Additional gain calibration

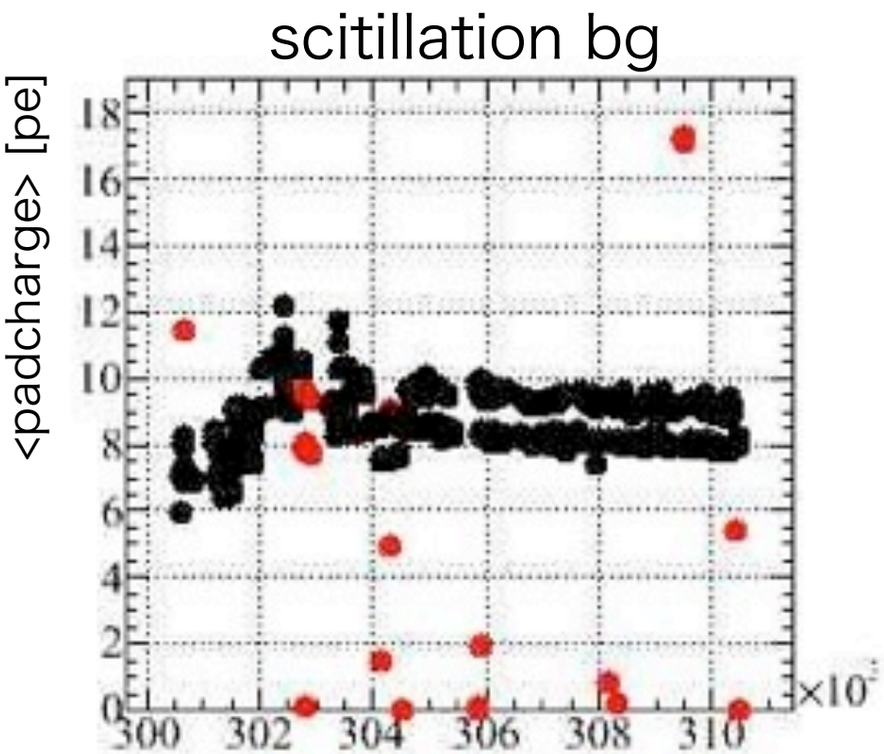
Yosuke Watanabe

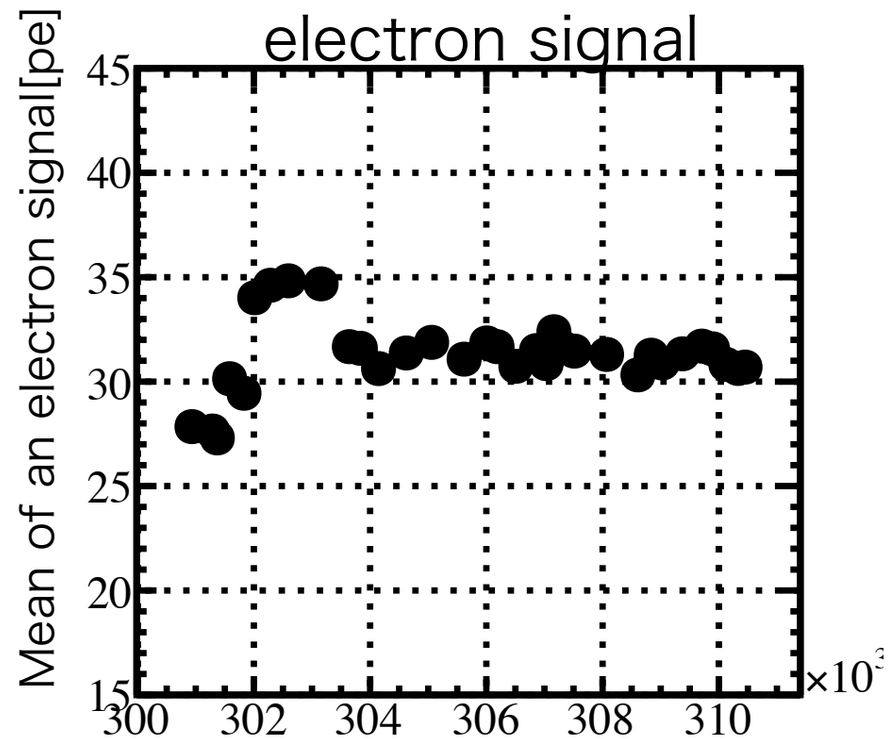
Outline

- Time dependent correction
- Module by module correction
  - To apply the common cut for all the module

