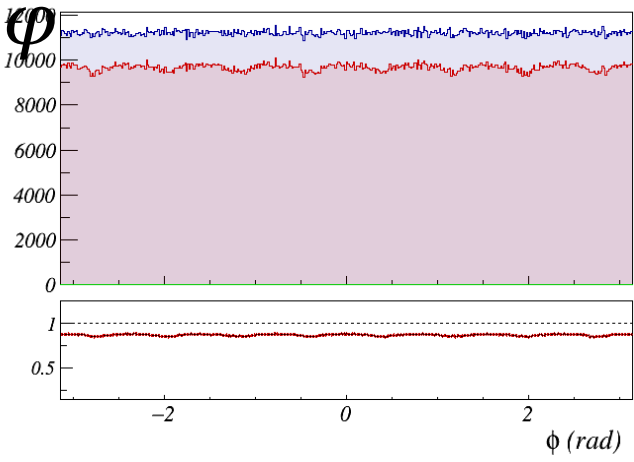
# Toroid

# Hybrid

$\theta$



$\phi$

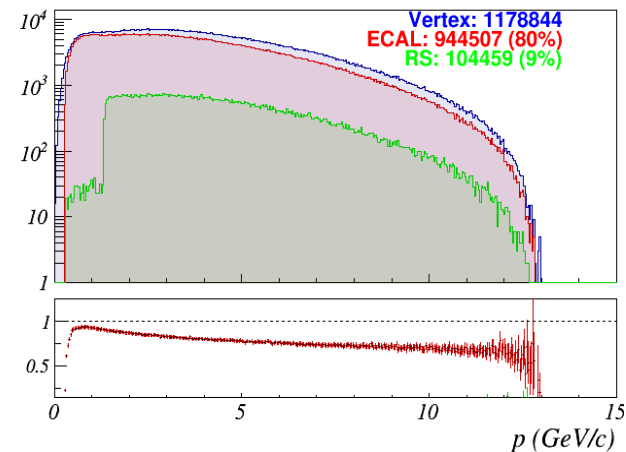
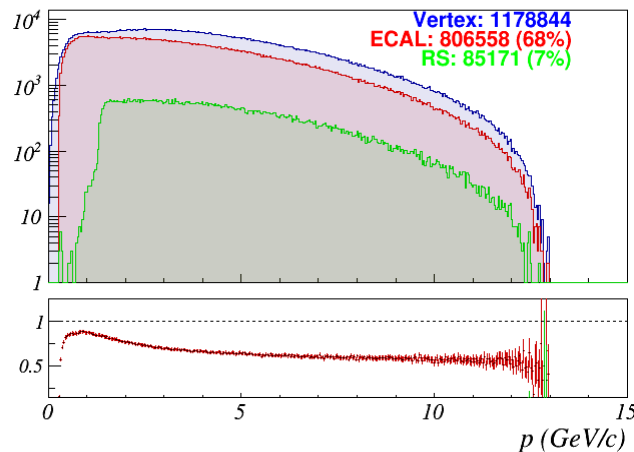
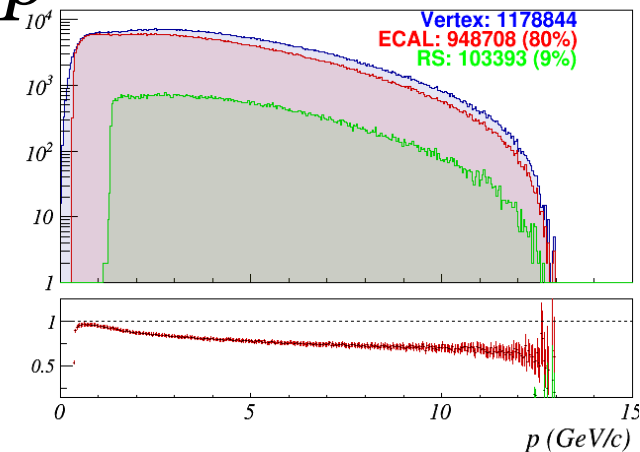
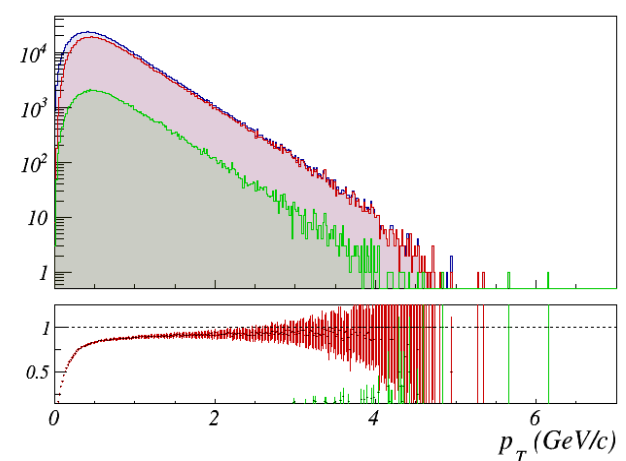
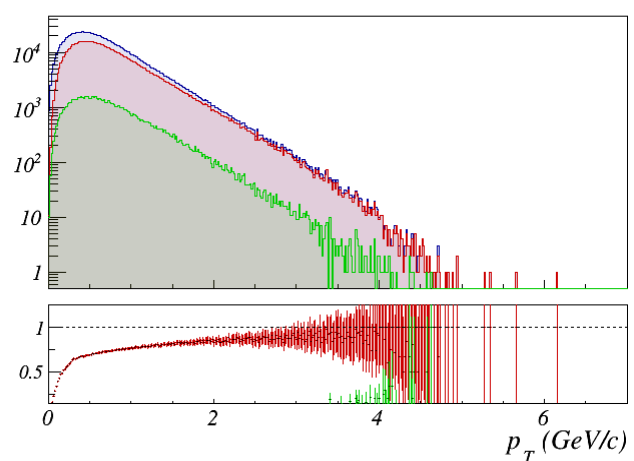
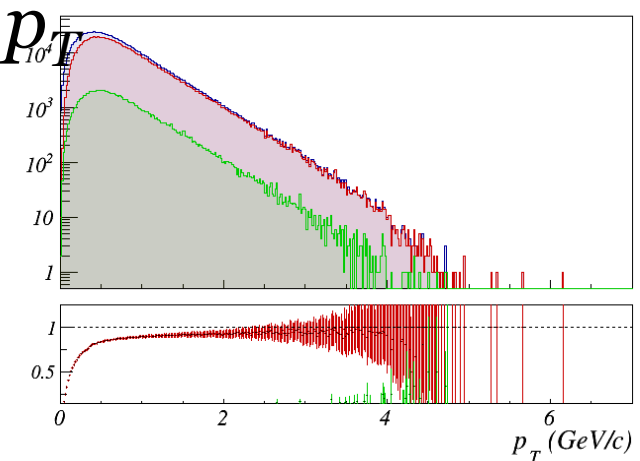


	Solenoid	Toroid	Hybrid
ECAL	86%	71%	83%

Solenoid

Toroid

Hybrid

 $p$  $p_T$ 

	Solenoid	Toroid	Hybrid
ECAL	80.5%	68.4%	80.1%

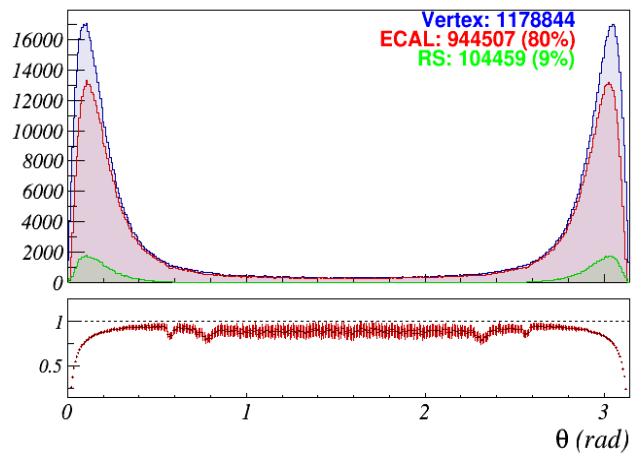
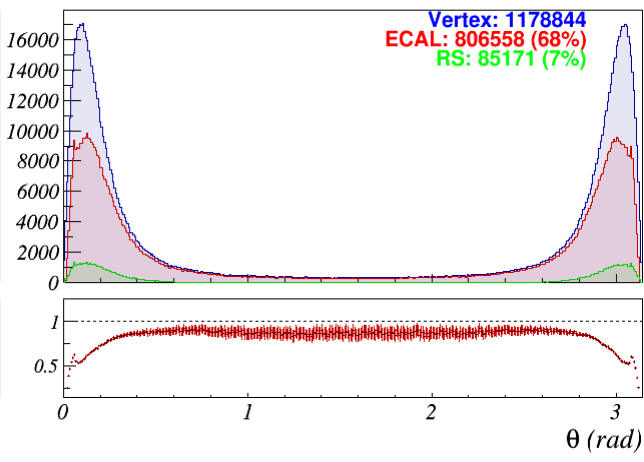
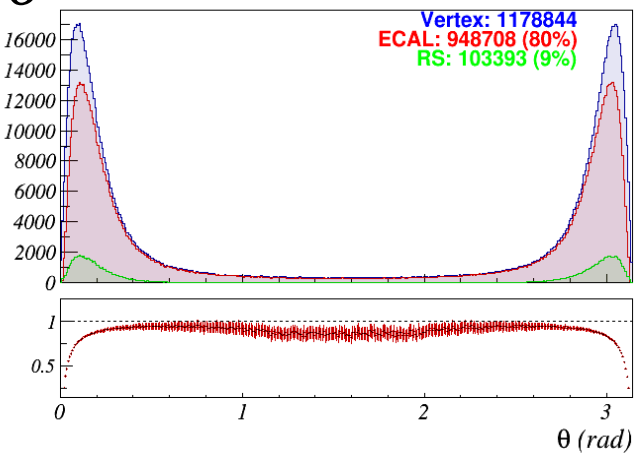
Angles:  $\theta$  from initial vertex

# Solenoid

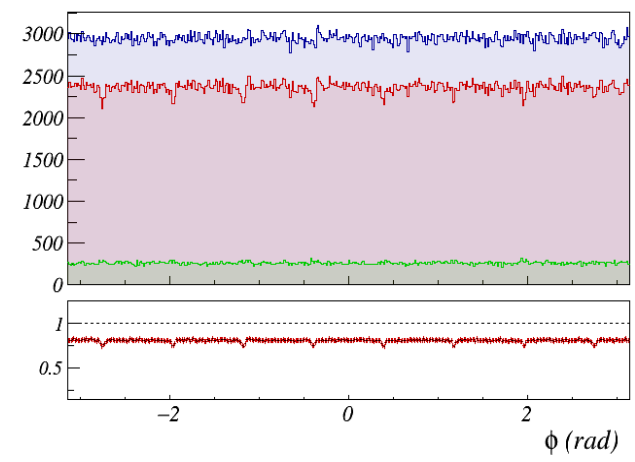
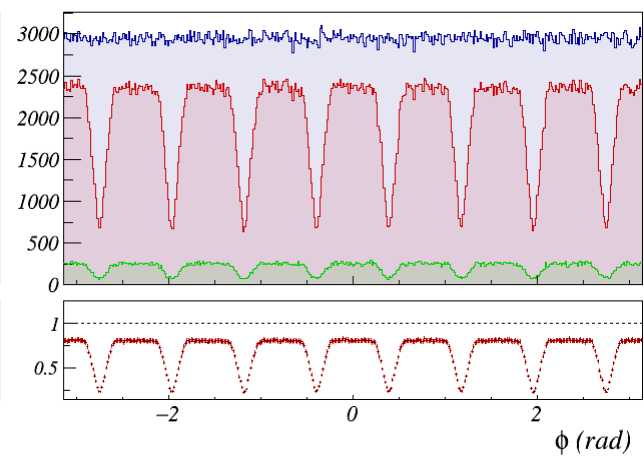
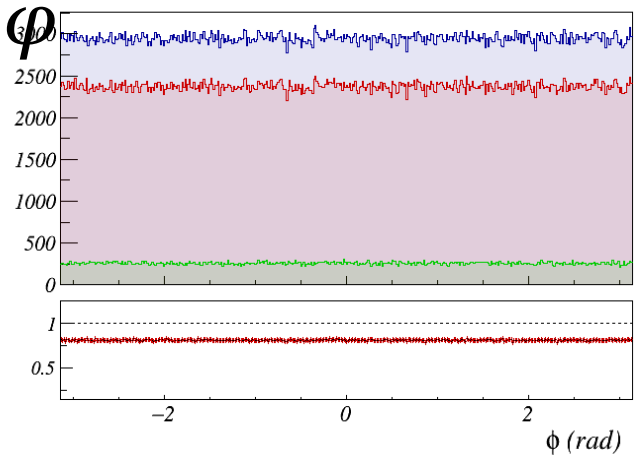
# Toroid

# Hybrid

$\theta$



$\phi$

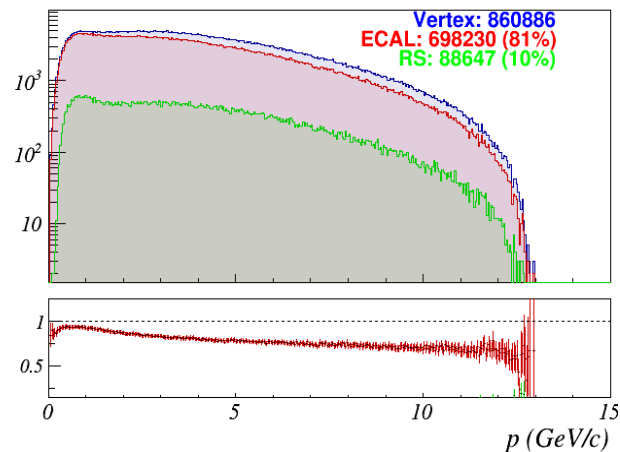
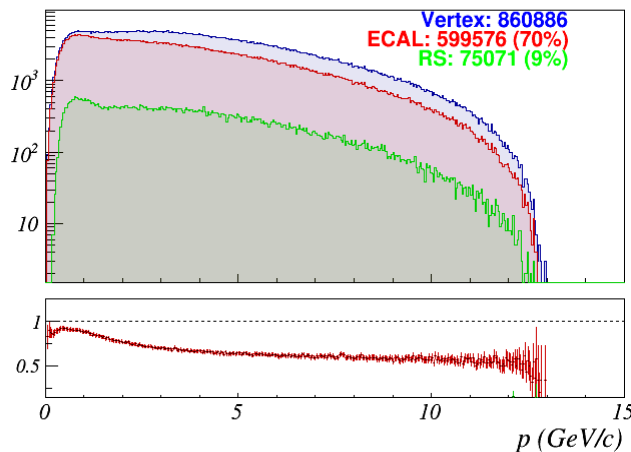
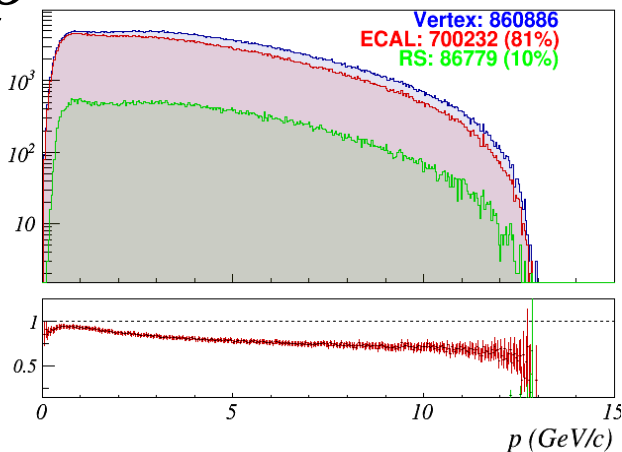
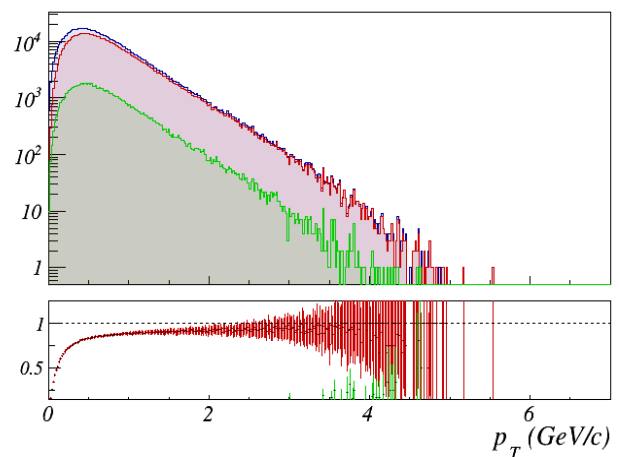
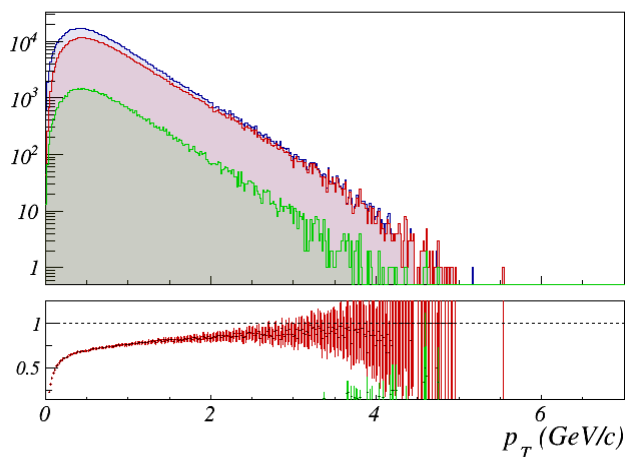
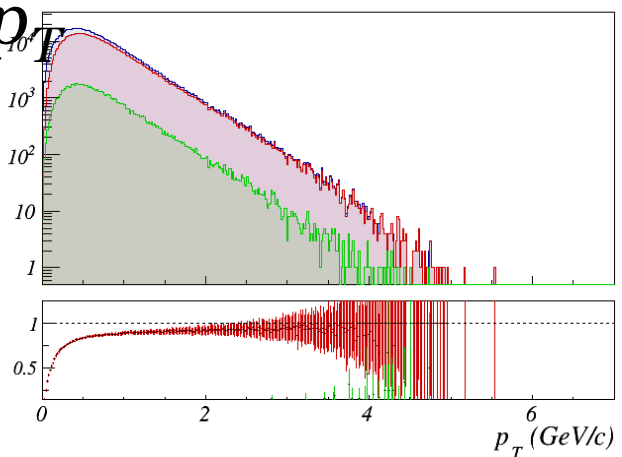


