

# **PROGRESS REPORT**

**Comparison of RICH response  
between real data and simulation**

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# Outline

## VTX 解析

### • Data の比較

- RICH response ( $\chi^2/n_{pe0}$ ,  $n_0$ ) を RICH swap を差し引いて  
Run11 data vs Run14 data, Run11 simulation vs Run14 simulation で比較  
… 各 $p_T$  distribution を plot
- RICH swap の結果を各場合で比較

**DST作成:** SvxCntQAAnalysis.C

Run11 data: /gpfs/mnt/gpfs02/phenix/hhj/hhj1/yueda/taxi/SvxCntQA/Run11AuAu200MinBiasPro101/9056/data/

Run14 data: /gpfs/mnt/gpfs02/phenix/hhj/hhj1/yueda/taxi/SvxCntQA/Run14AuAu200CAMBPro104/9048/data/

Run11 simulation: /phenix/hhj2/hachiya/14.06/richana\_sim

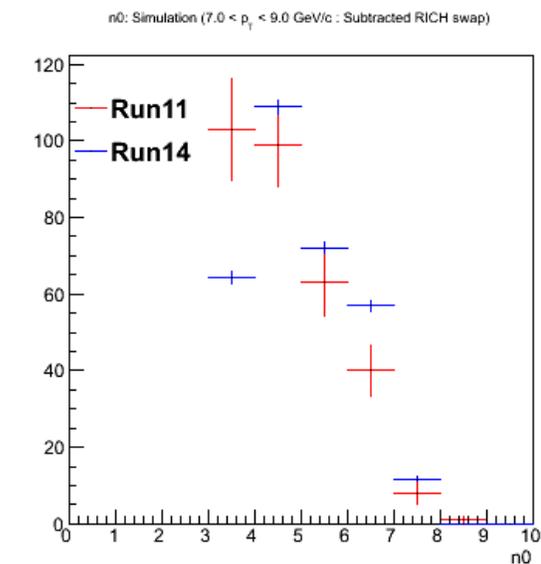
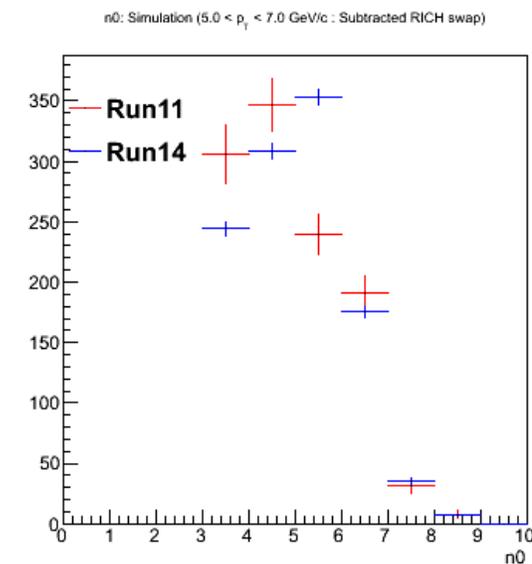
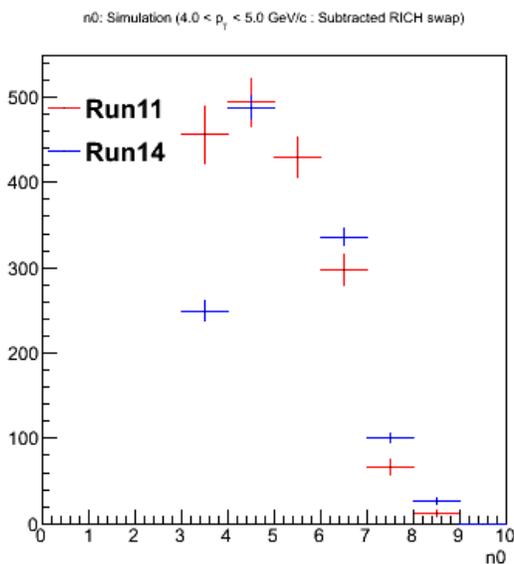
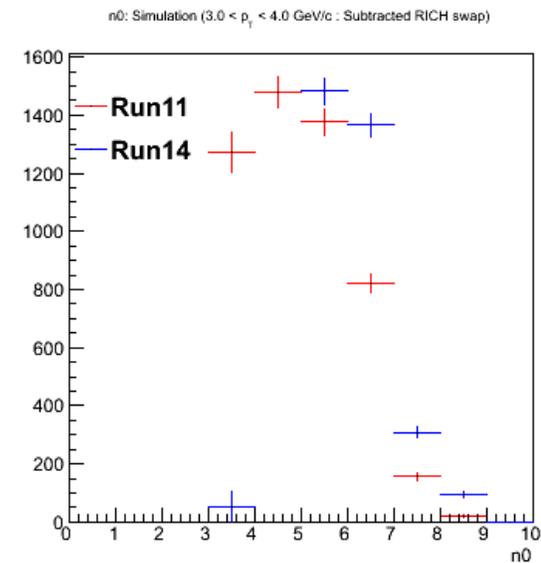
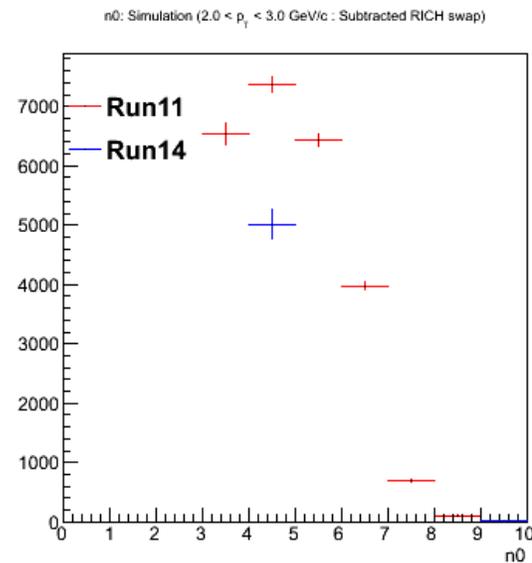
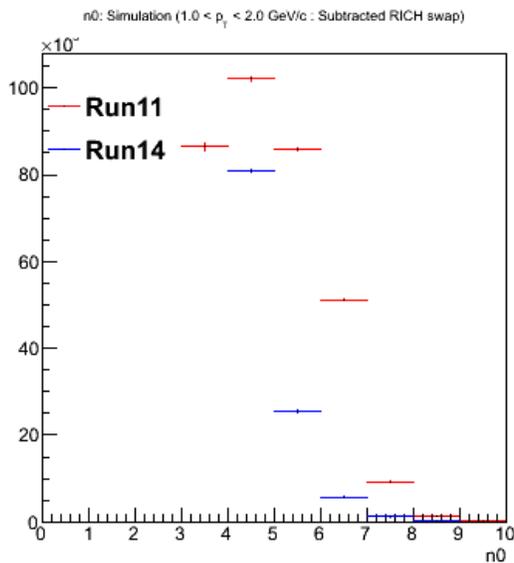
Run14 simulation: /phenix/analysis/vtx/run14AuAu/single\_e/pisaToDST