Time-dependent correction

Review

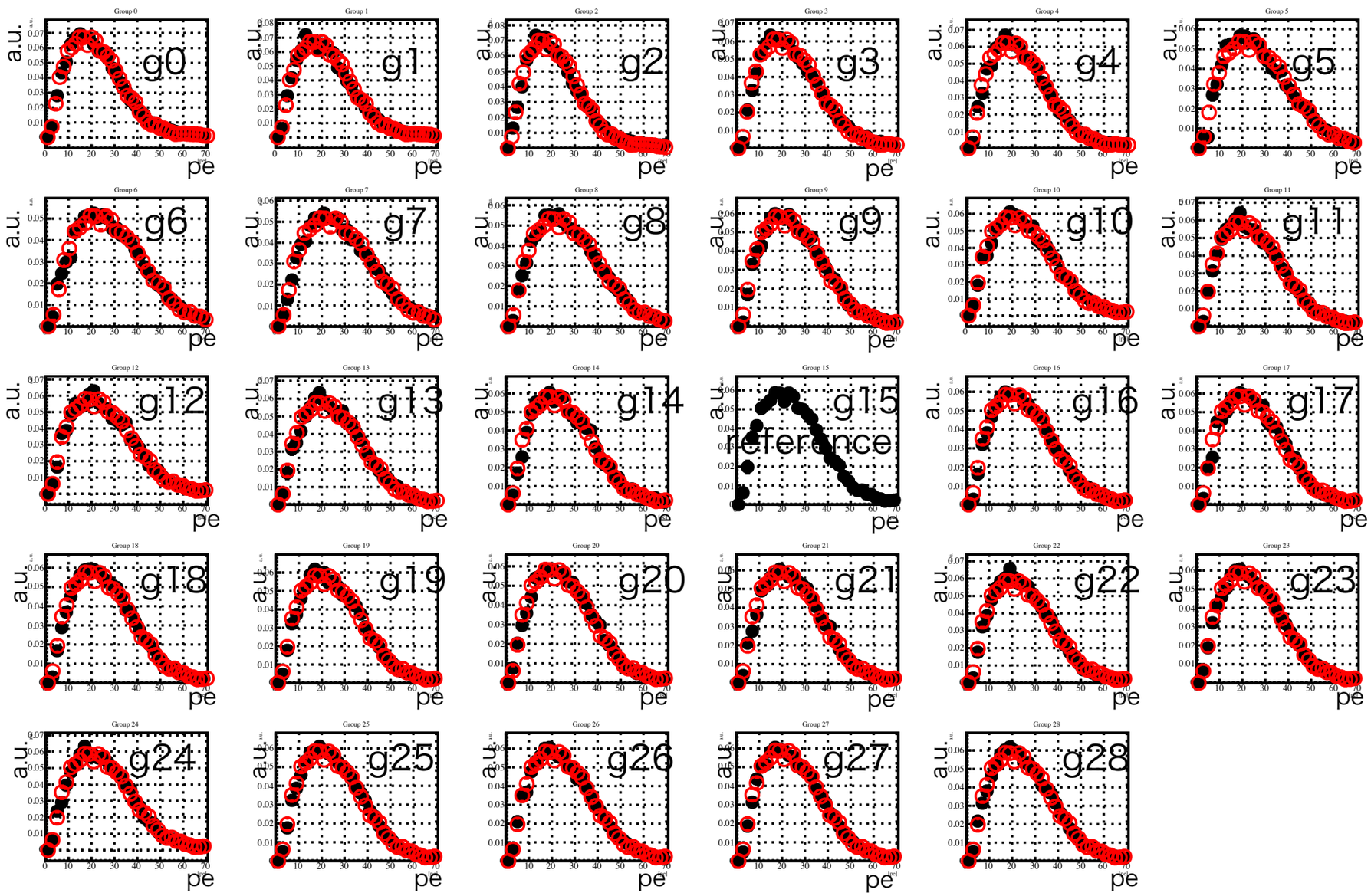




- Left: <pad charge> as a function of run number
- Right: Mean of an electron signal as a function of run number
- Scintillation BG and electron signal show the similar behavior (jump and slope)
- Derive correction parameter with electron signal.