	Solenoid	Toroid	Hybrid
ECAL	80.5%	68.4%	80.1%

Solenoid

Toroid

Hybrid

 $p$  $p_T$ 

	Solenoid	Toroid	Hybrid
ECAL	81.3%	69.6%	81.1%

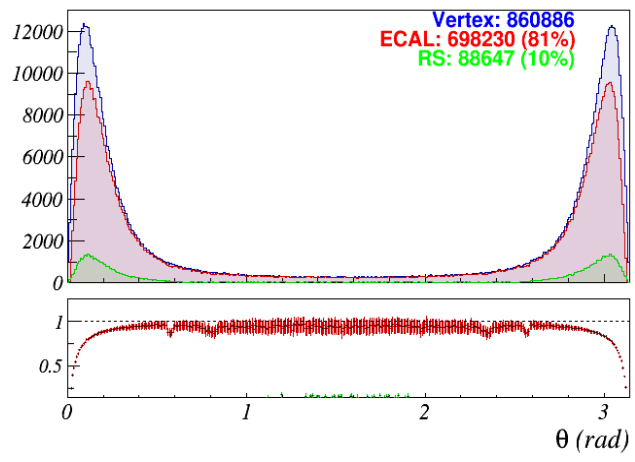
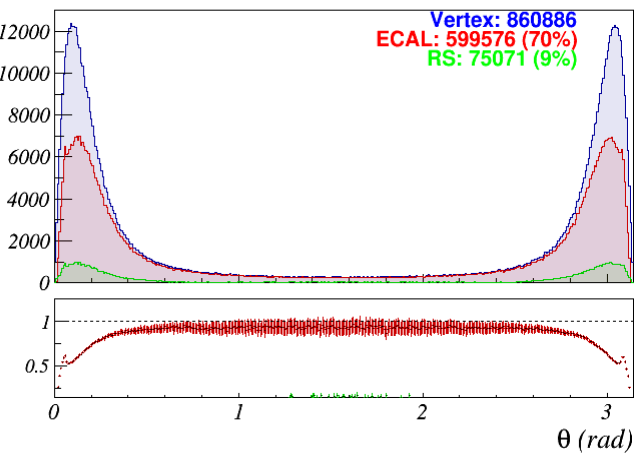
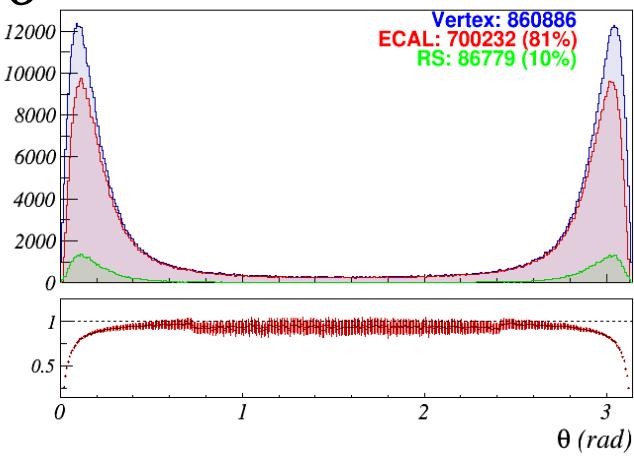
Angles:  $n$  from initial vertex

# Solenoid

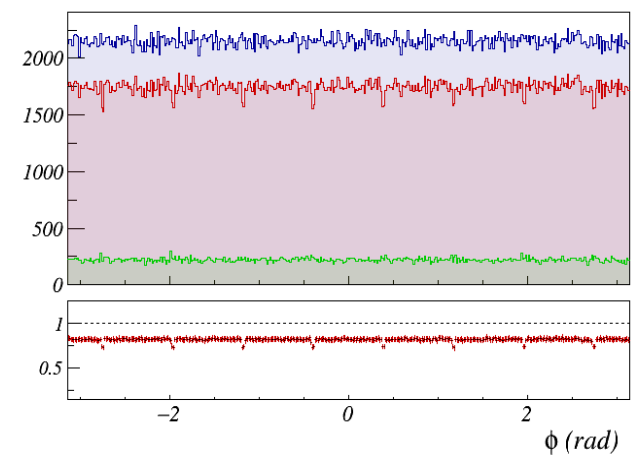
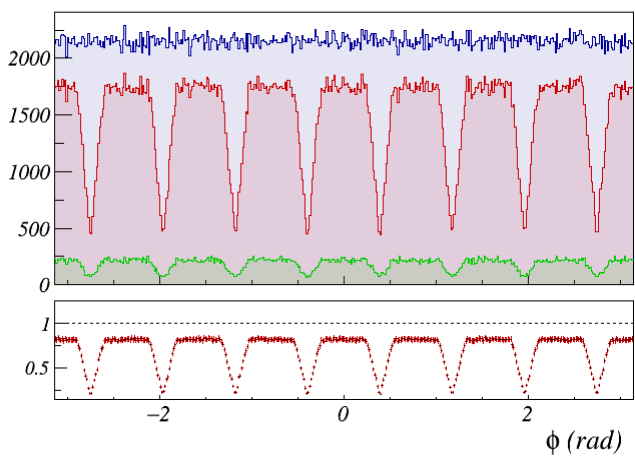
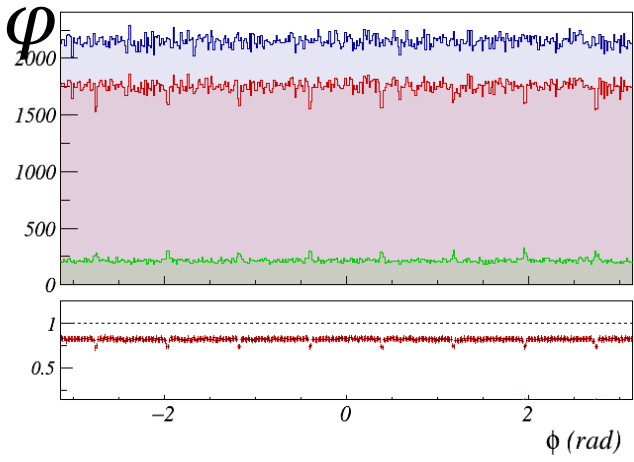
# Toroid

# Hybrid

$\theta$



$\phi$



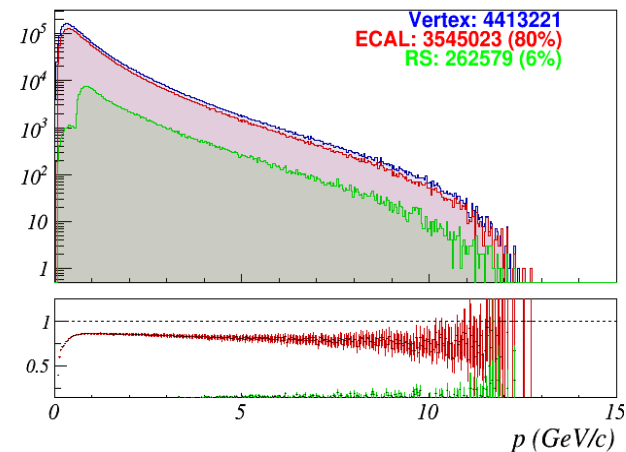
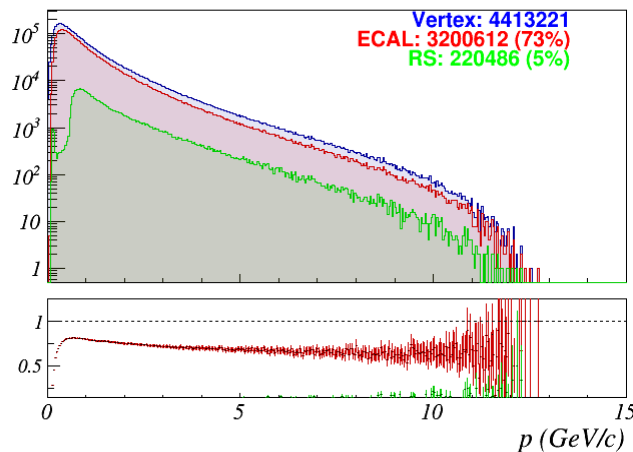
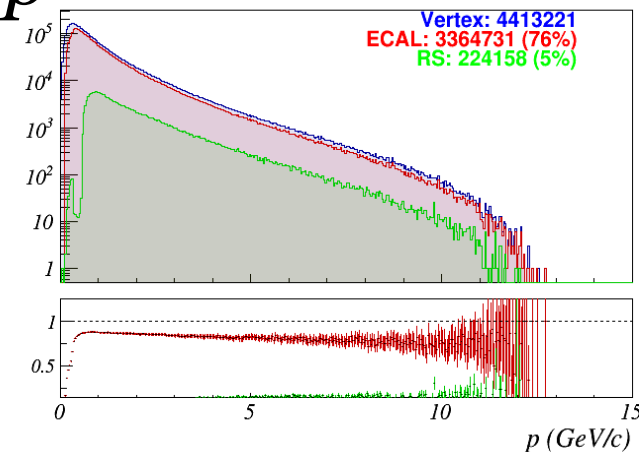
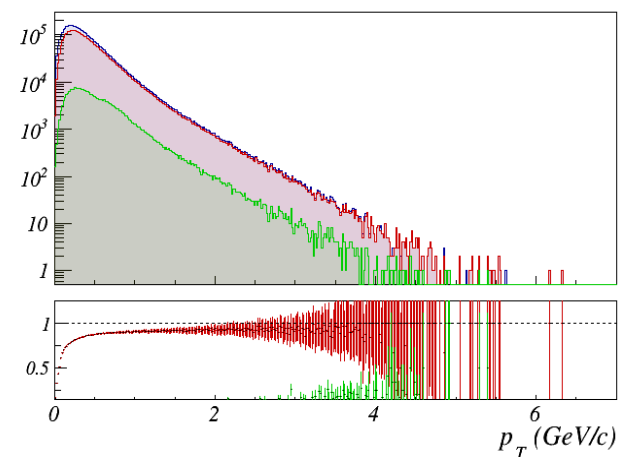
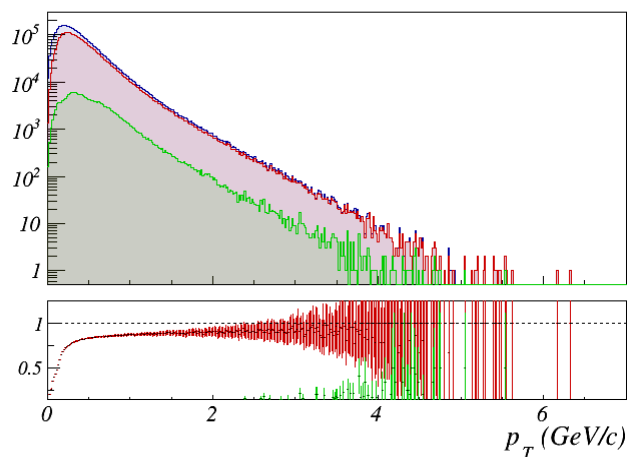
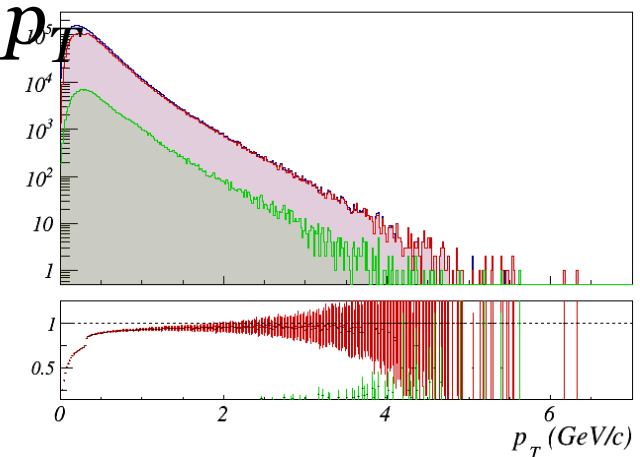
	Solenoid	Toroid	Hybrid
ECAL	81.3%	69.6%	81.1%

Momentum:  $\pi^+$  from initial vertex

Solenoid

Toroid

Hybrid

 $p$  $p_T$ 

	Solenoid	Toroid	Hybrid
ECAL	76%	73%	80%

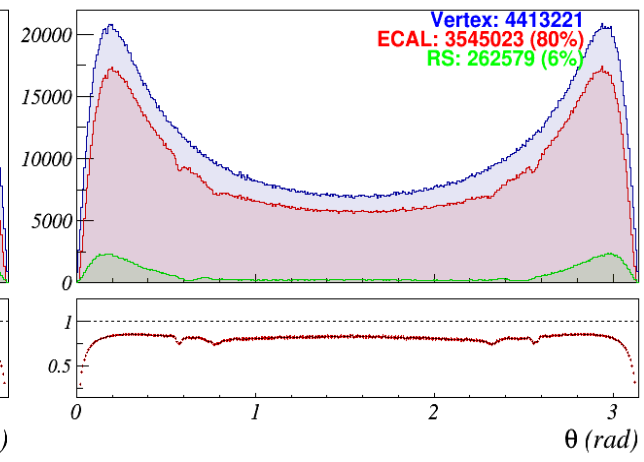
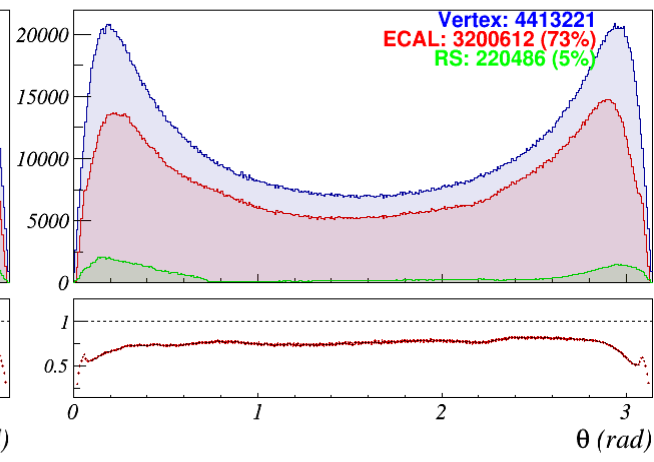
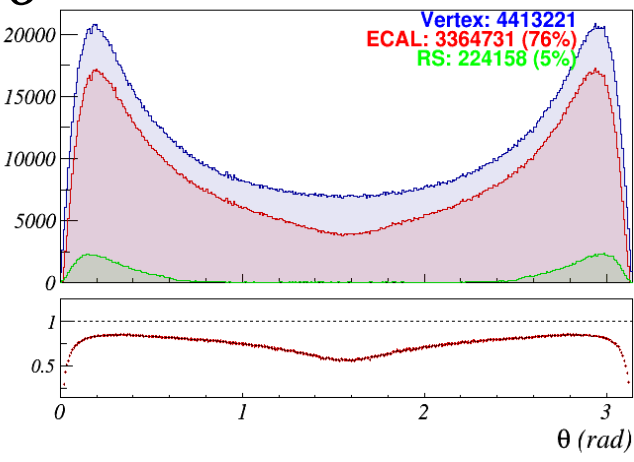
Angles:  $\pi^+$  from initial vertex