**DST to hist:**

cut:  $\text{mom} * \sin(\text{the0}) > 0.75 \ \&\& \ n_0 > 2$

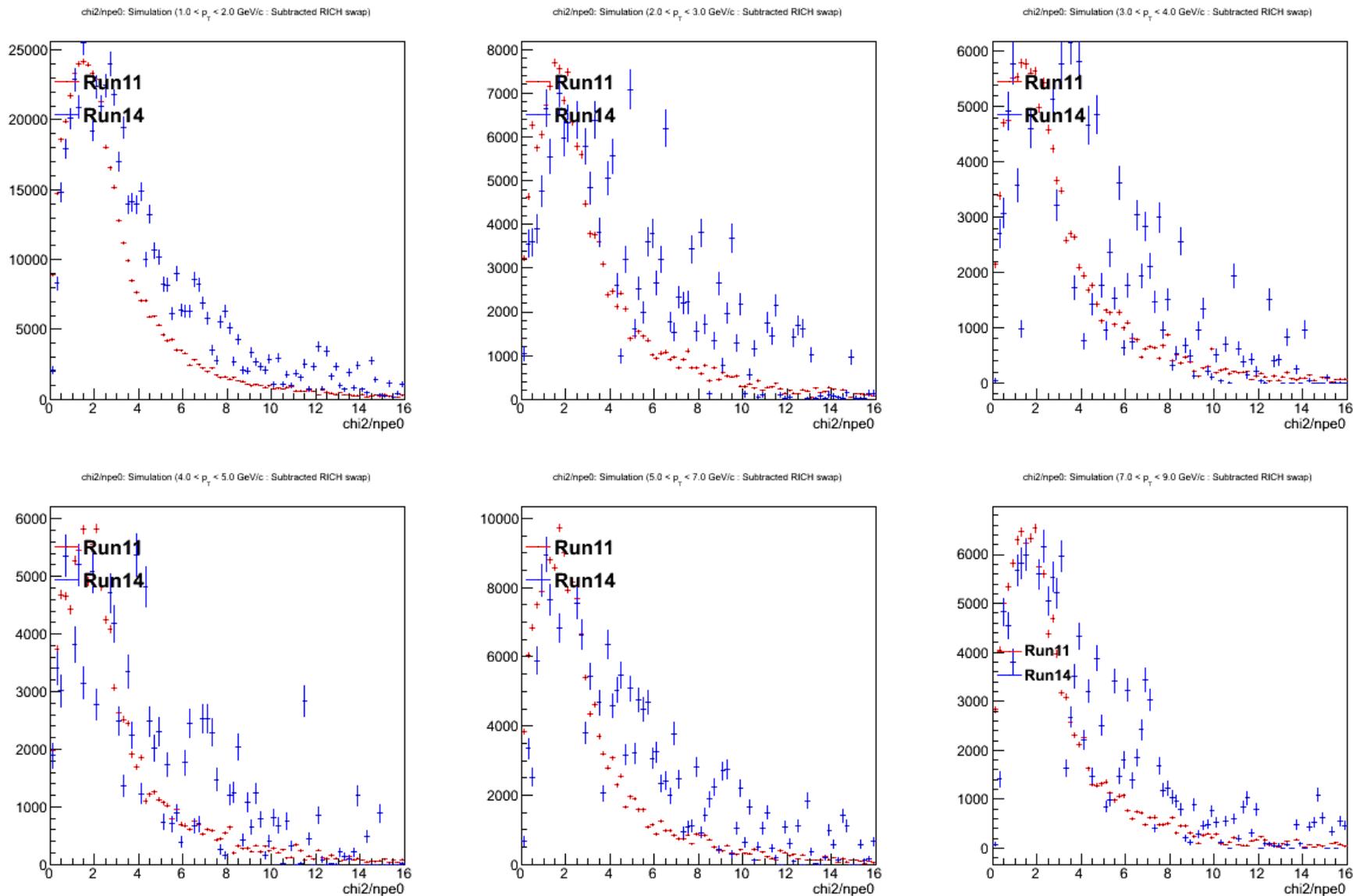
$p_T$  weight:  $\text{simpt} * 822.9 * \text{pow}((\exp(-0.4 * \text{simpt} - 0.2 * \text{simpt} * \text{simpt}) + \text{simpt} / 0.71), -8.3)$