Derive correction parameter

electron signal of EN3 for different run groups

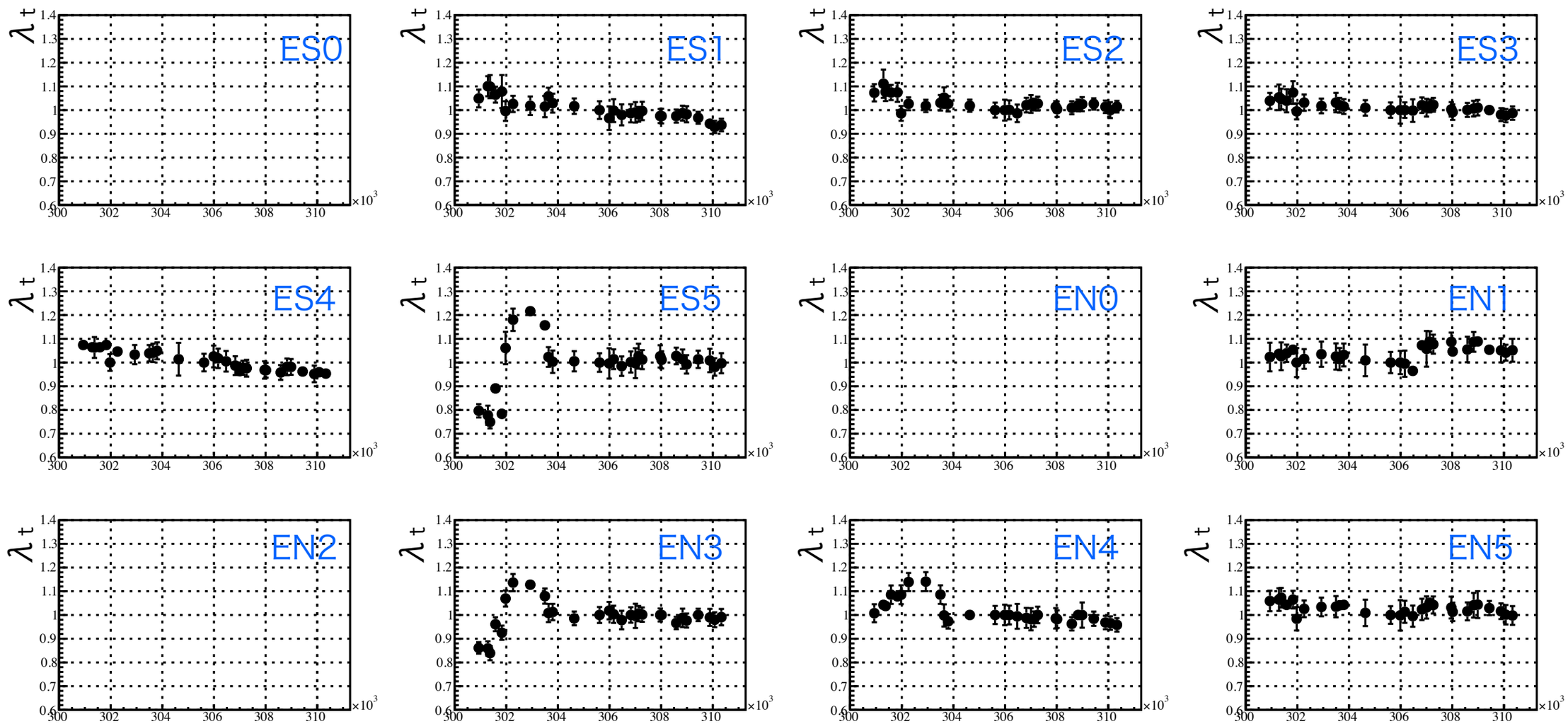


black: electron signal of the group

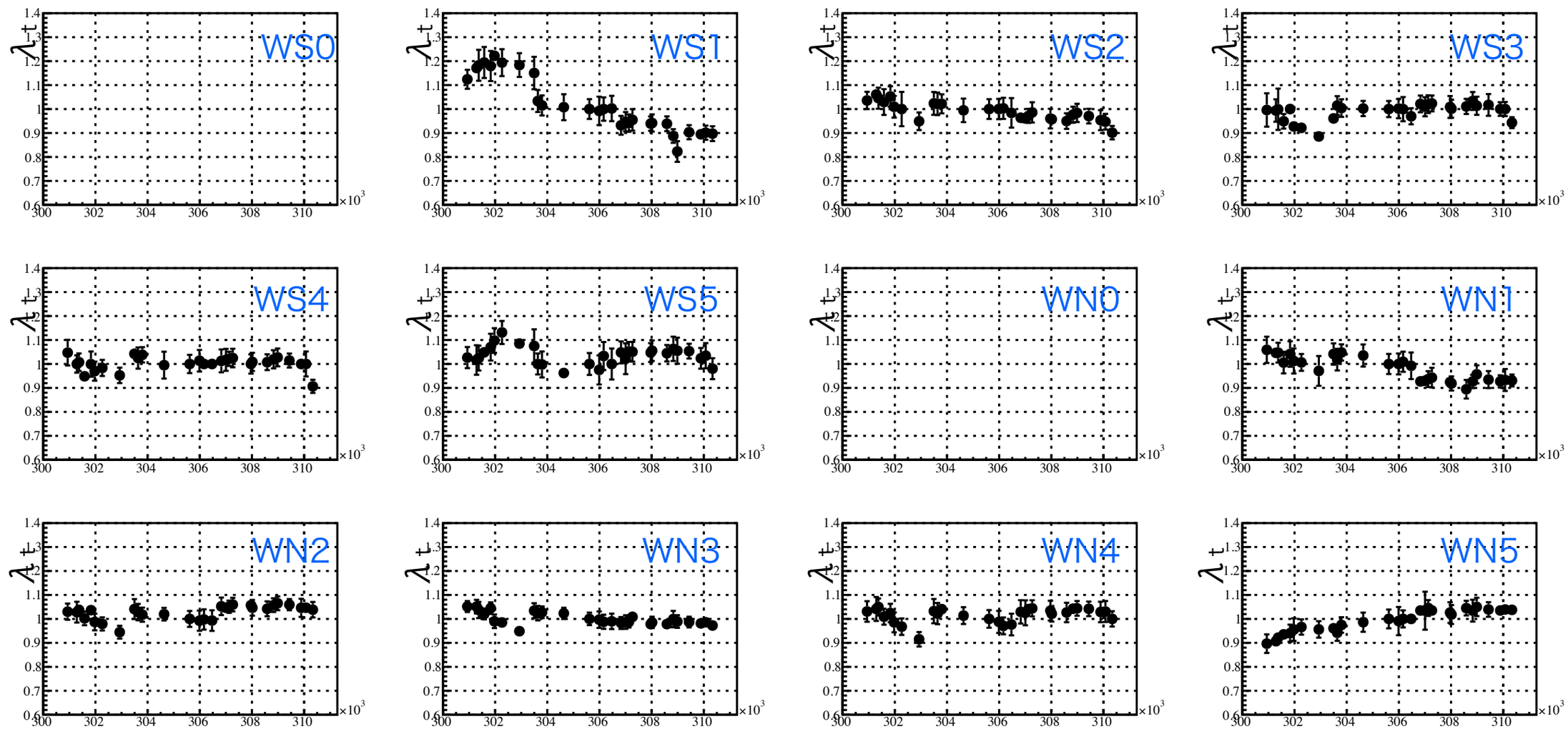
red: scaled electron signal of the reference group

- electron signal
  - 200GeV
  - Centrality: 60-92%
  - eid cut(backup)
  - BG is subtracted with swapping techniquez(backup)
- 200GeV runs are divided into 29 groups
- Scale the electron signal of g15 to fit the electron signal of the other run groups
  - fit param.: scale factor λ_t
  - fit range: 4-60pe
- Use the λ_t as a correction parameter

λ_t vs run number (east)