# Solenoid

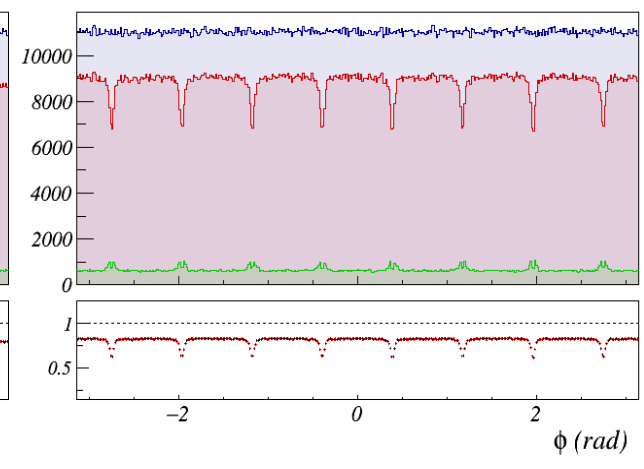
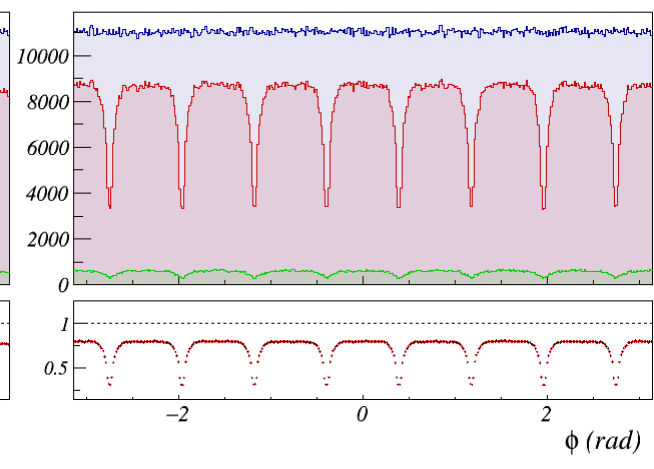
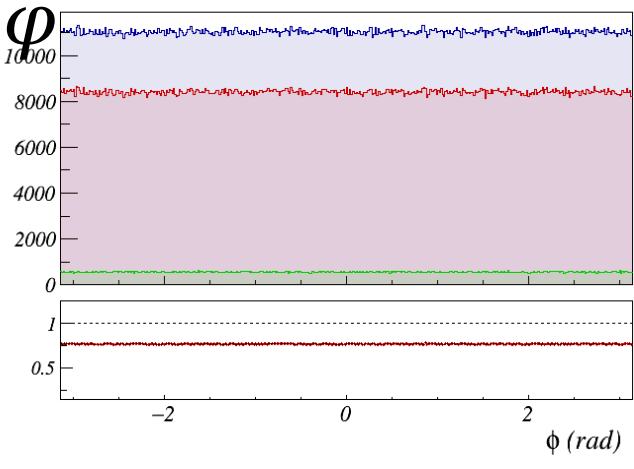
# Toroid

# Hybrid

$\theta$



$\phi$



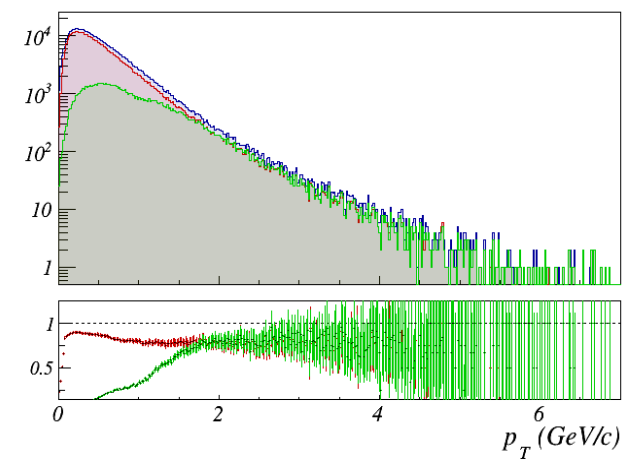
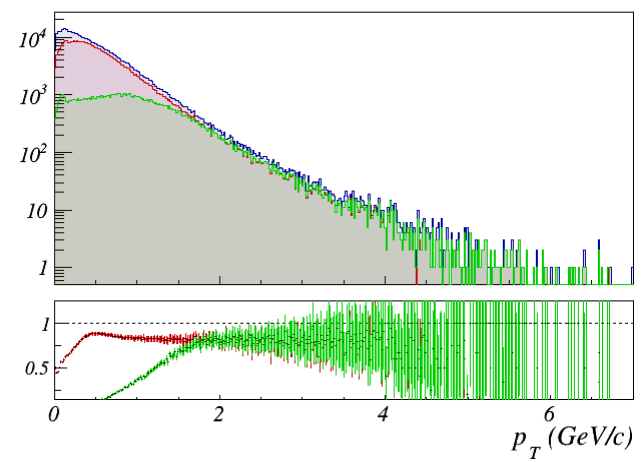
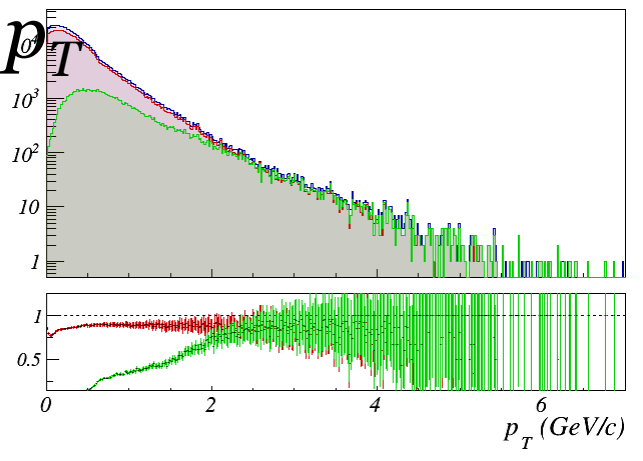
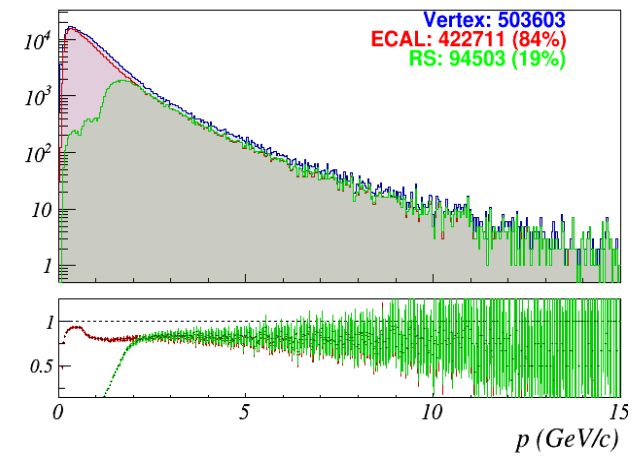
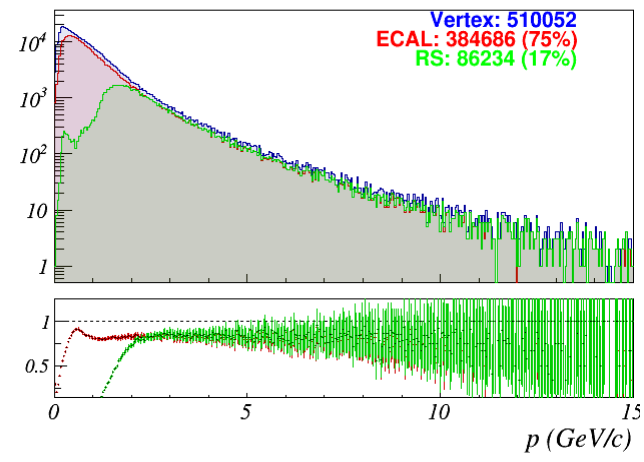
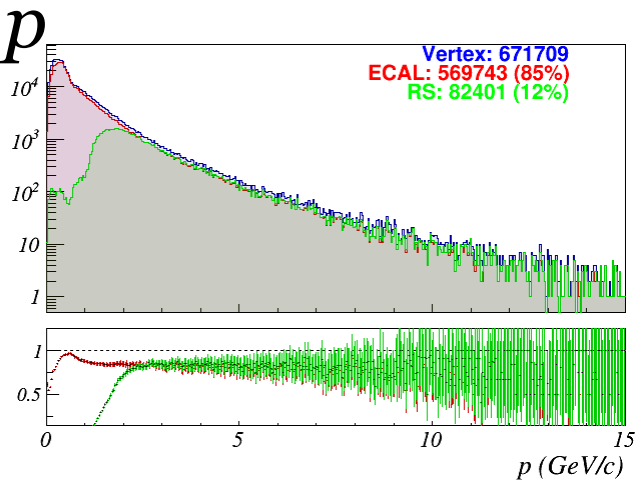
	Solenoid	Toroid	Hybrid
ECAL	76%	73%	80%

Momentum:  $\pi^+ \rightarrow \mu^+ \nu_\mu$

# Solenoid

# Toroid

# Hybrid



	Solenoid	Toroid	Hybrid
ECAL	85%	75%	84%
RS	12%	17%	19%

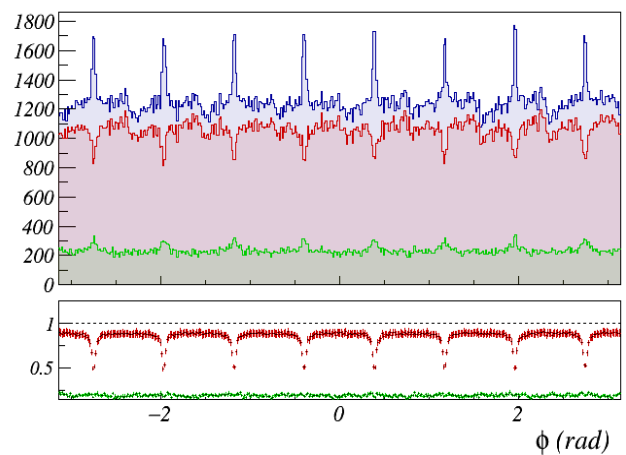
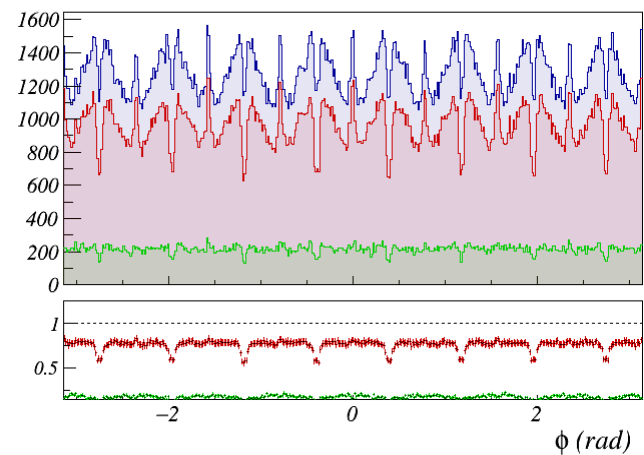
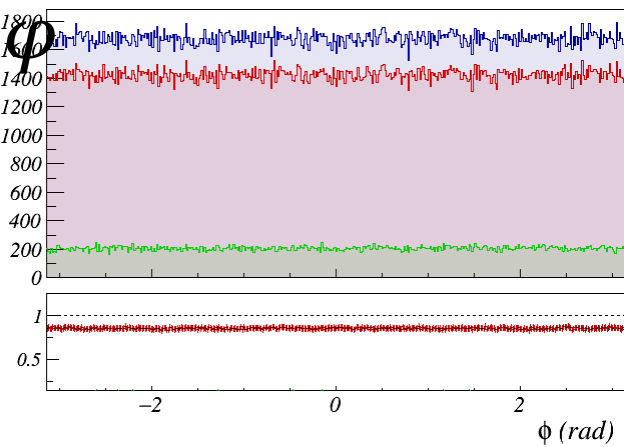
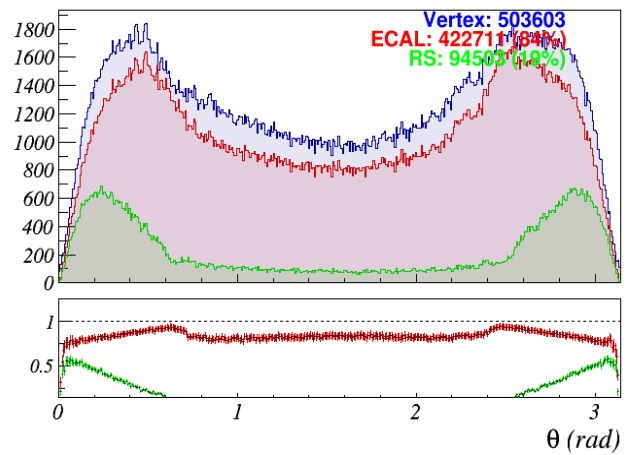
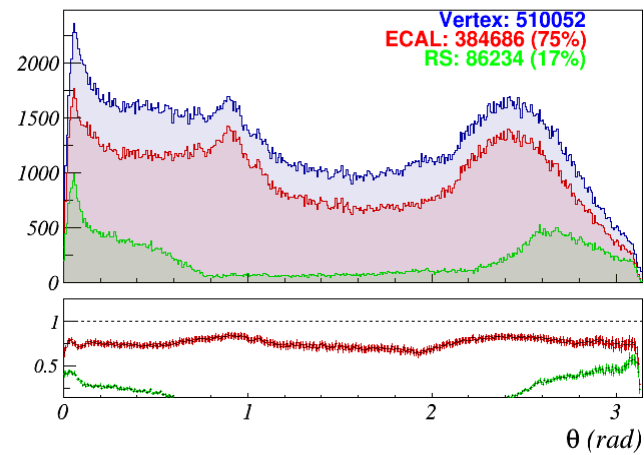
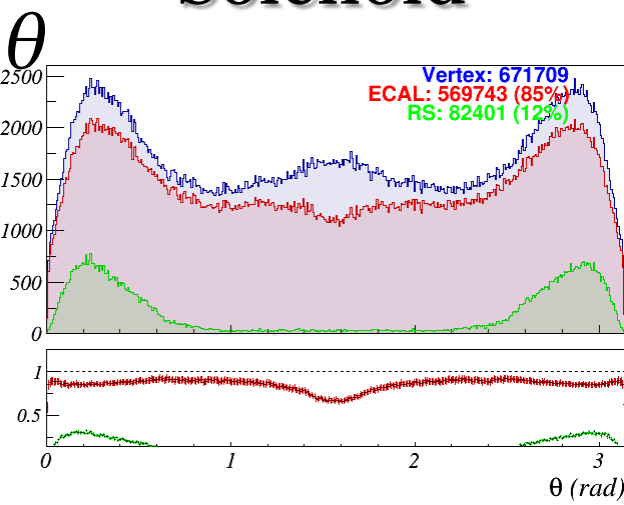