# Comparison n0 between Run11 simulation and Run14 simulation



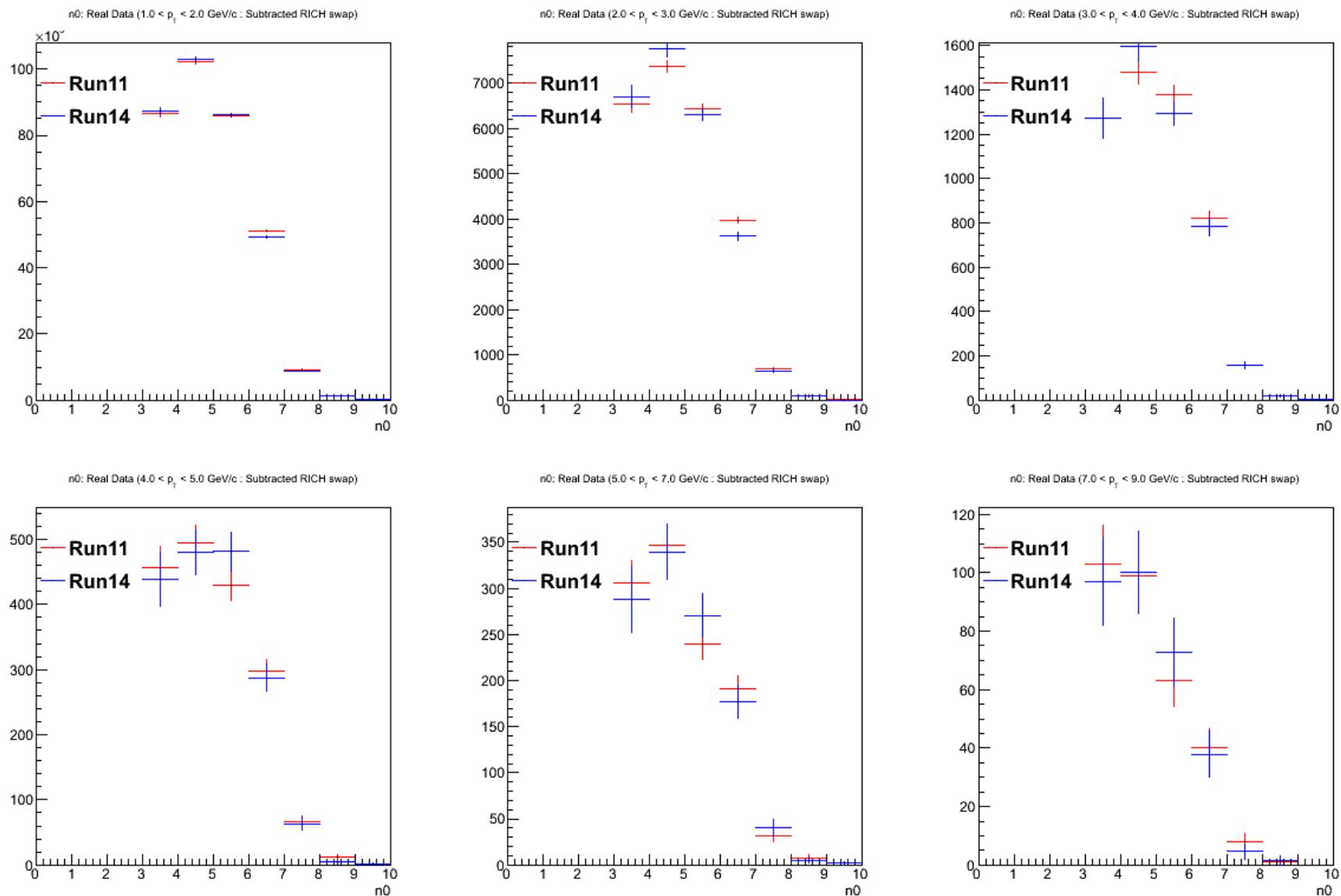
Run11(—) と Run14(—) の分布が一致していない

# Comparison chi2/npe0 between Run11 simulation and Run14 simulation



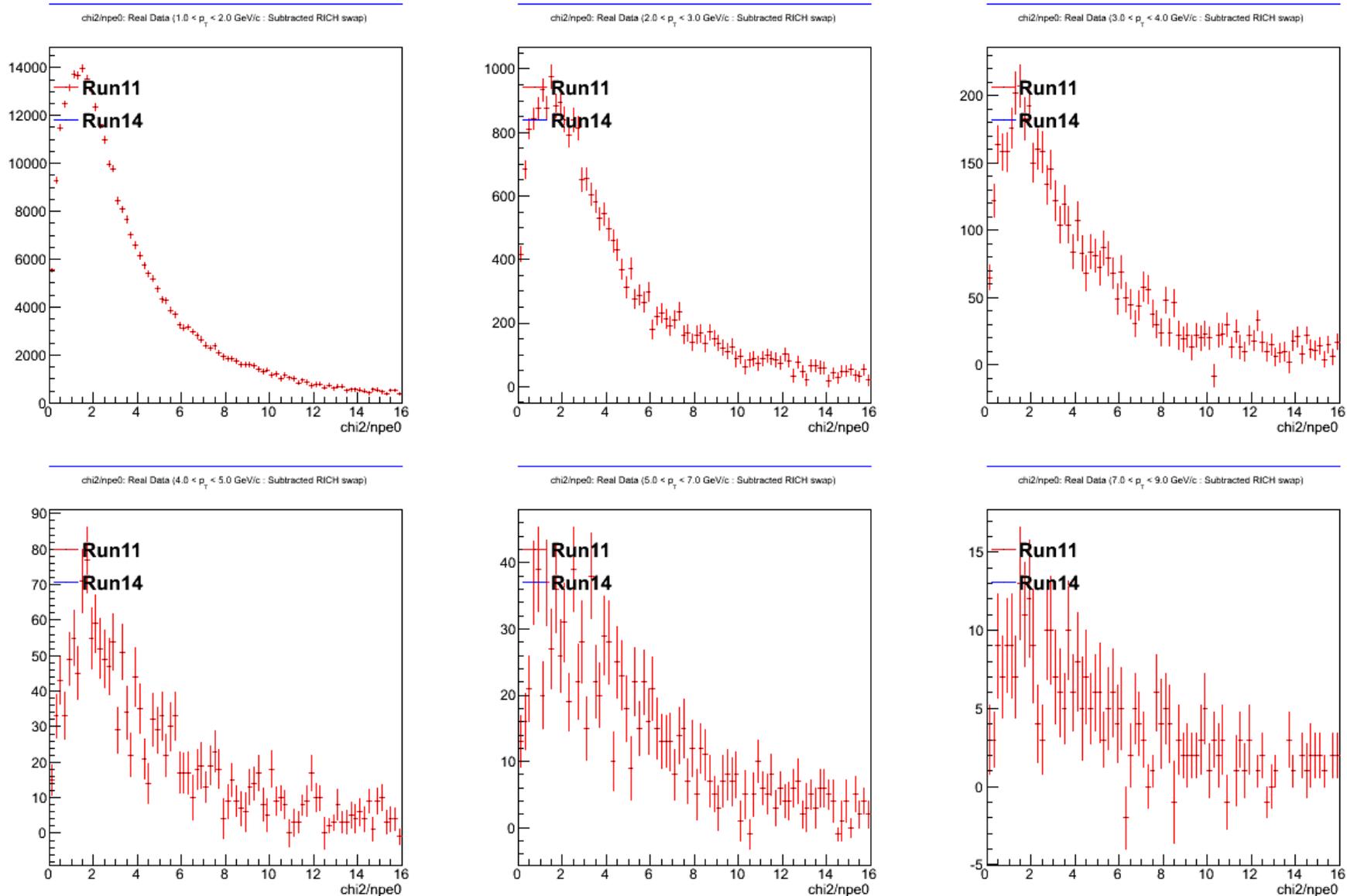
Run14(一) の分布が乱雑になっている  