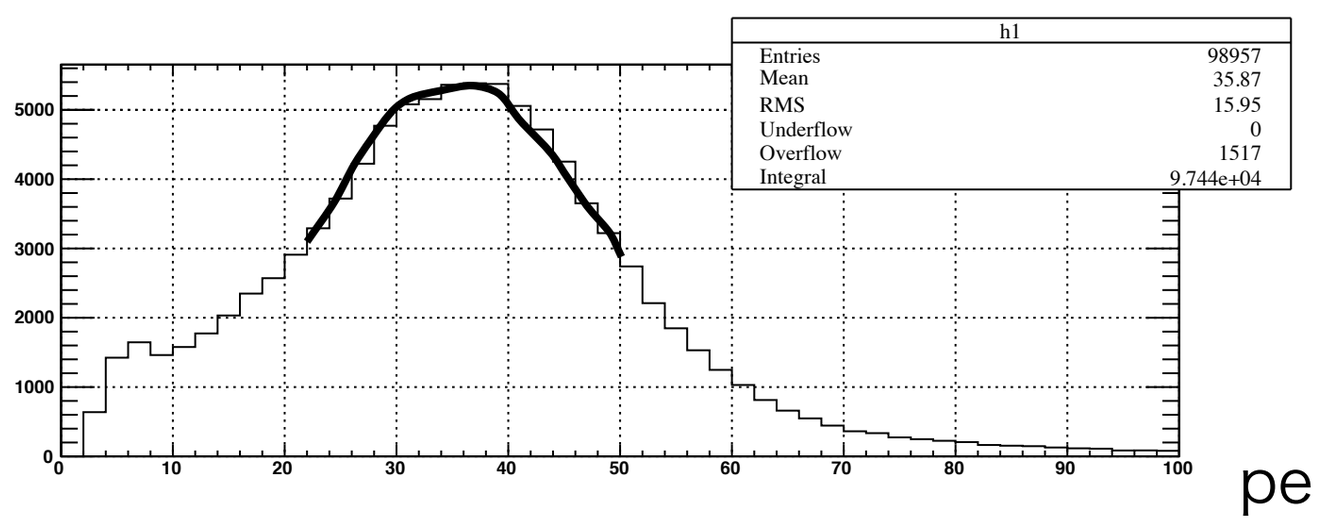


λ_t vs run number (west)

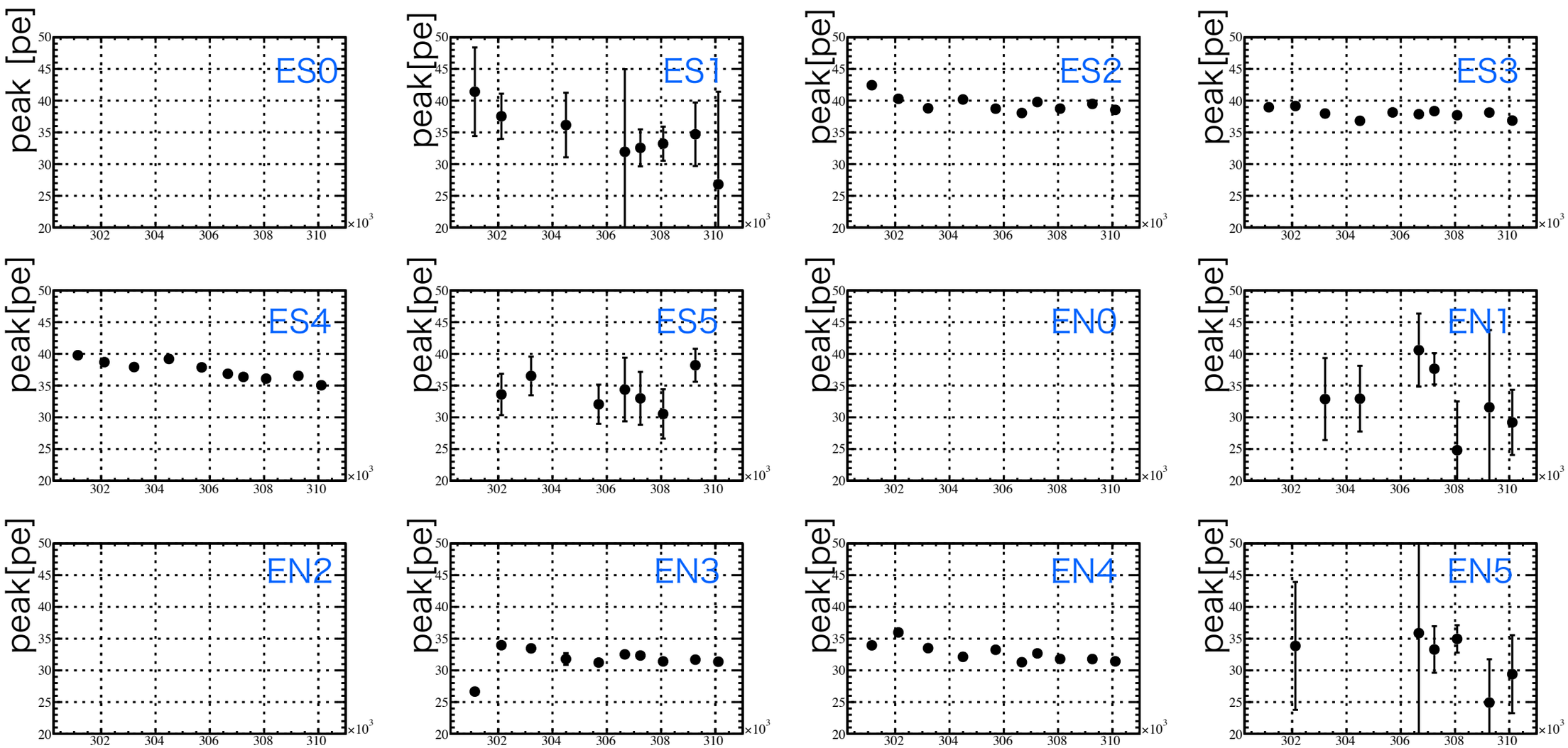


Cross check with “Double”