# Angles: $\pi^+ \rightarrow \mu^+ \nu_\mu$

## Solenoid

## Toroid

## Hybrid



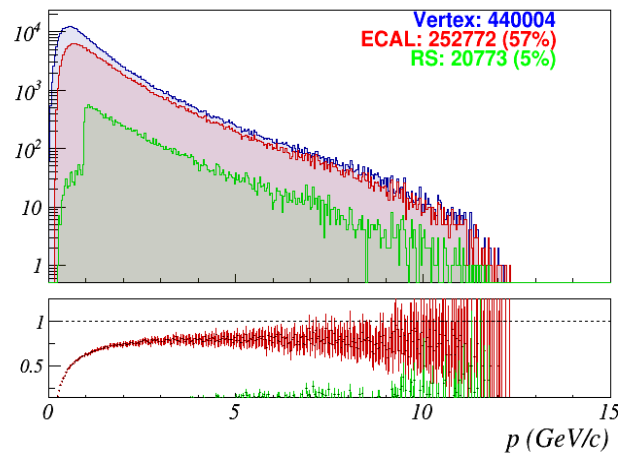
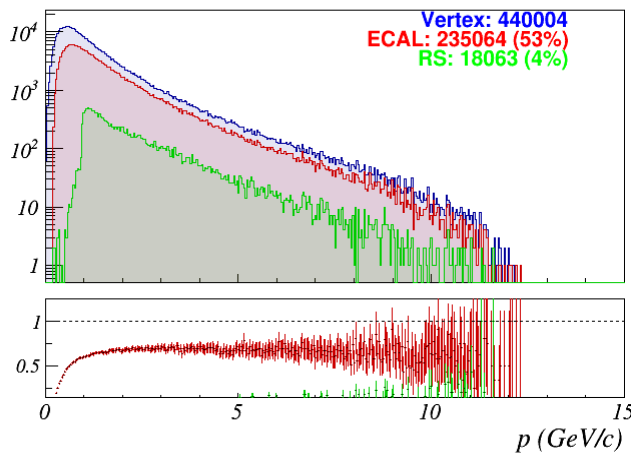
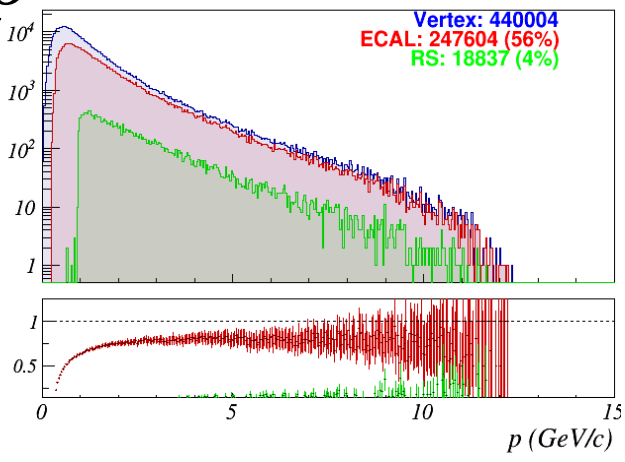
	Solenoid	Toroid	Hybrid
ECAL	85%	75%	84%
RS	12%	17%	19%

# Solenoid

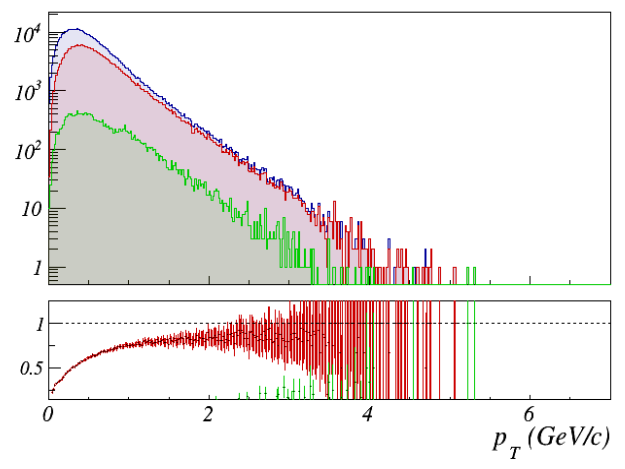
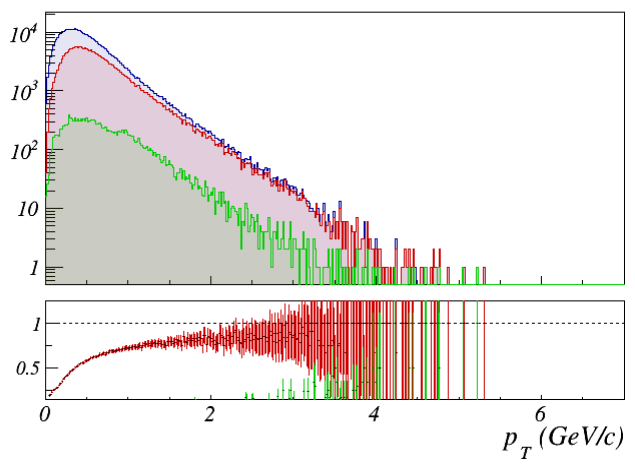
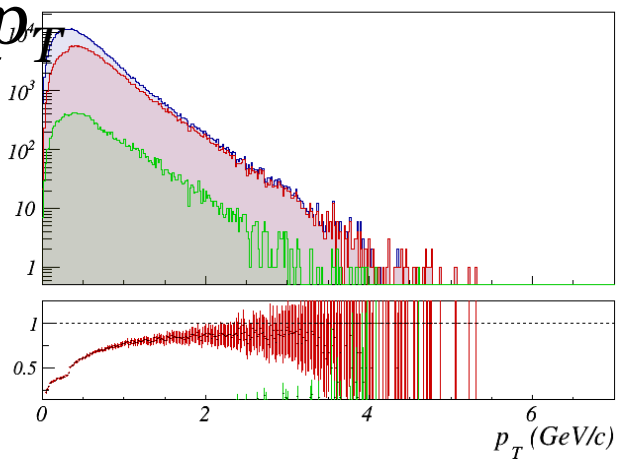
# Toroid

# Hybrid

$p$



$p_T$



	Solenoid	Toroid	Hybrid
ECAL	56%	53%	57%

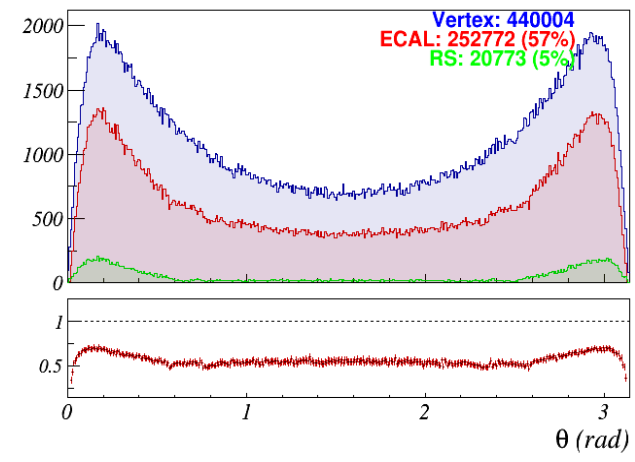
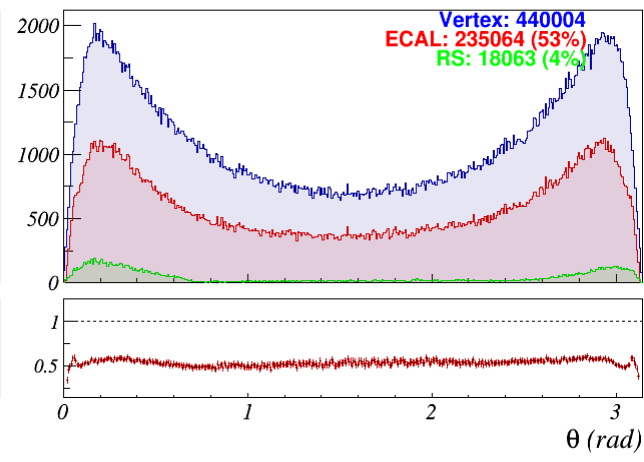
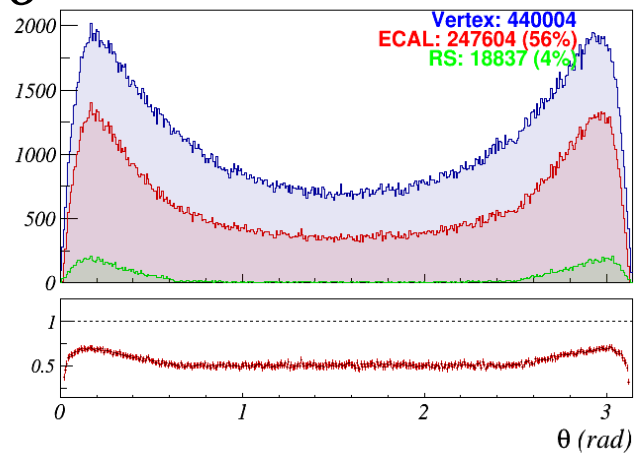
Angles: K<sup>+</sup> from initial vertex

# Solenoid

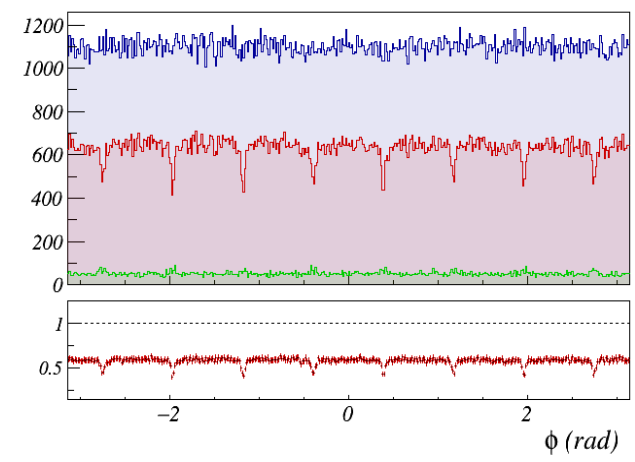
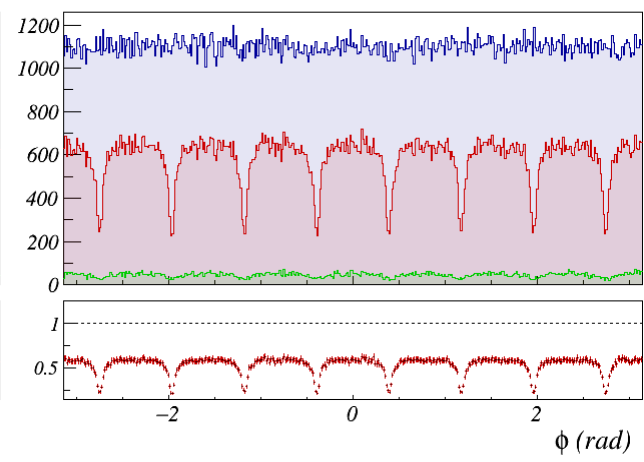
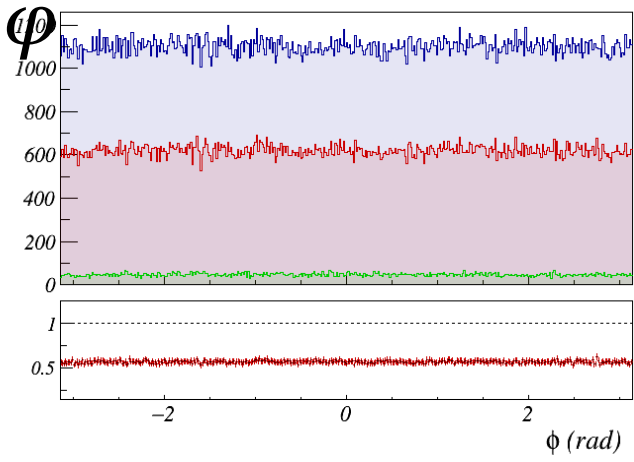
# Toroid

# Hybrid

$\theta$



$\phi$

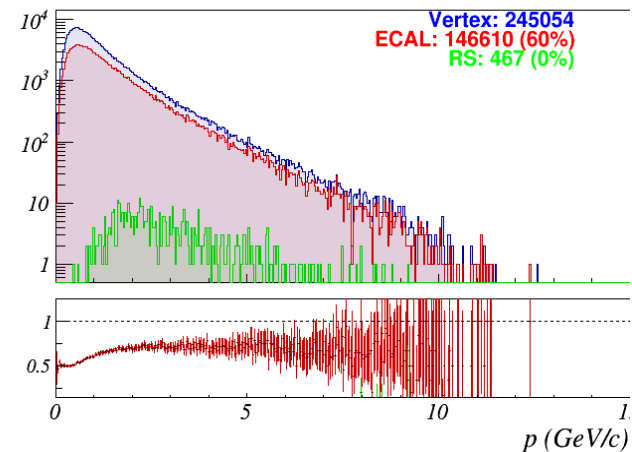
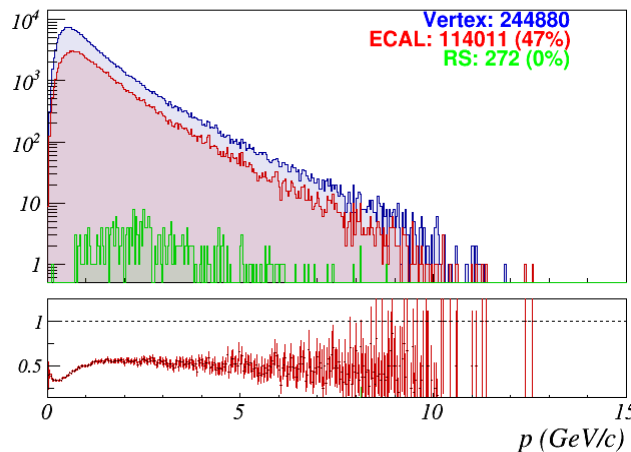
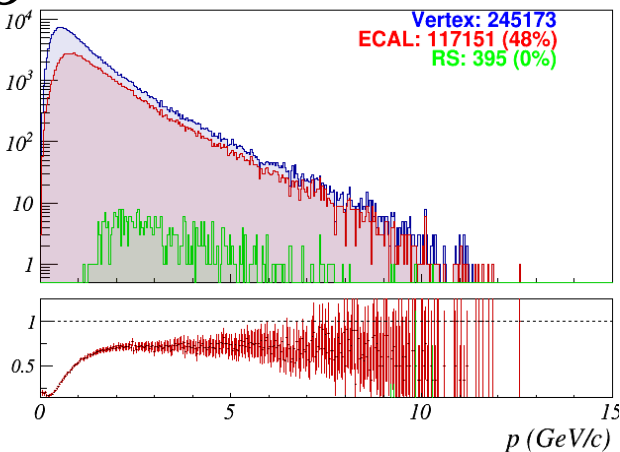
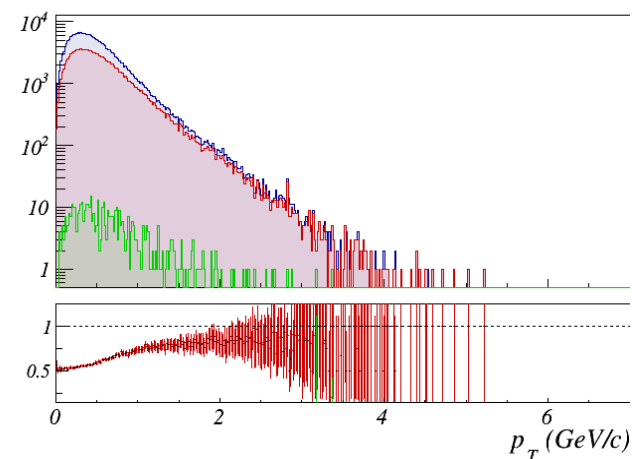
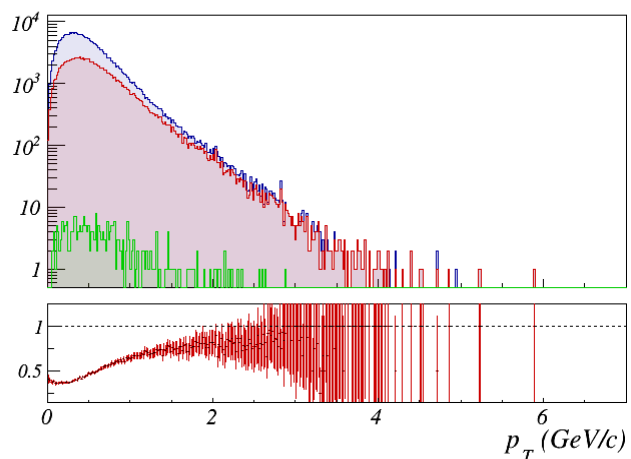
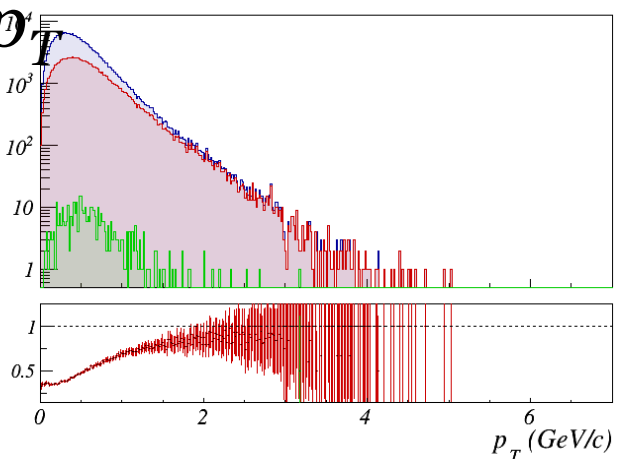