- 統計量に依るものか

# Comparison n0 between Run11 data and Run14 data



全 $p_T$  領域でほぼ一致している

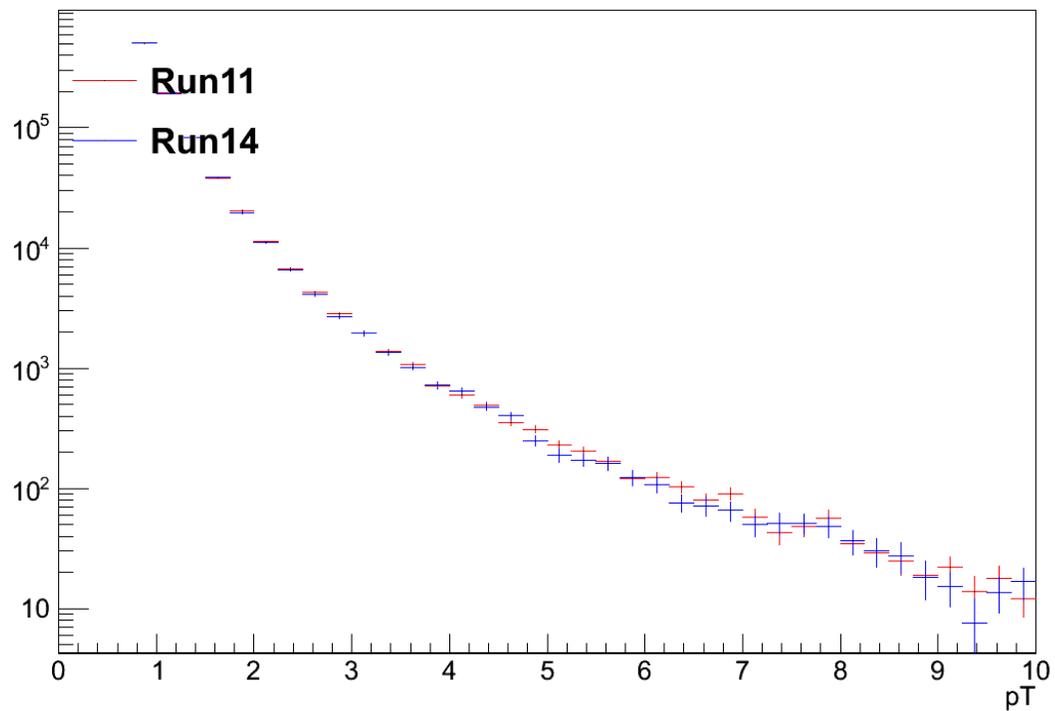
# Comparison $\chi^2/n_{pe0}$ between Run11 data and Run14 data



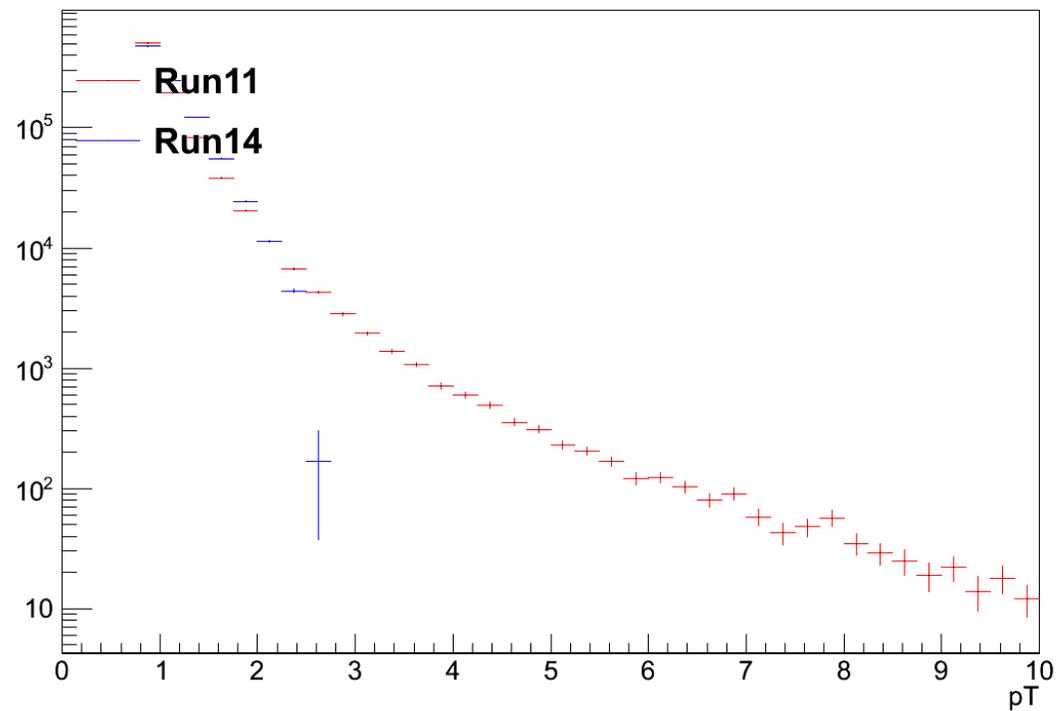
Run14 が Run11 と完全に離れた分布となっている  
- 上手く差引きを行えていない