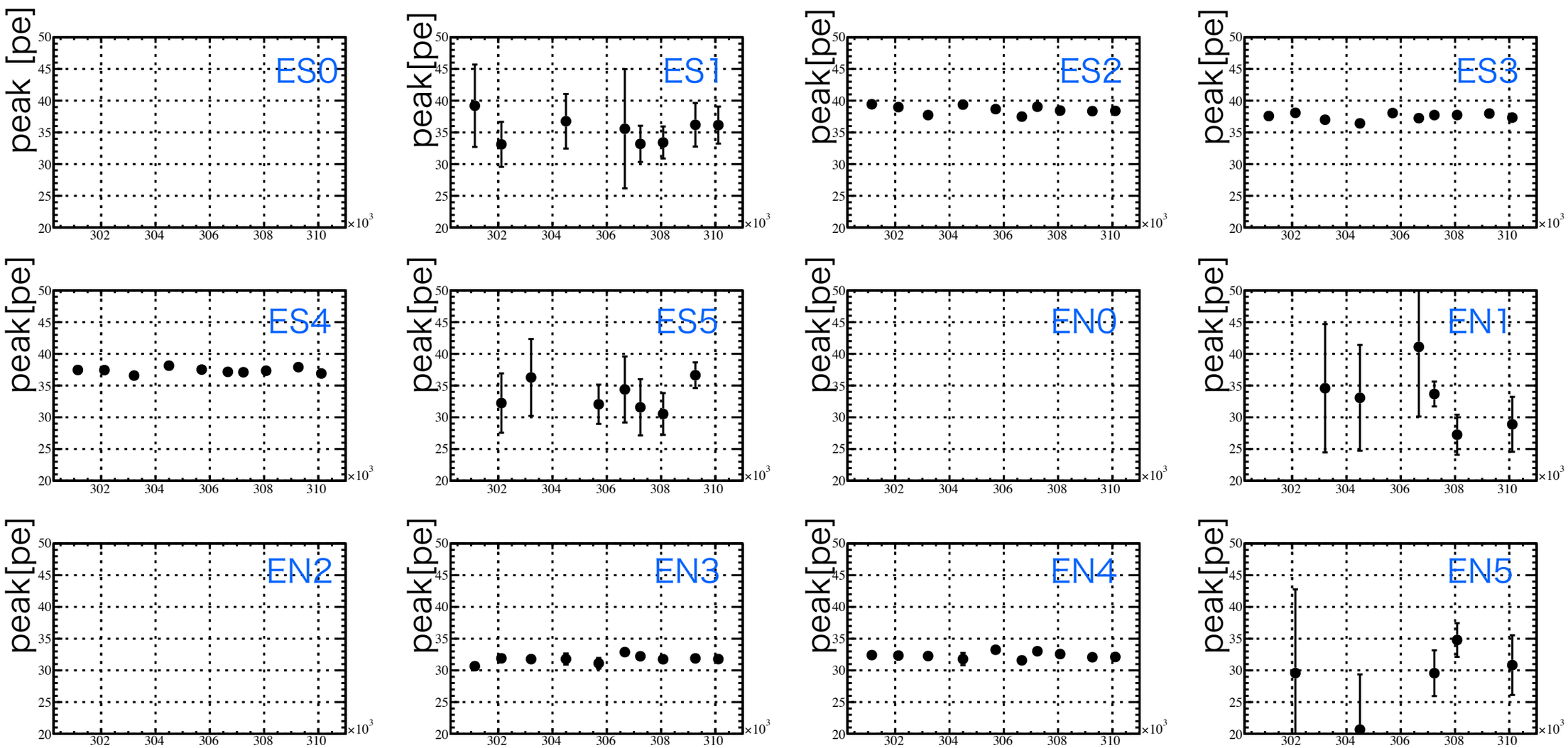
- 200GeV, 60-92% (10 groups)
- Apply the correction on slide 8&9 at the CellList level (I modified hbdAdcCalib.cc)
- Cut
  - elD cut (backup)
  - phiV < (0.018+0.93*exp(-16.82*mass))
  - Opening angle < 50mrad
  - mass < 30MeV/c^2
- Fit the charge distribution to gaussian and find the peak position



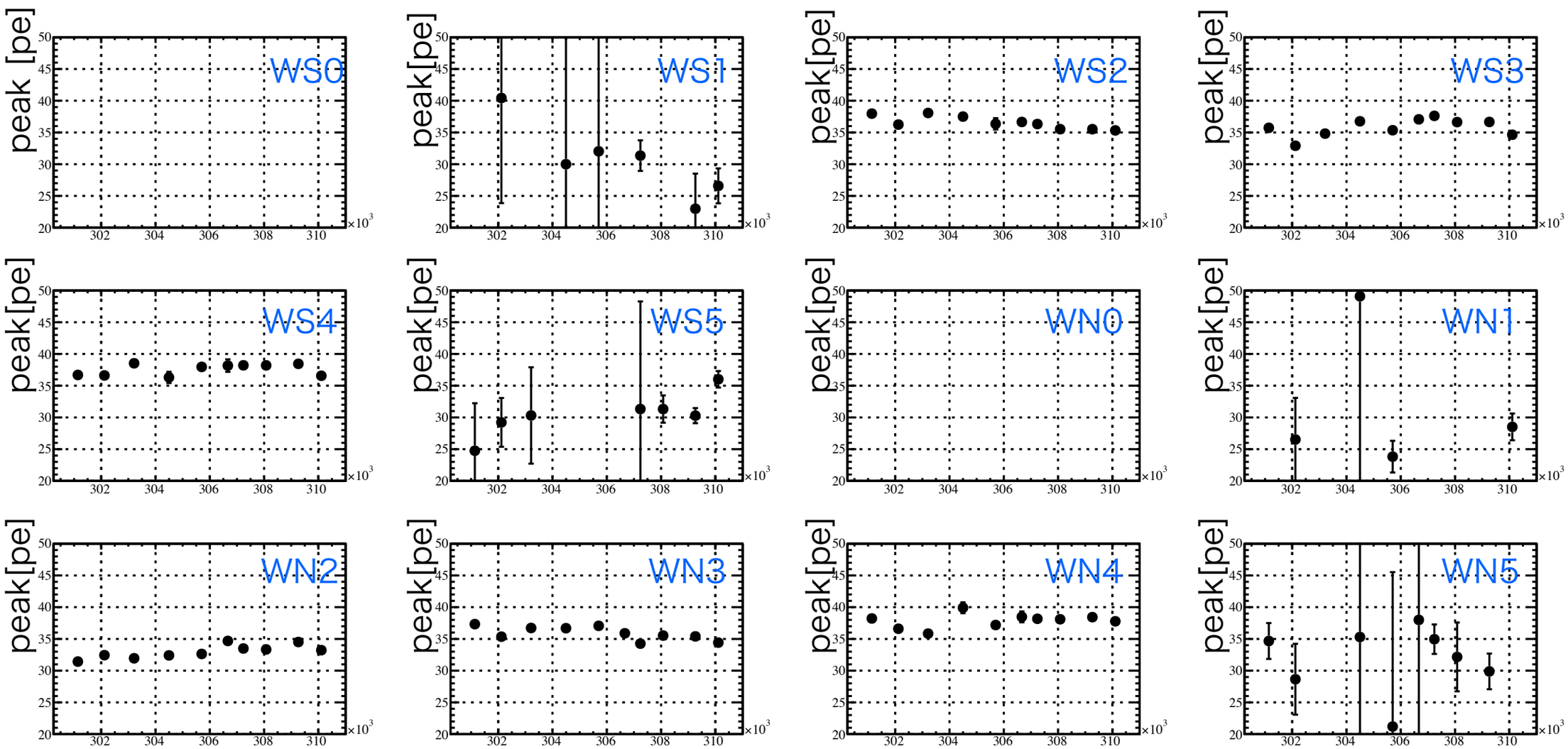
peak vs run number (before correction: east)