	Solenoid	Toroid	Hybrid
ECAL	56%	53%	57%

Solenoid

Toroid

Hybrid

 $p$  $p_T$ 

	Solenoid	Toroid	Hybrid
ECAL	48%	47%	60%

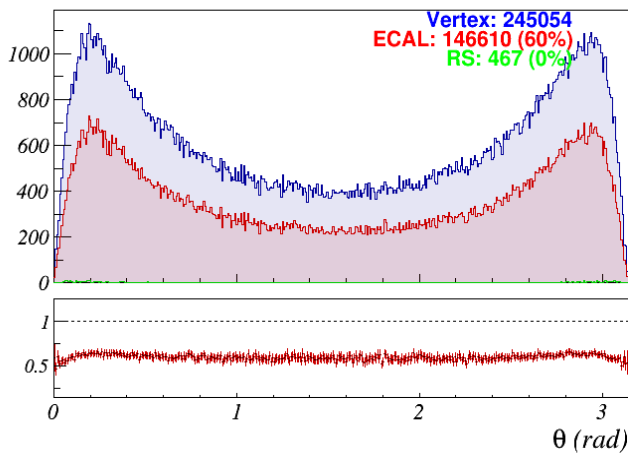
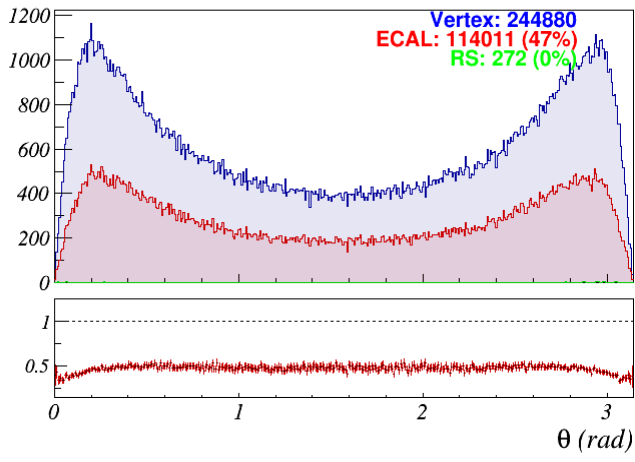
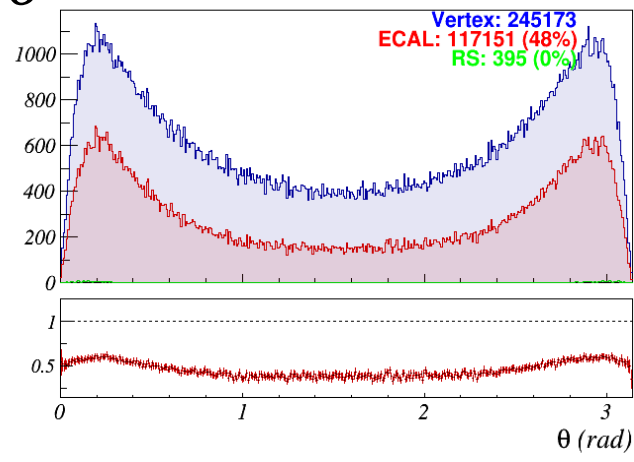
Angles:  $K^0 \rightarrow \pi^+ \pi^-$

# Solenoid

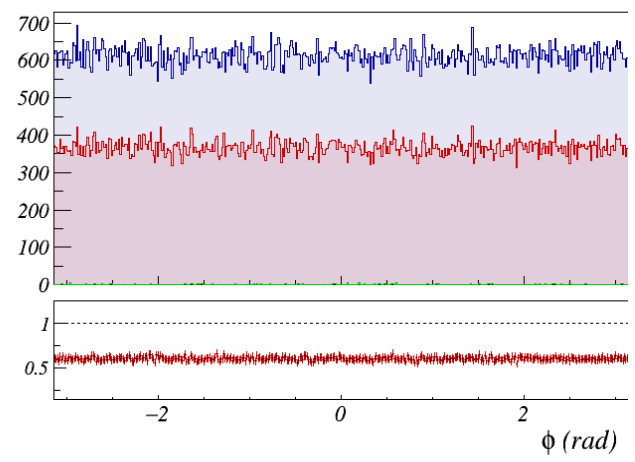
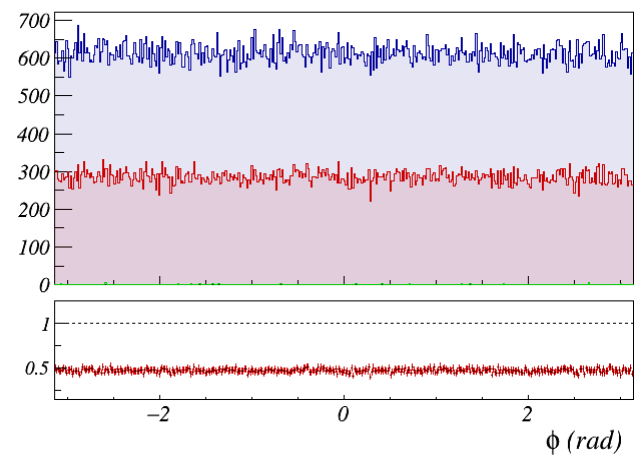
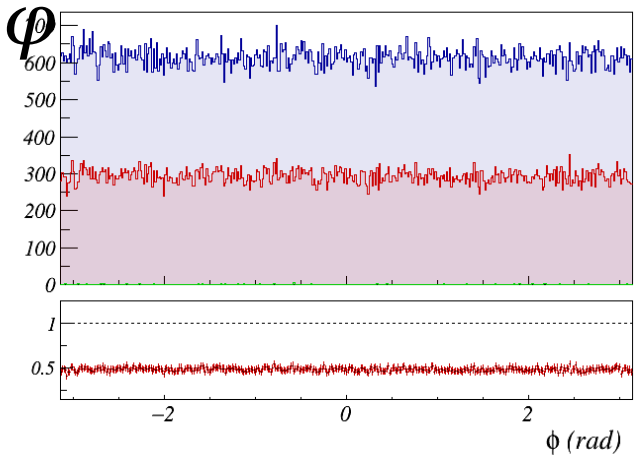
# Toroid

# Hybrid

$\theta$



$\phi$



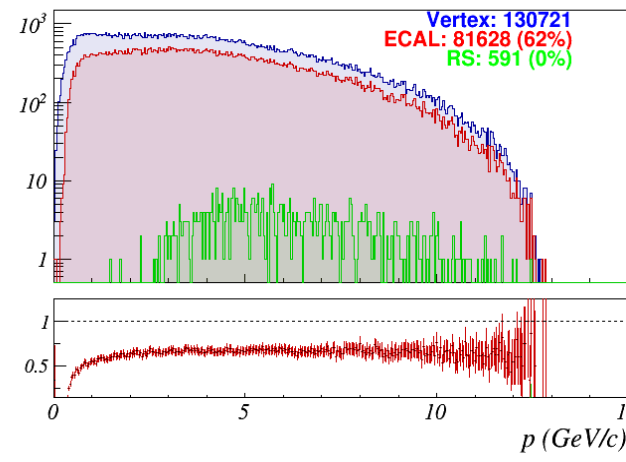
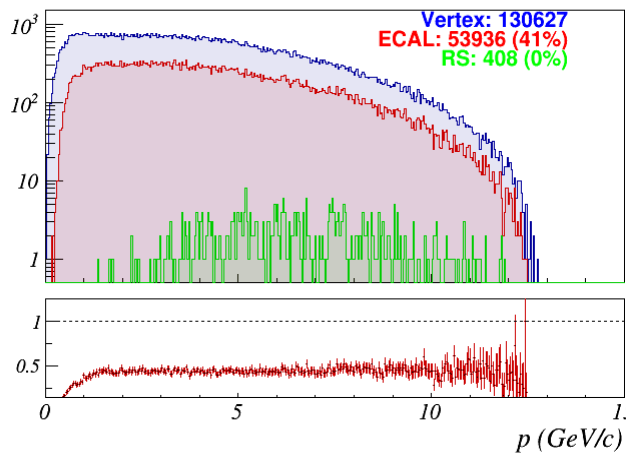
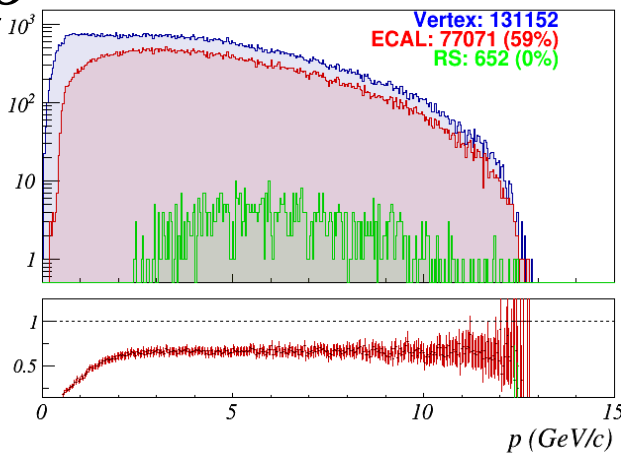
	Solenoid	Toroid	Hybrid
ECAL	48%	47%	60%

# Solenoid

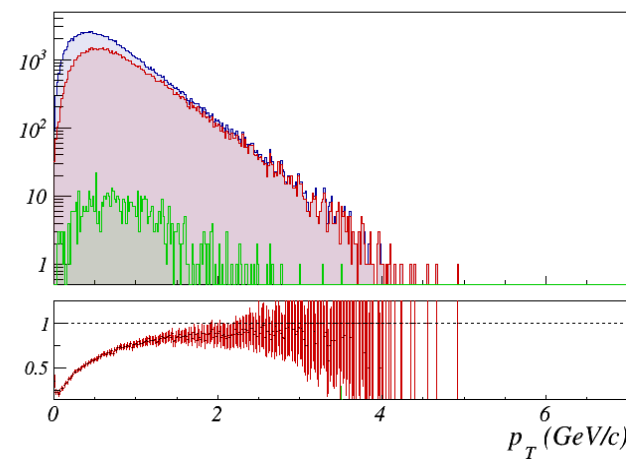
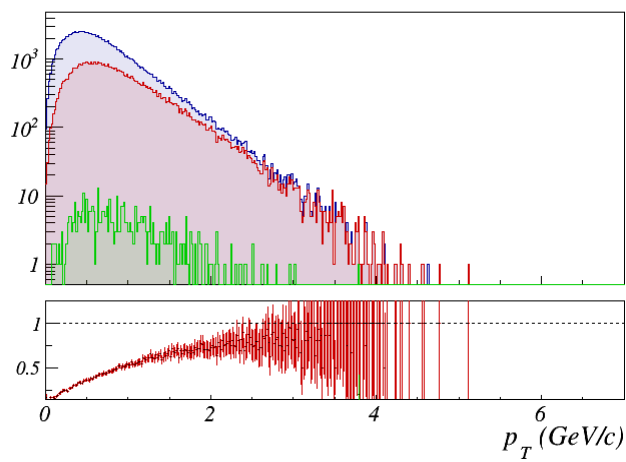
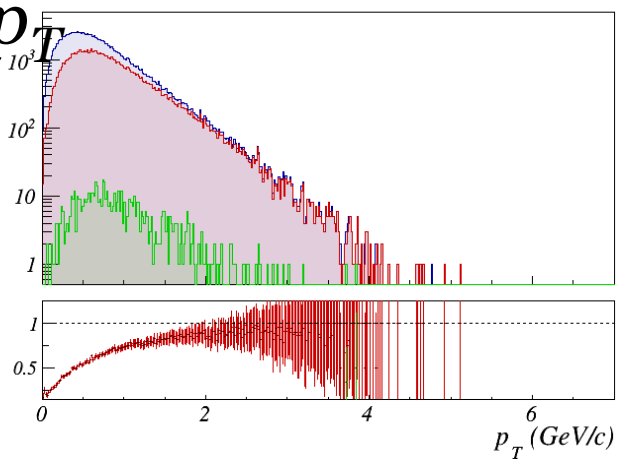
# Toroid

# Hybrid

$p$



$p_T$

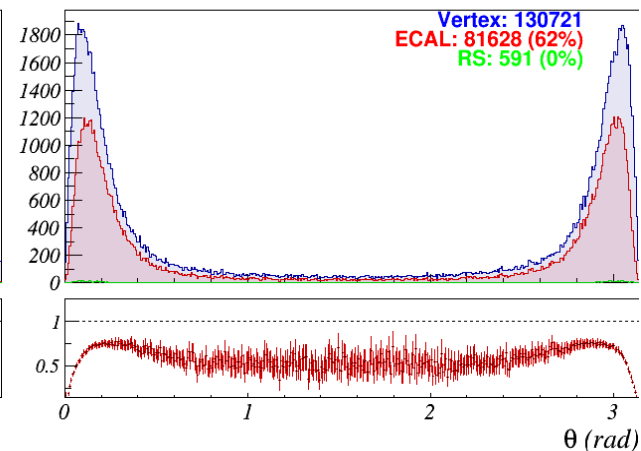
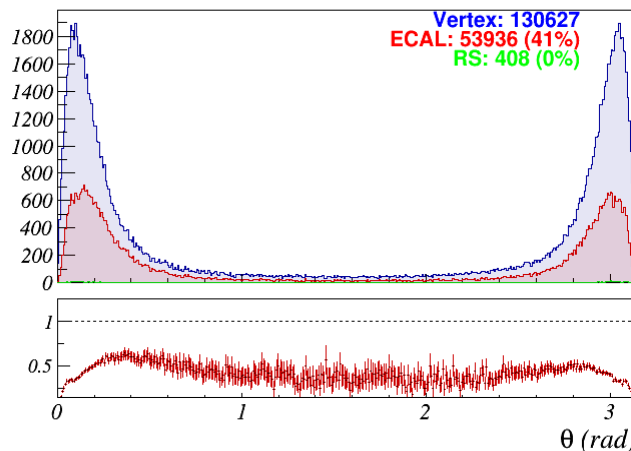
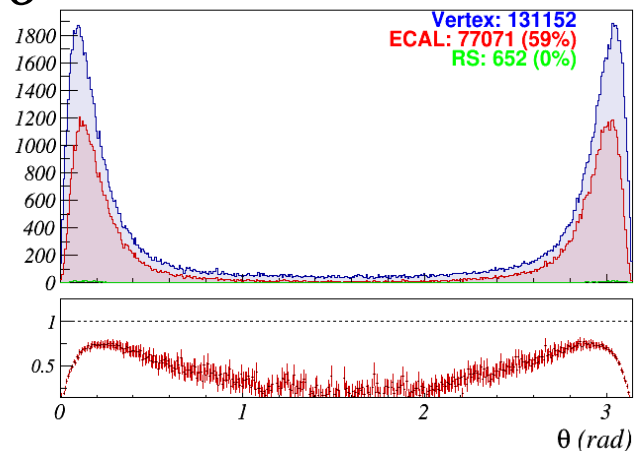
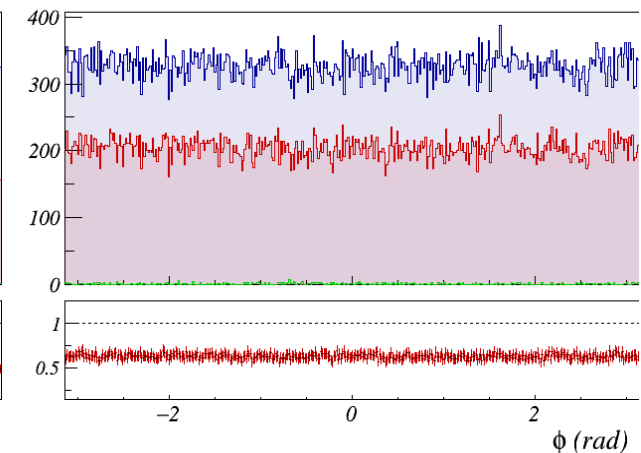
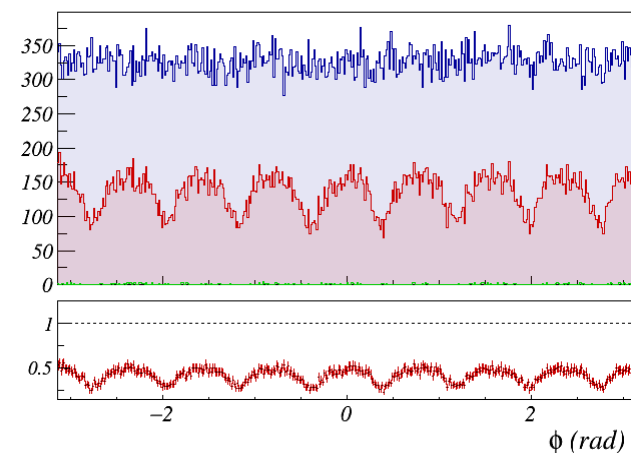
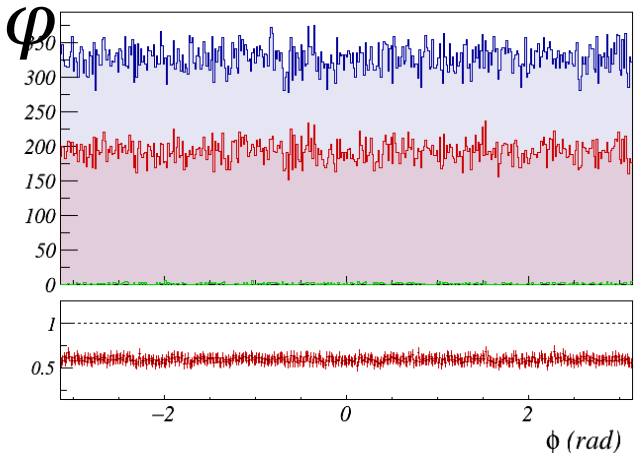