# $p_T$ distribution

$p_T$ : Real Data(Subtraction)

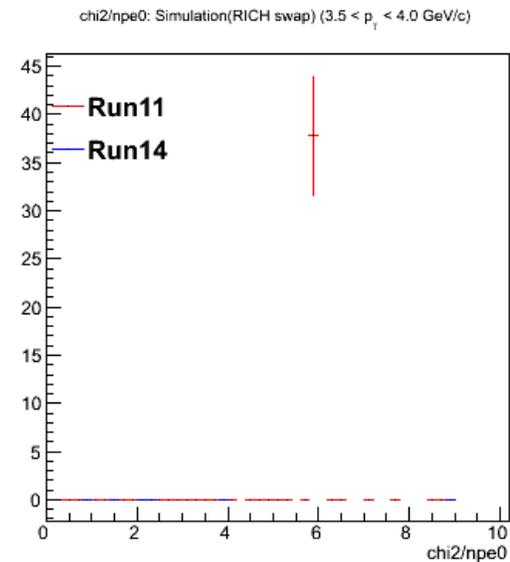
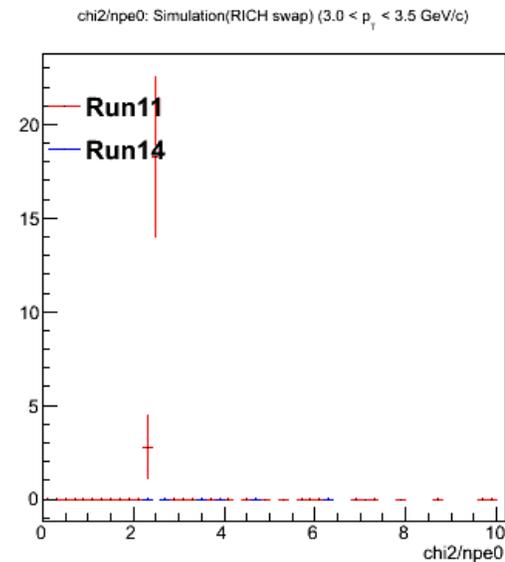
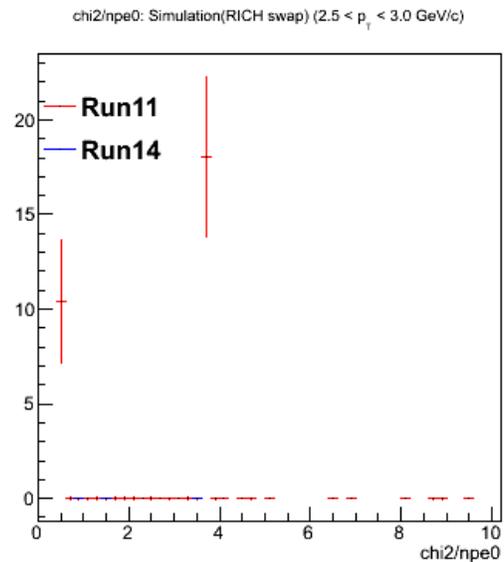
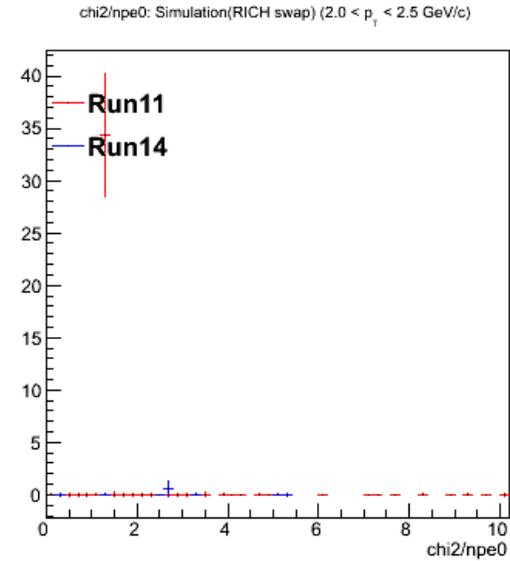
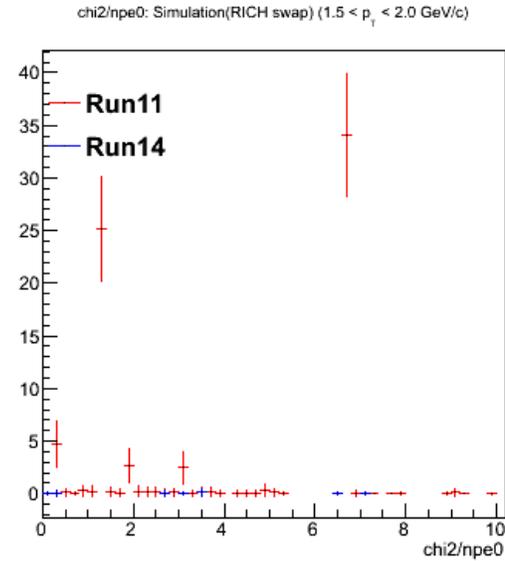
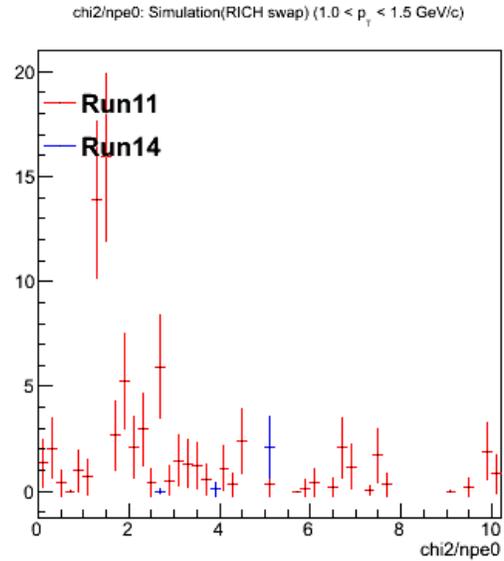


$p_T$ : Simulation(Subtraction)