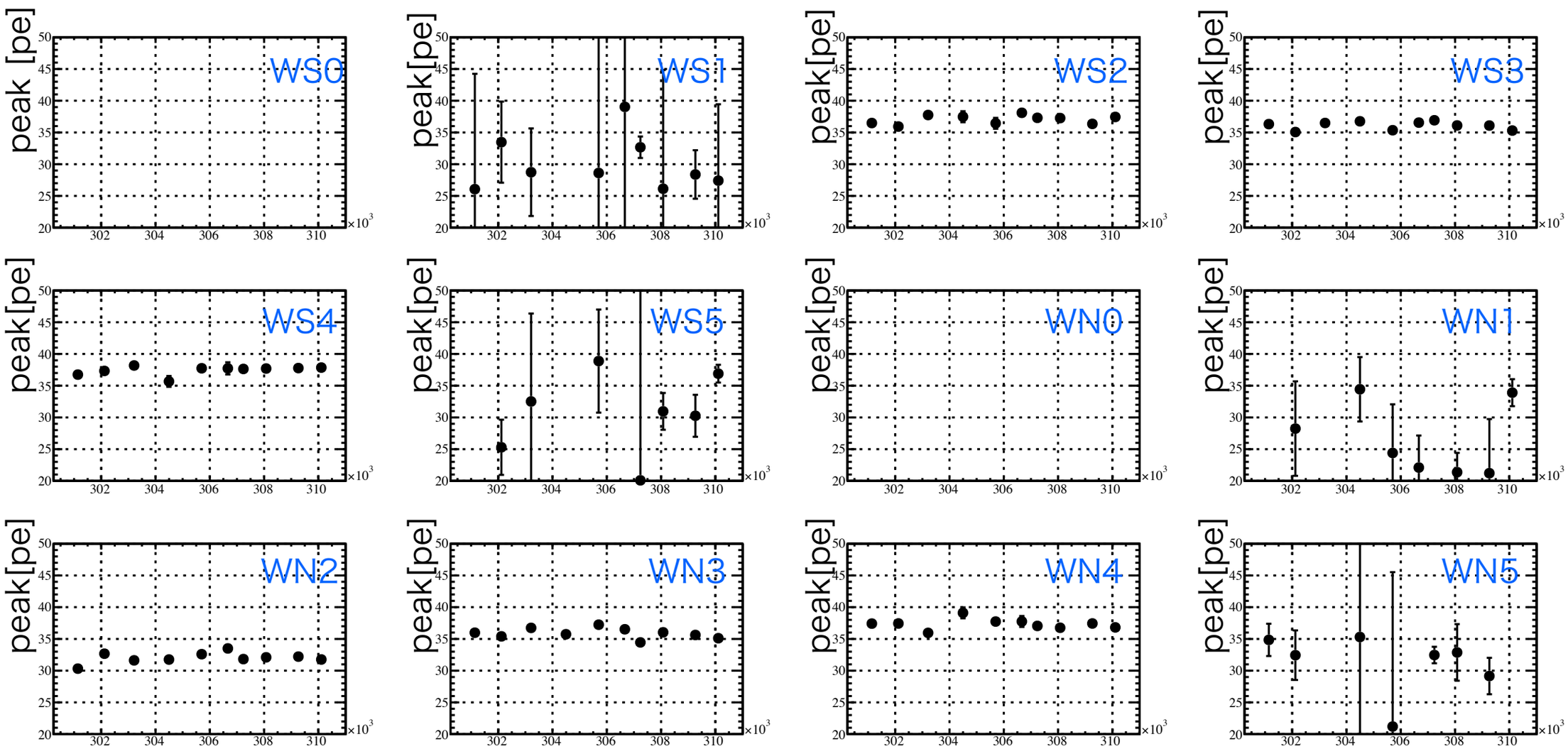
peak vs run number (after correction: east)



peak vs run number (before correction: west)