	Solenoid	Toroid	Hybrid
ECAL	59%	41%	62%

Solenoid

Toroid

Hybrid

 $\theta$  $\phi$ 

	Solenoid	Toroid	Hybrid
ECAL	59%	41%	62%

Particles	Solenoid %	Toroid %	Hybrid %
$\gamma$	93 (ECAL)	84 (ECAL)	91 (ECAL)
$\pi^0 \rightarrow \gamma\gamma$	86 (ECAL)	71 (ECAL)	83 (ECAL)
p	80.5 (ECAL)	68.4 (ECAL)	80.1 (ECAL)
n	81.3 (ECAL)	69.6 (ECAL)	81.1 (ECAL)
$\pi^+$	76 (ECAL)	73 (ECAL)	80 (ECAL)
$\pi^+ \rightarrow \mu^+\nu_\mu$	85 (ECAL)	75 (ECAL)	84 (ECAL)
	12 (RS)	17 (RS)	19 (RS)
$K^+$	56 (ECAL)	53 (ECAL)	57 (ECAL)
$K^0 \rightarrow \pi^+\pi^-$	48 (ECAL)	47 (ECAL)	60 (ECAL)
$\Lambda \rightarrow p\pi^-$	59 (ECAL)	41 (ECAL)	62 (ECAL)



# Additional materials

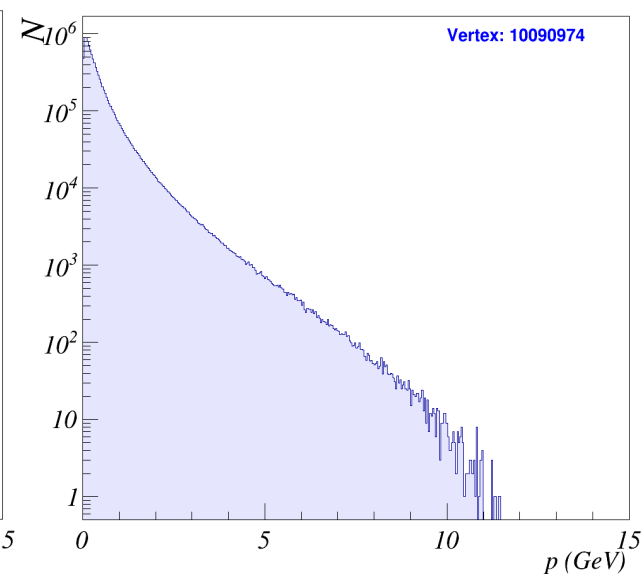
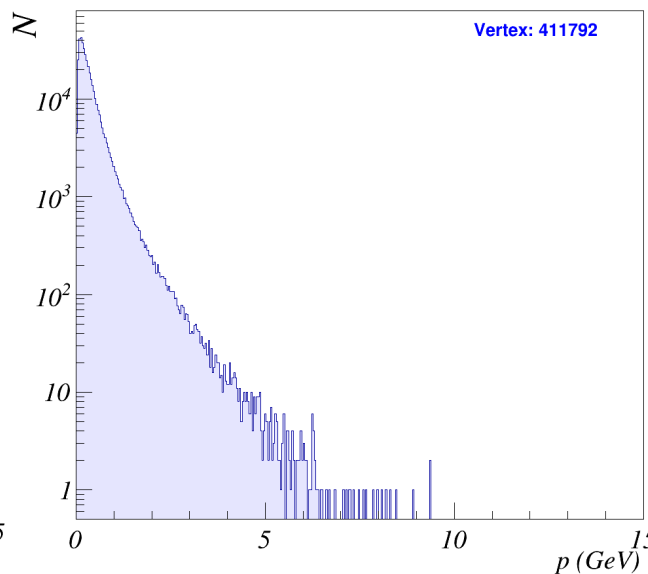
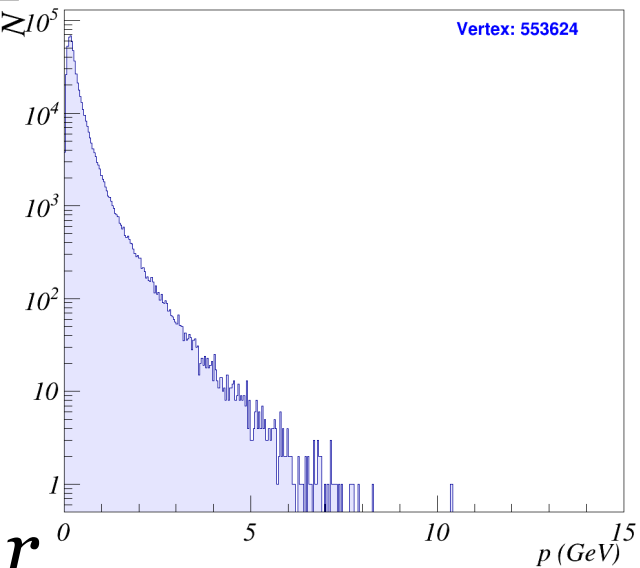


Solenoid

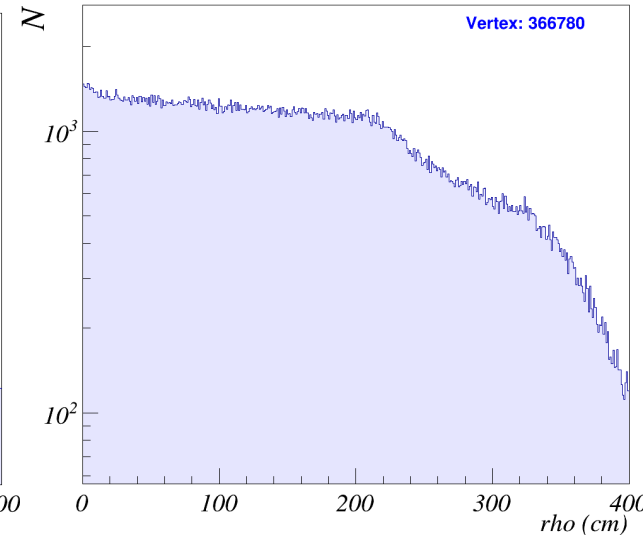
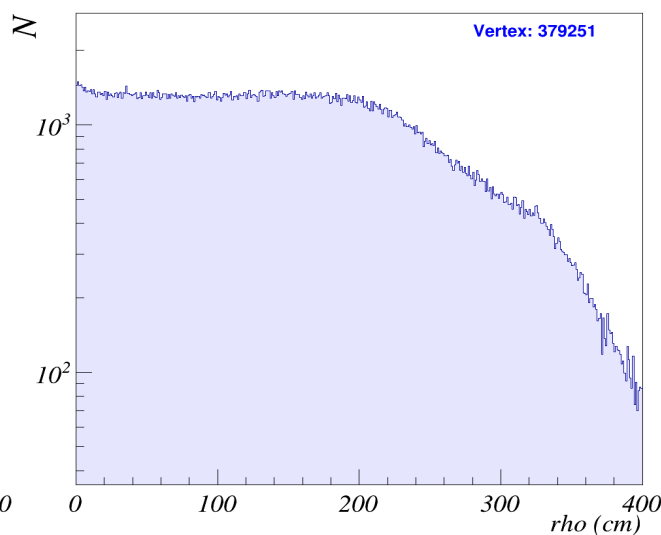
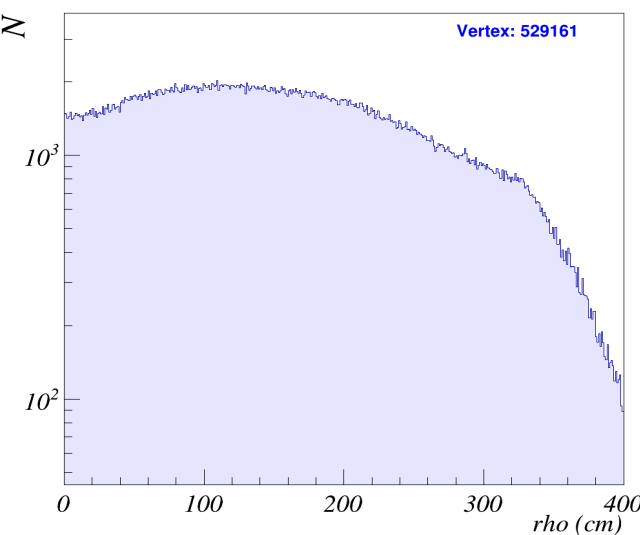
Toroid

Hybrid

$p$



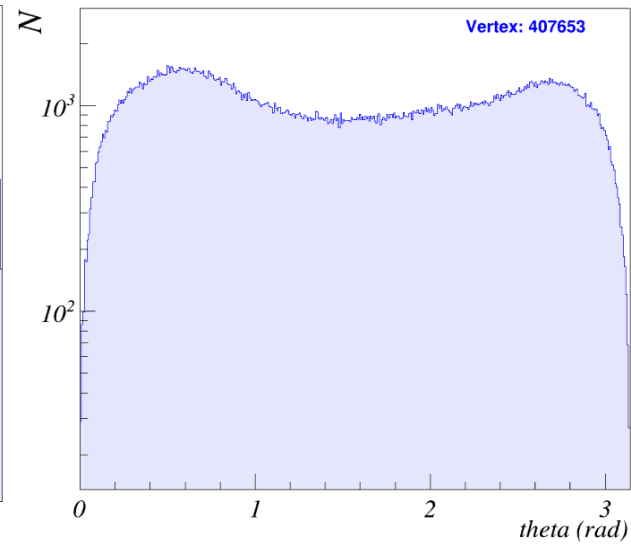
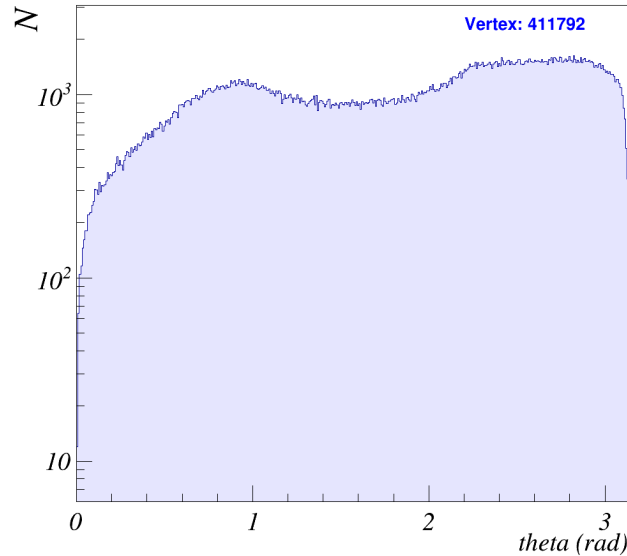
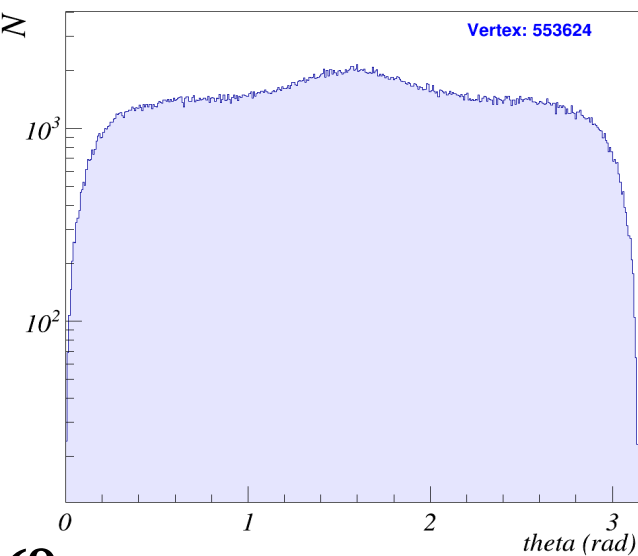
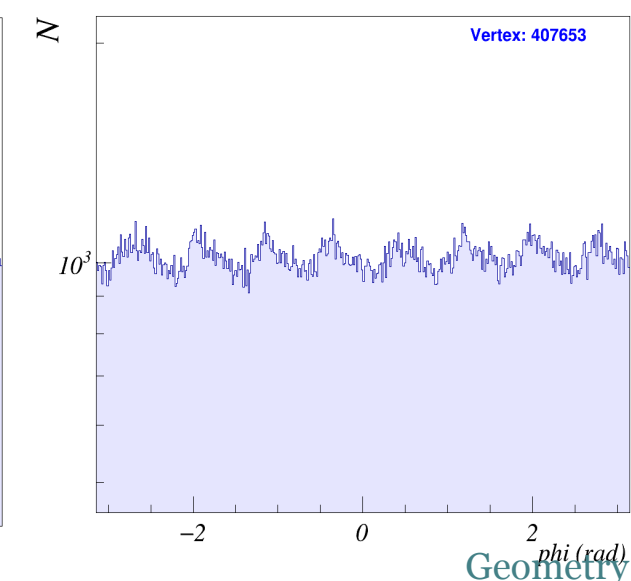
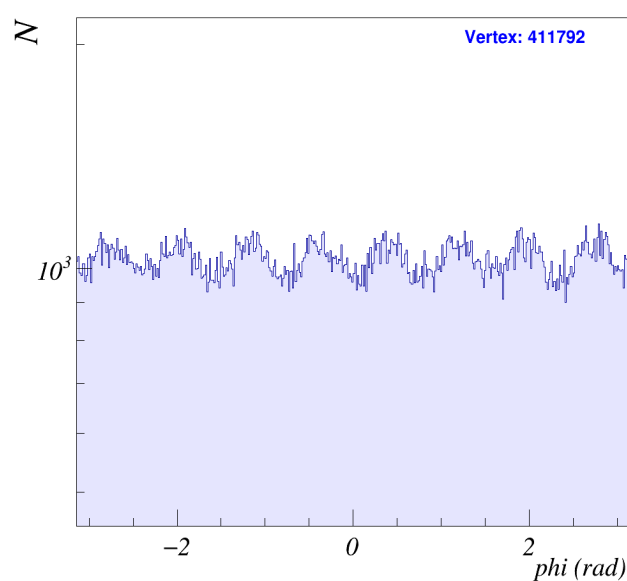
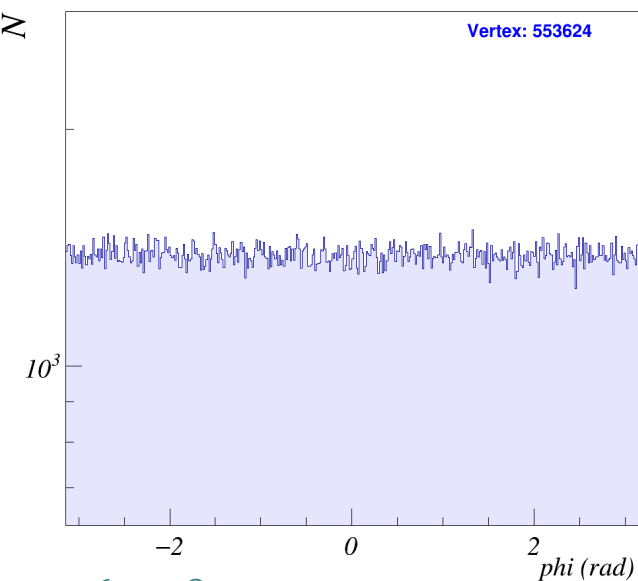
$r$