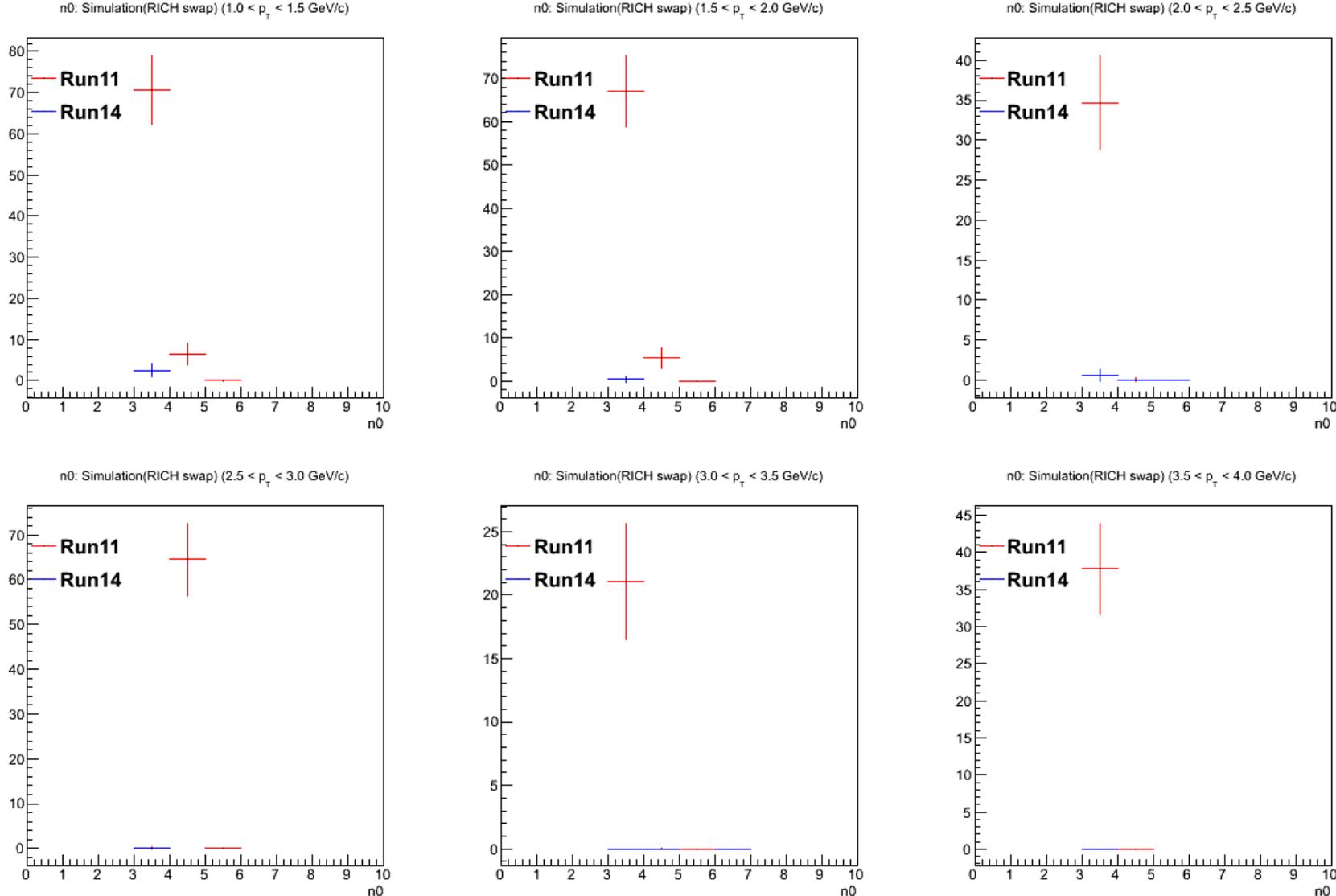
ほぼ同じ

# Comparison $\chi^2/n_{pe0}$ (RICH swap) between Run11 simulation and Run14 simulation



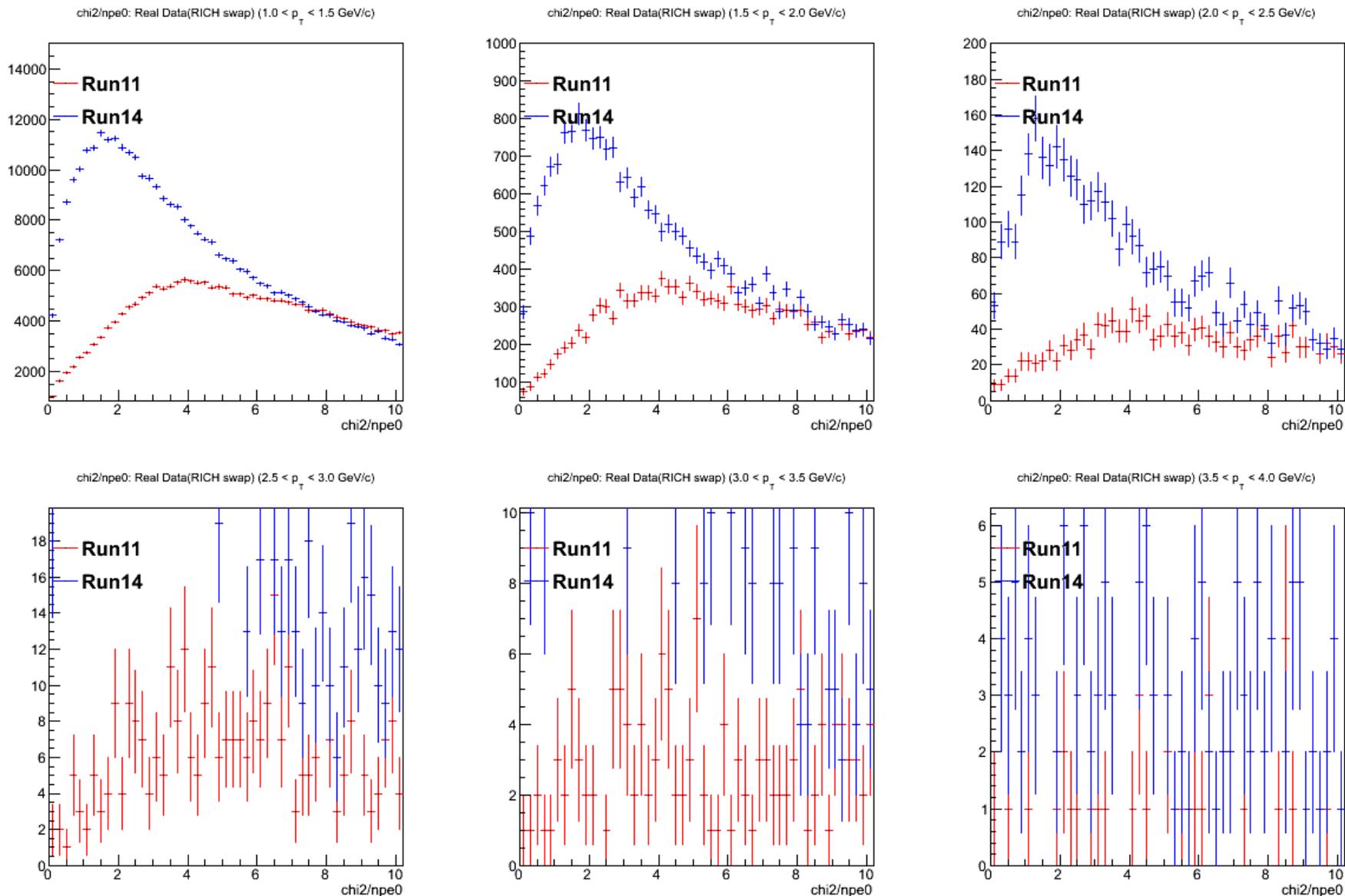
Run14 の統計量が非常に小さい  
- normalize は行っていない

# Comparison n0(RICH swap) between Run11 simulation and Run14 simulation



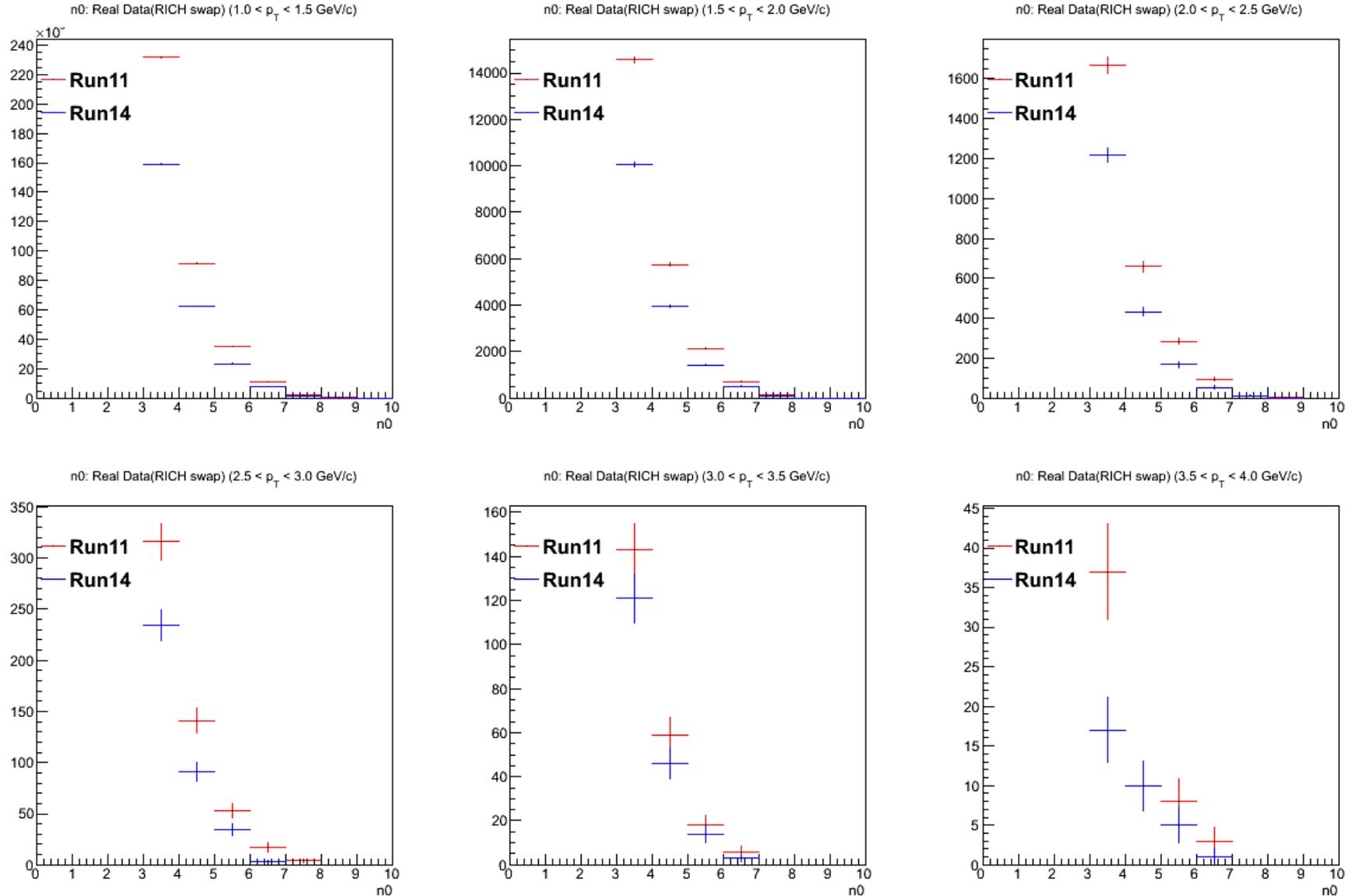
Run14 の統計量が非常に小さい  
- normalize は行っていない