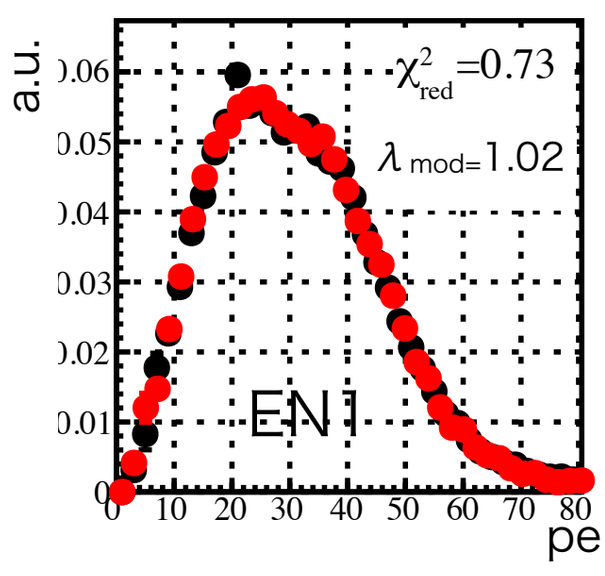
peak vs run number (after correction: west)

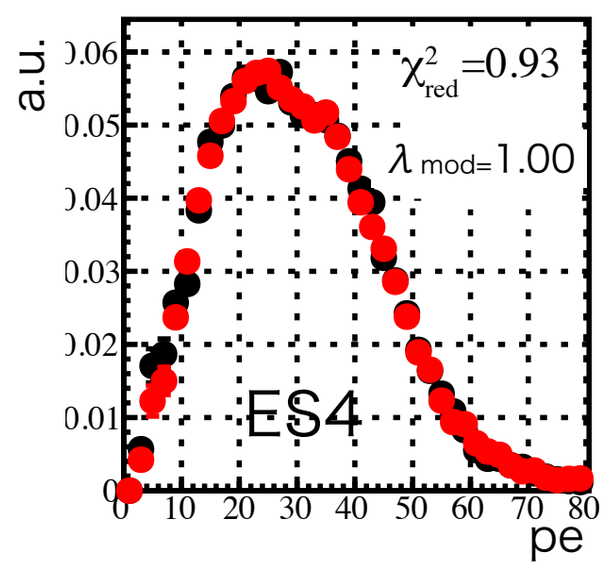


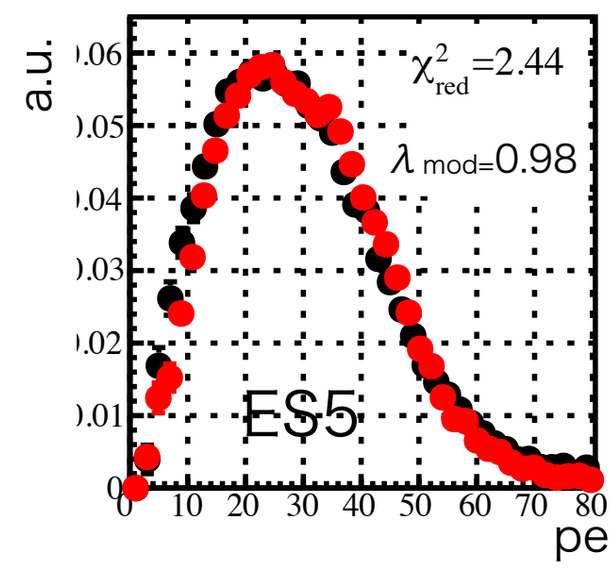
Module-by-module correction

Compare electron signal of each module

- 200GeV, 60-92%
- electron signal is derived in the same way as slide 5
- After the time-dependent correction described in the last section
- Projection points are limited to the center of the modules
  - 10<|locx|<15 (z in PHENIX coordinate)
  - |locy|<3 (phi in PHENIX coordinate)
- Scale the electron signal of WS2 to fit the electron signal of the other modules
  - fit param.: scale factor λ_{mod}
  - fit range : 10 - 70 pe