Solenoid

Toroid

Hybrid

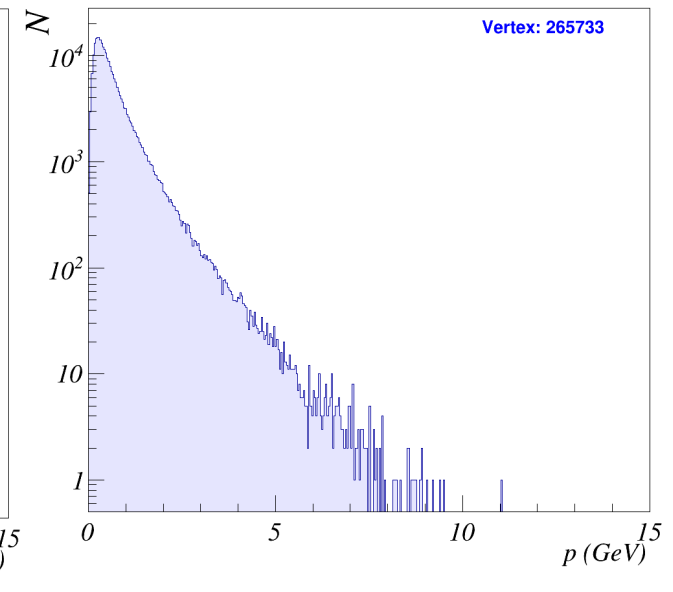
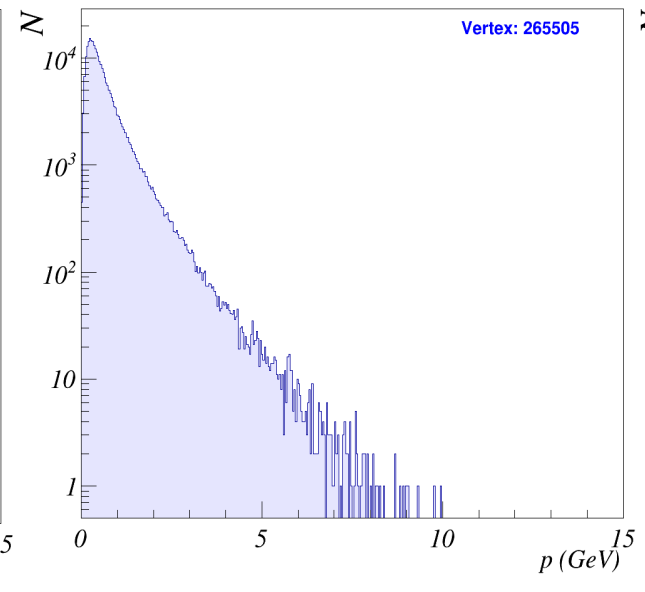
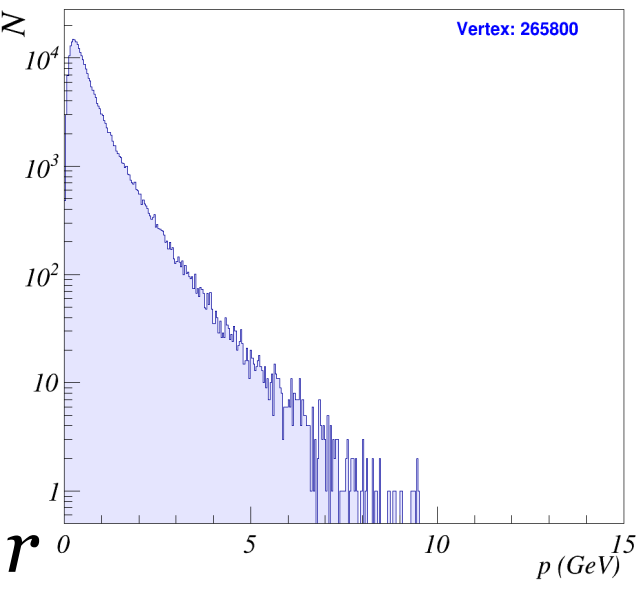
 $\theta$  $\varphi$ 

# Solenoid

# Toroid

# Hybrid

$p$

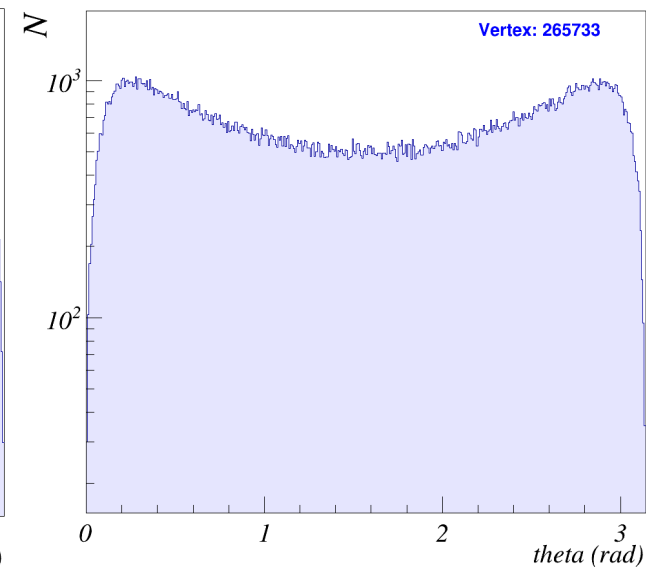
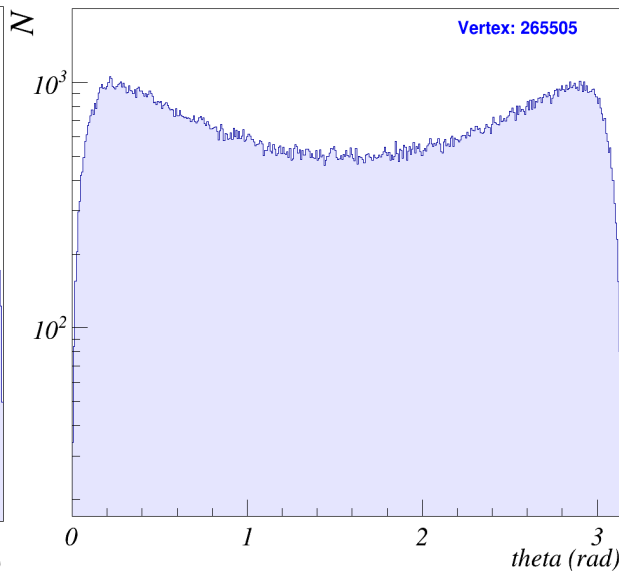
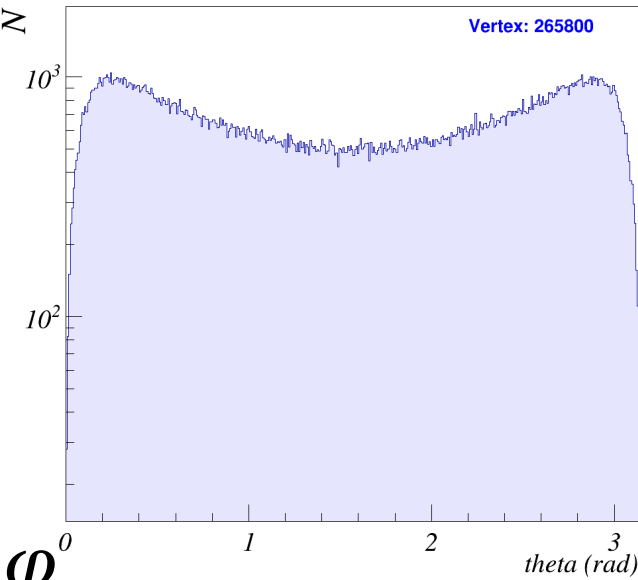
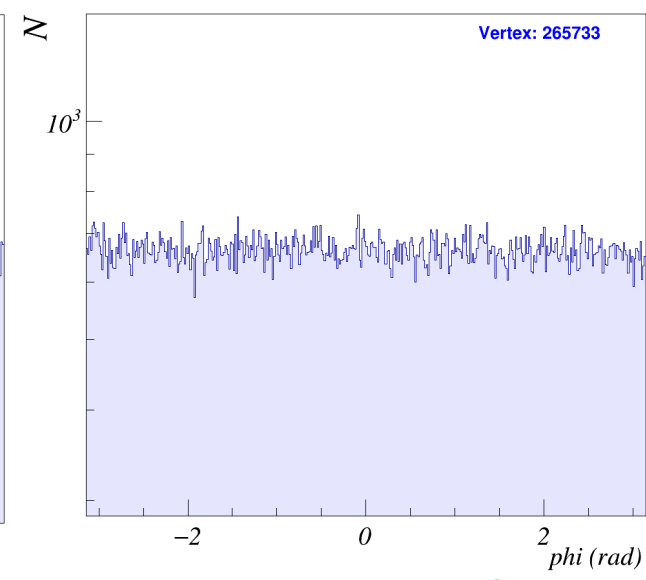
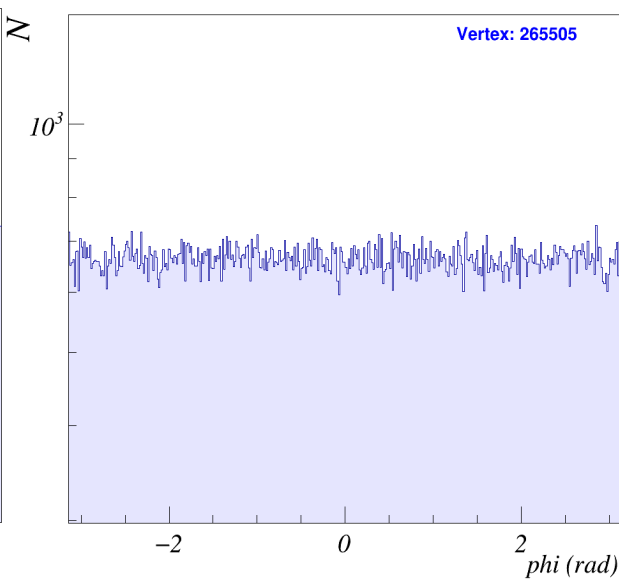
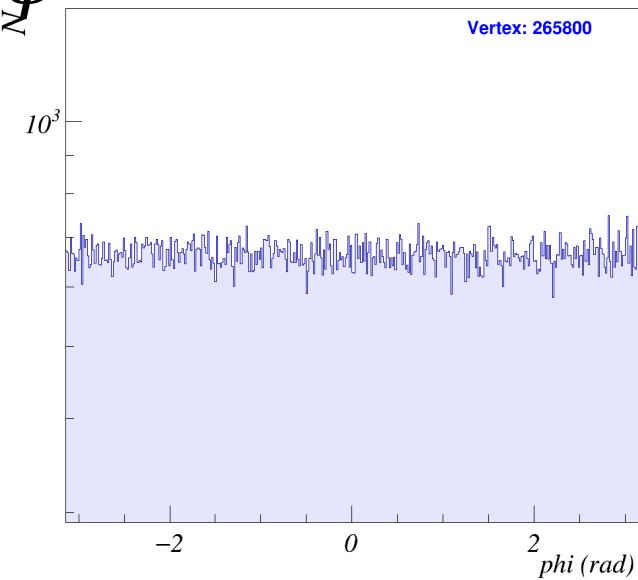