# Comparison chi2/npe0(RICH swap) between Run11 data and Run14 data



形自体が異なってしまっている  
- normalize は行ってない

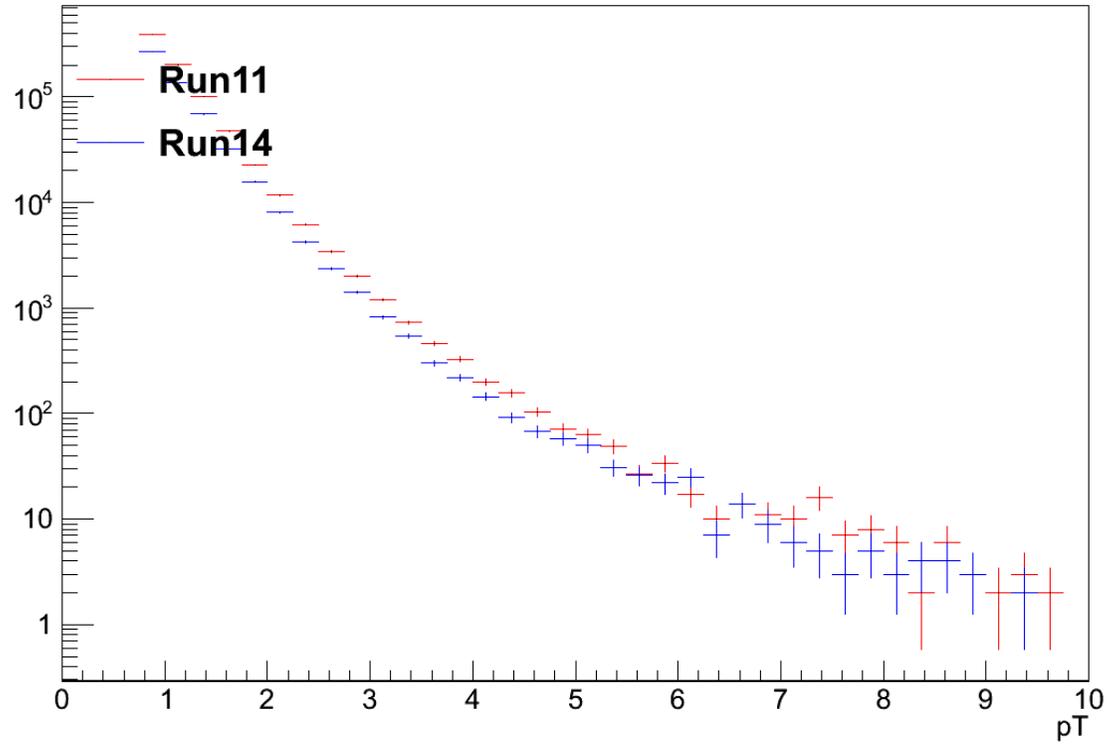
# Comparison n0(RICH swap) between Run11 data and Run14 data



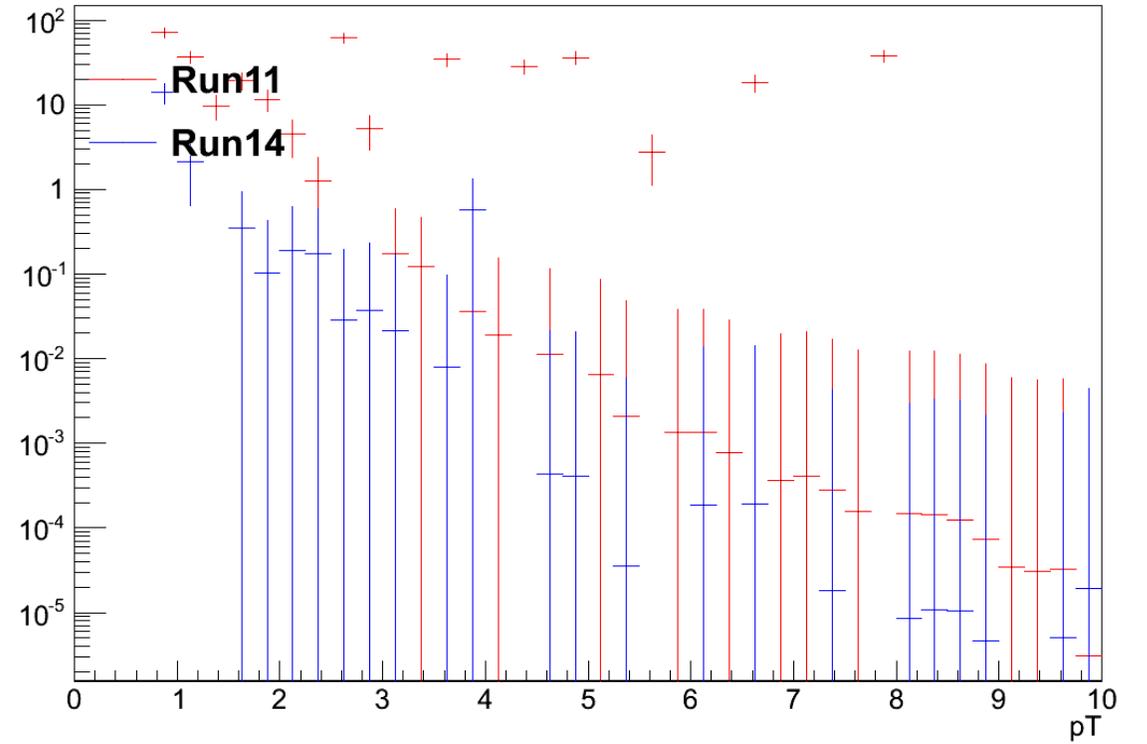
全 $p_T$  領域で同じ形をしている  
- normalize は行っていない

# $p_T$ distribution

$p_T$ : Real Data(RICH swap)



$p_T$ : Simulation(RICH swap)



同じ形をしている

# Summary

- RICH response( $n_0$ ,  $\chi^2/n_{pe0}$ ) の Run11 と Run14 の real data, simulation 毎の比較
  - RICH swap subtraction を行った
    - simulation は  $n_0$ ,  
real data は  $\chi^2/n_{pe0}$  の分布が奇妙
- RICH swap 自体の分布の比較
  - simulation の RICH swap の統計量が非常に小さい
  - real data の  $\chi^2/n_{pe0}$  の RICH swap の形が一致していない

## To do

- 原因を調査中