$r$

Solenoid

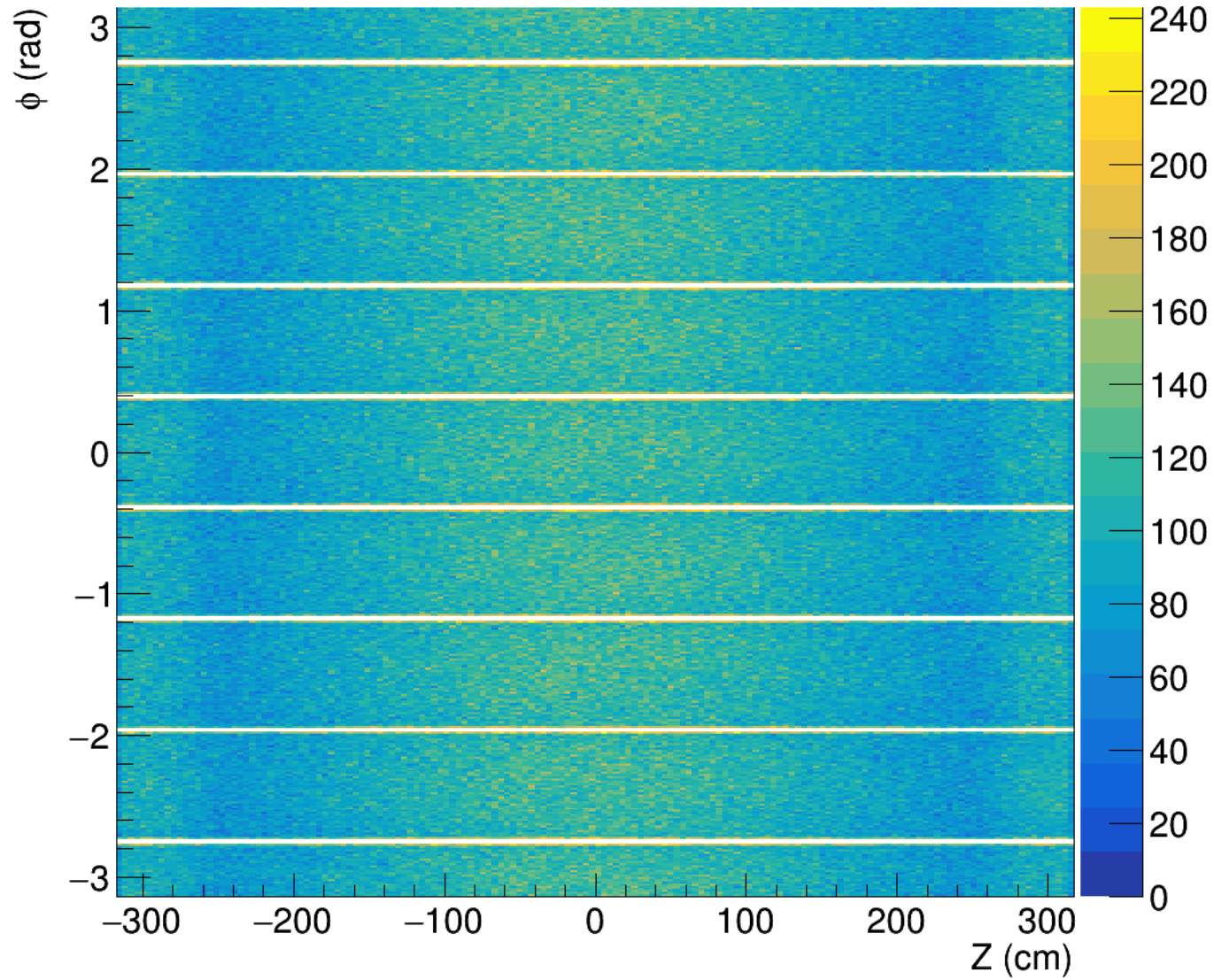
Toroid

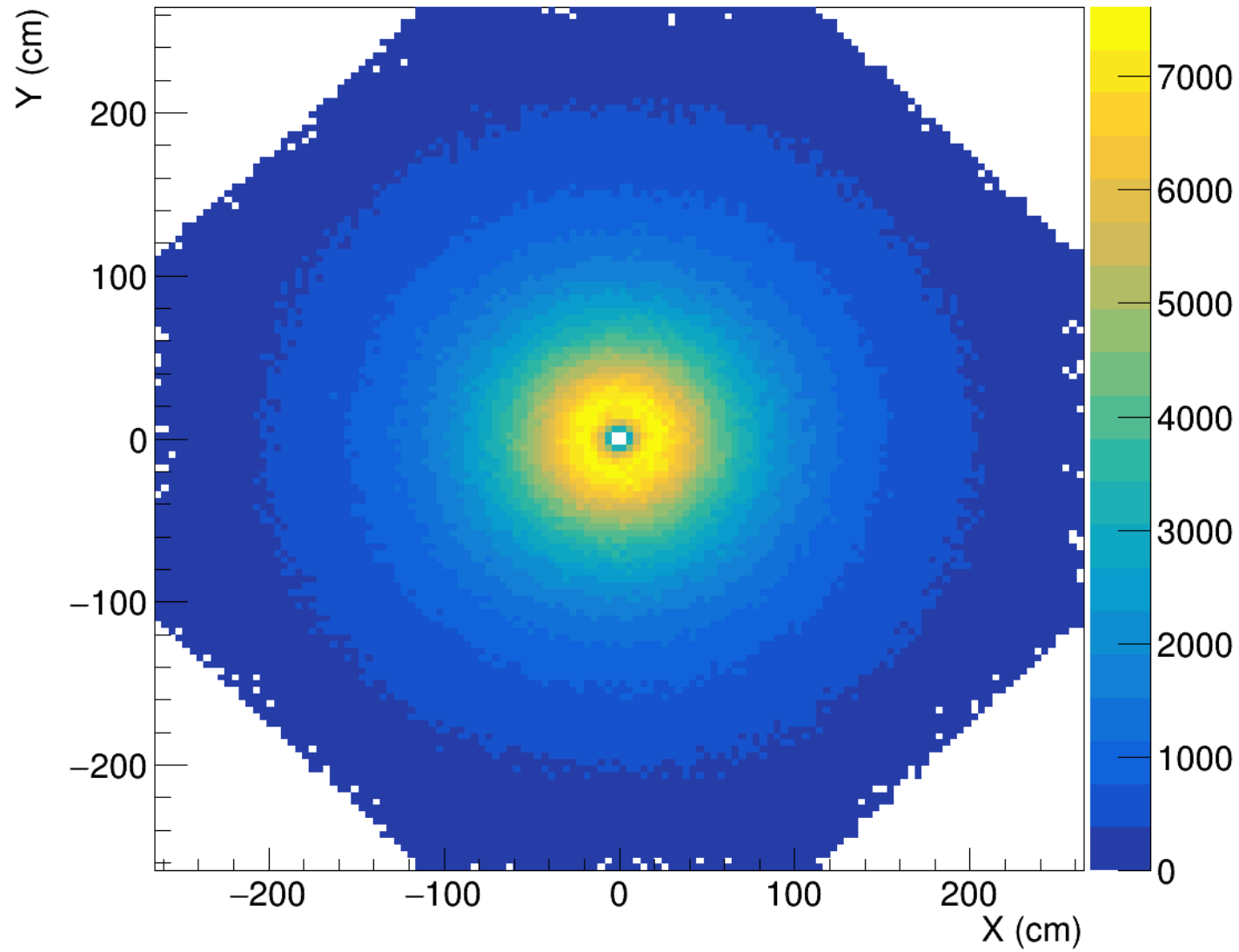
Hybrid

 $\theta$  $\phi$ 

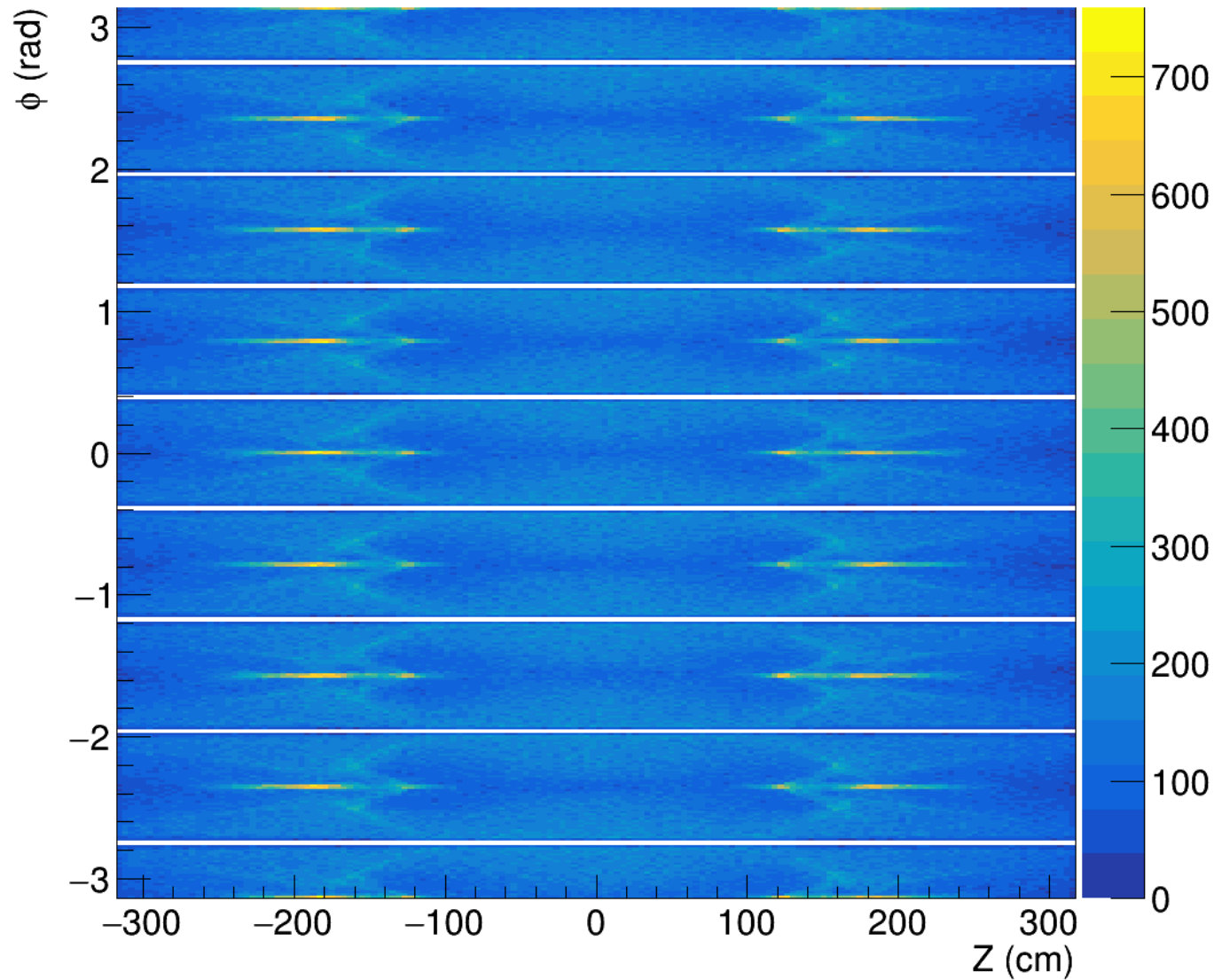
# Occupancy

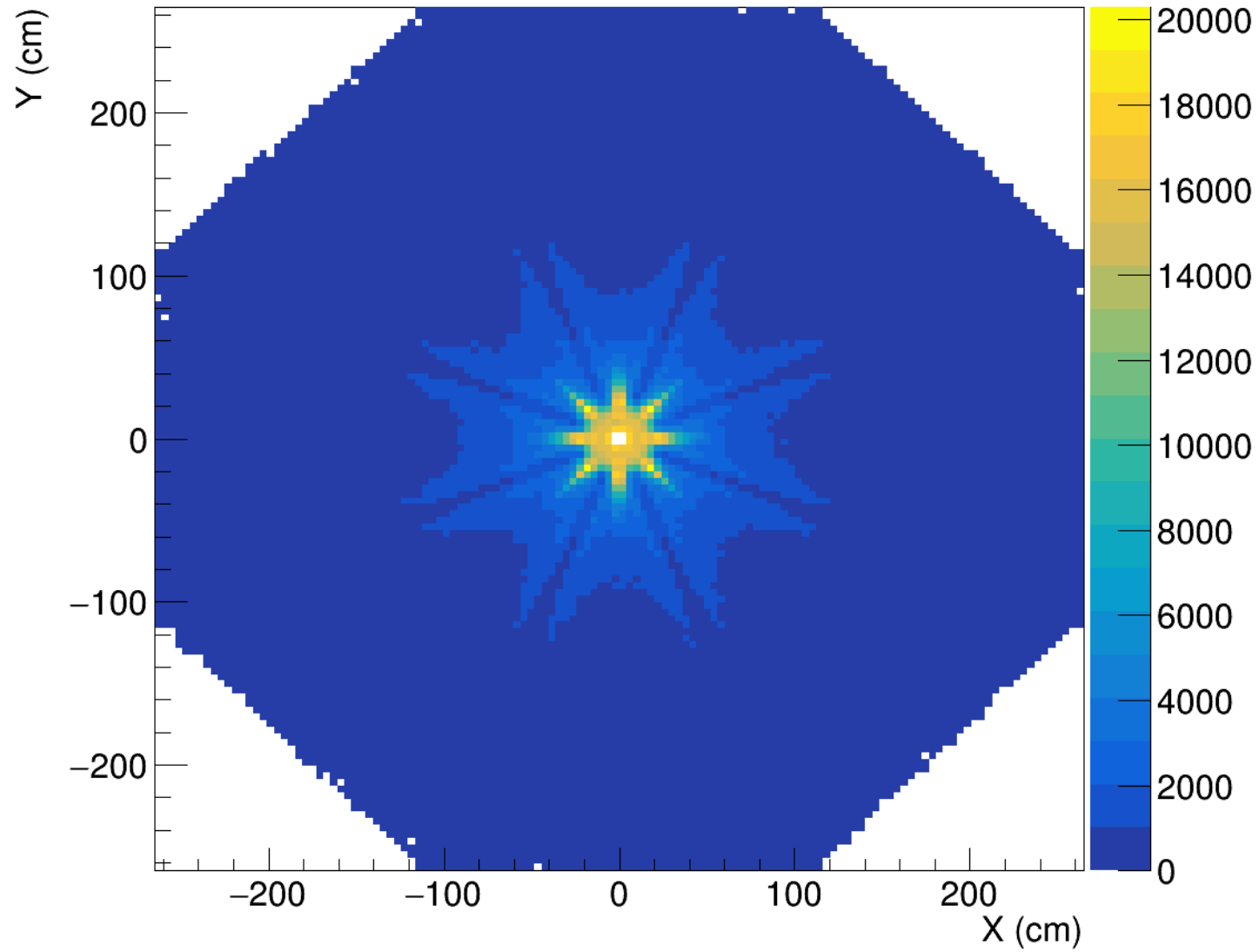


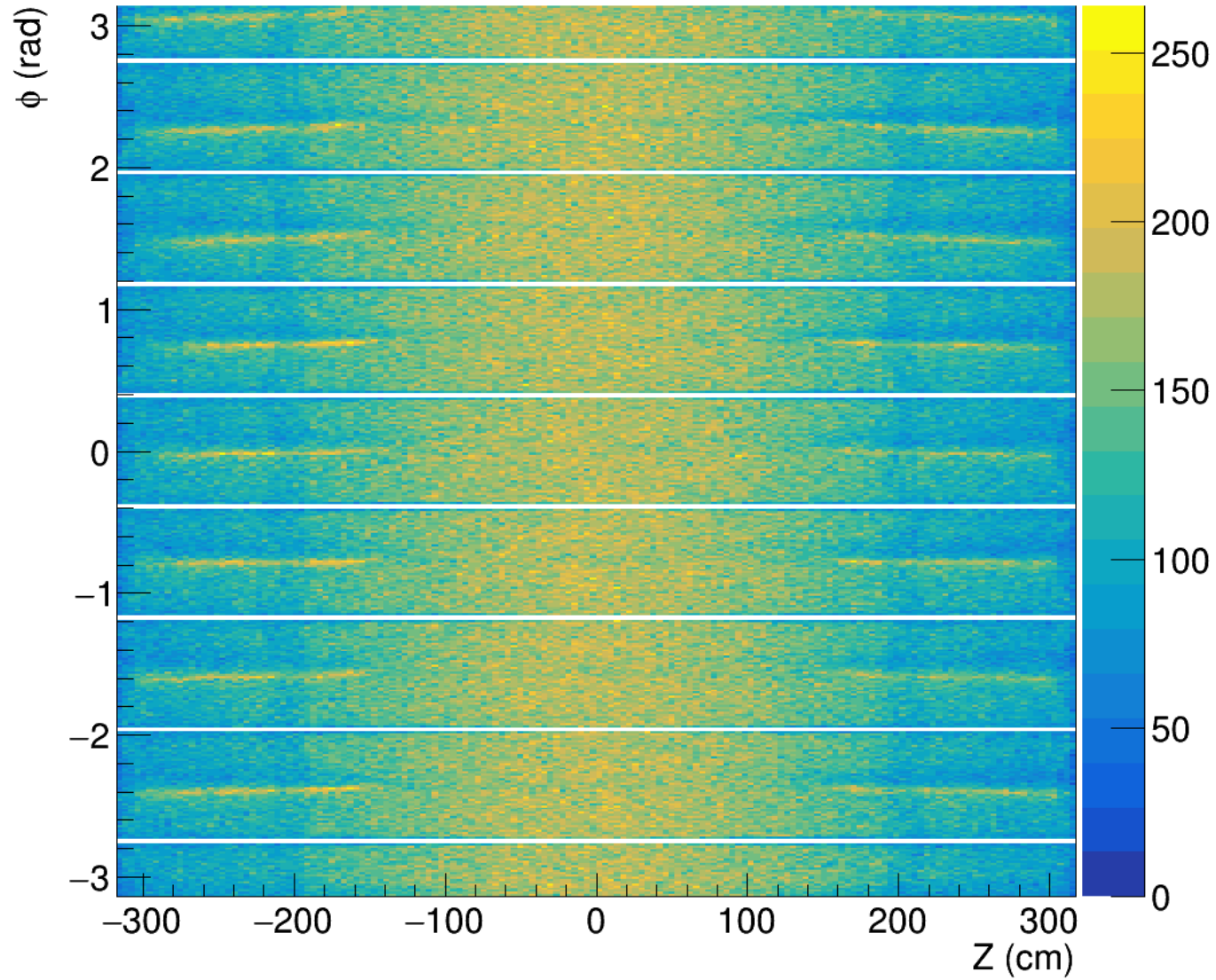


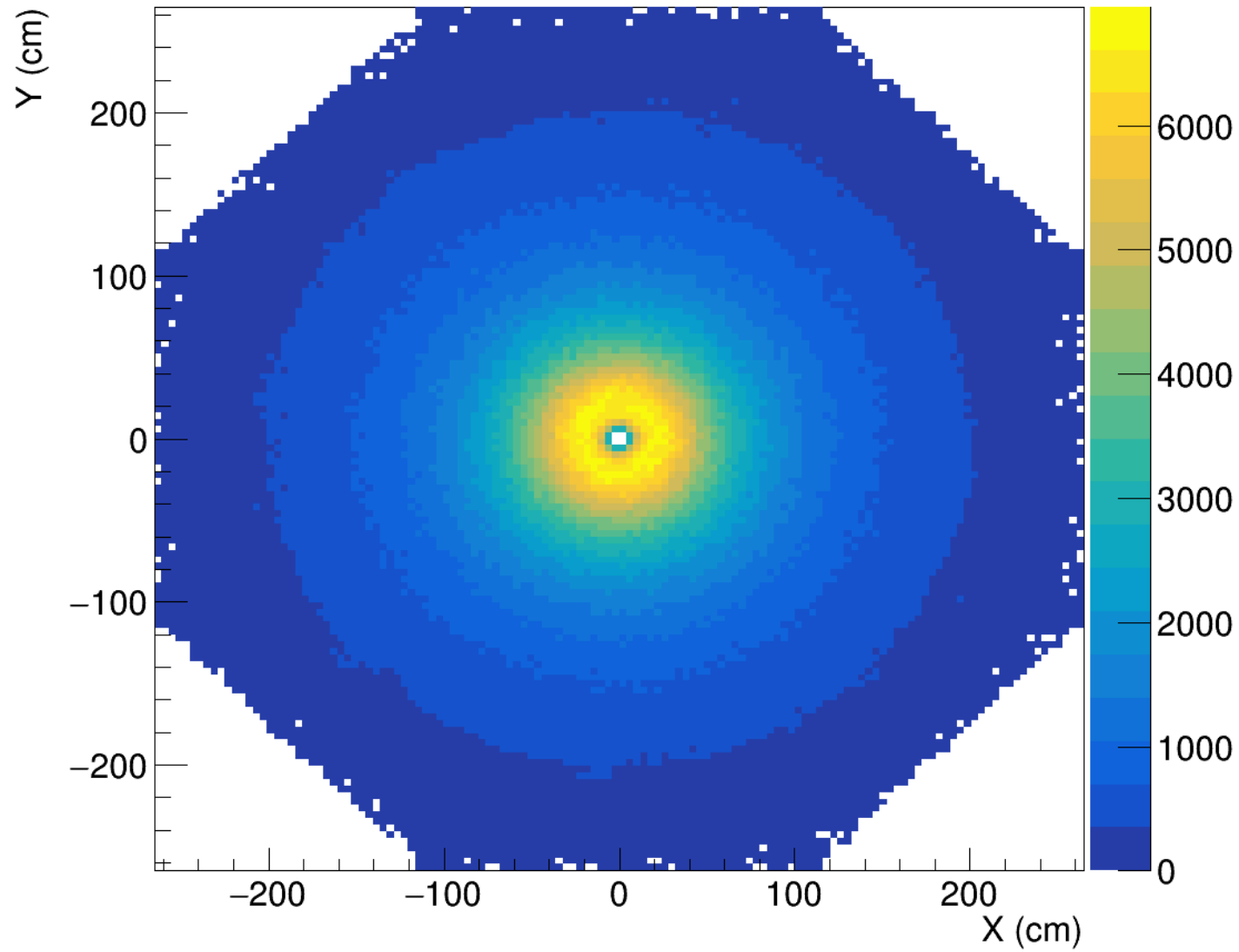












Particles	Solenoid %	Toroid %	Hybrid %
$\gamma$	93 (ECAL)	84 (ECAL)	91 (ECAL)
$\pi^0 \rightarrow \gamma\gamma$	86 (ECAL)	71 (ECAL)	83 (ECAL)
p	80.5 (ECAL)	68.4 (ECAL)	80.1 (ECAL)
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	12 (RS)	17 (RS)	19 (RS)
$K^+$	56 (ECAL)	53 (ECAL)	57 (ECAL)
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