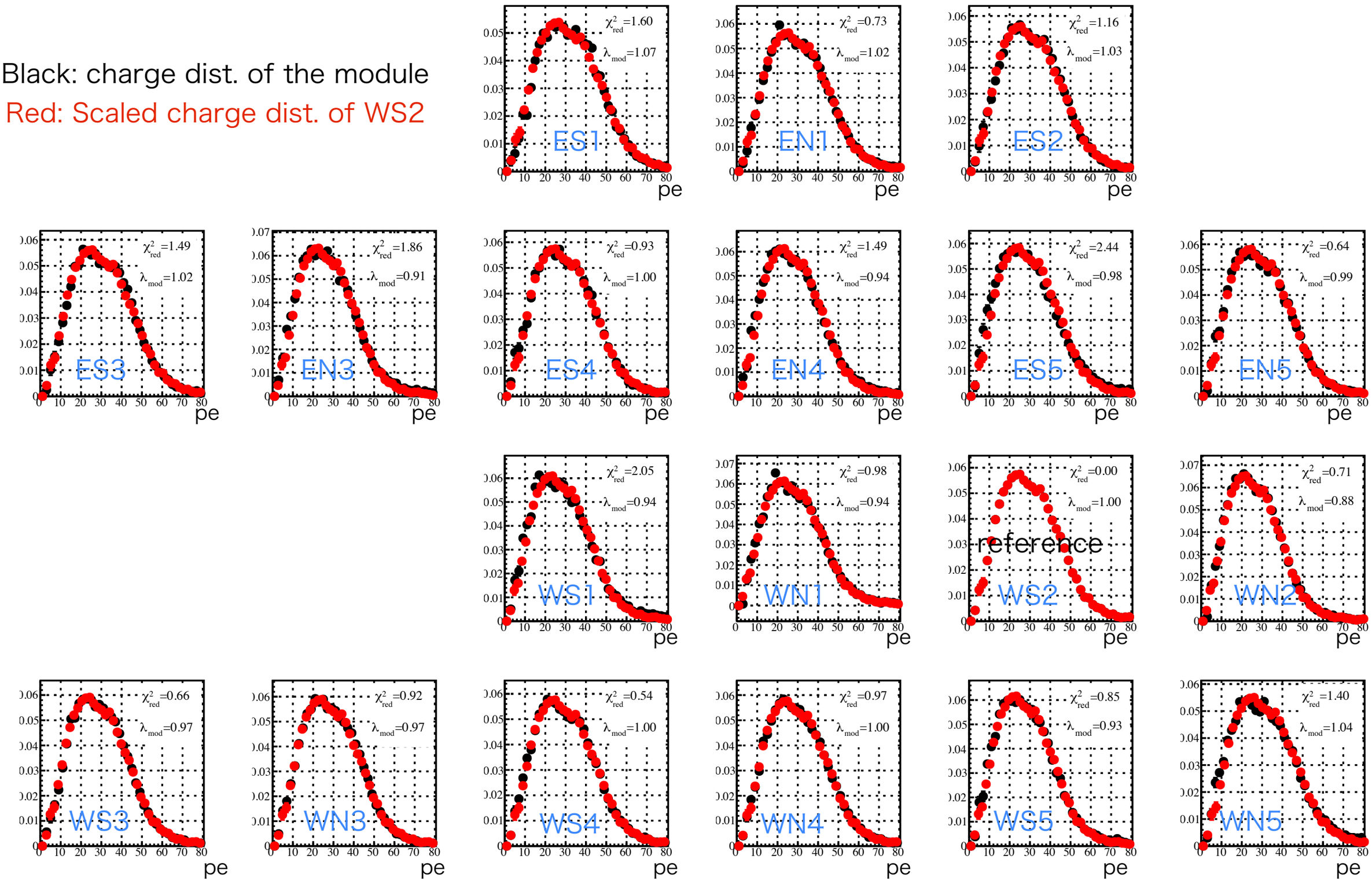




Charge dist. of all the modules

Black: charge dist. of the module

Red: Scaled charge dist. of WS2



Plan

Apply correction at the CellList level (?)

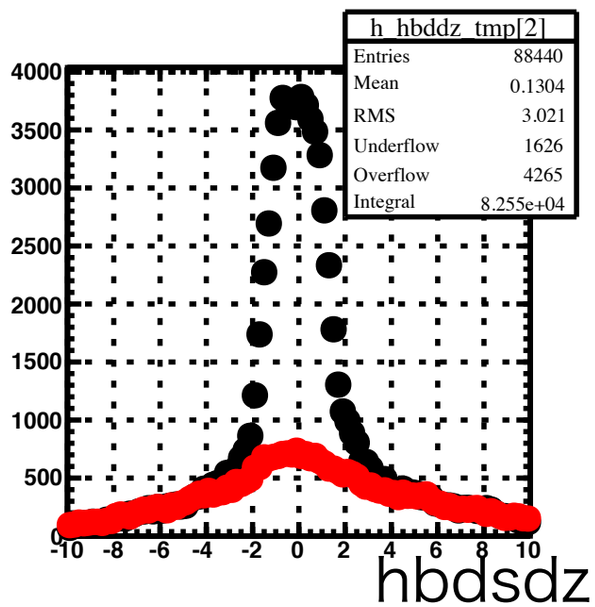
1. Modify hbdAdcCalib.cc(hh)
   - Add similar function as the regular gain calibration
2. Remake the thresholds for HbdMinPadClusterizer
3. Submit to CVS

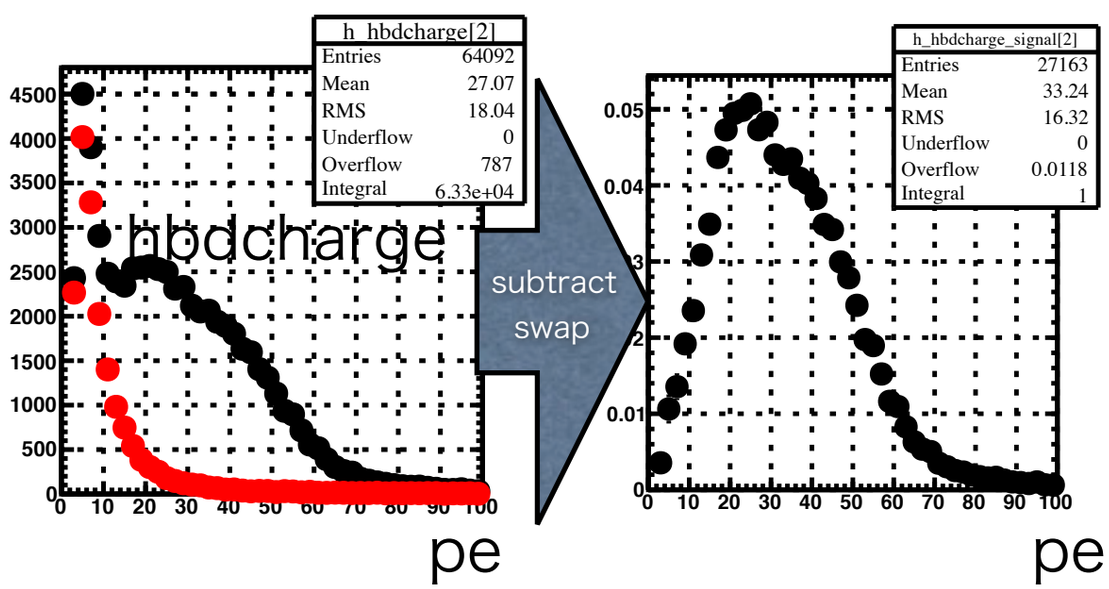
Backup

Setup

- Data set: 200GeV 60-92% events
- CA elD cut
  - pt>0.2GeV
  - n0>=3,disp<5,chi2/npe0<25
  - |emcdphi|<0.03,|emcdz+1|<15
  - ecore/mom>0.6
- Clusterizer
  - WisClusterizer in CVS

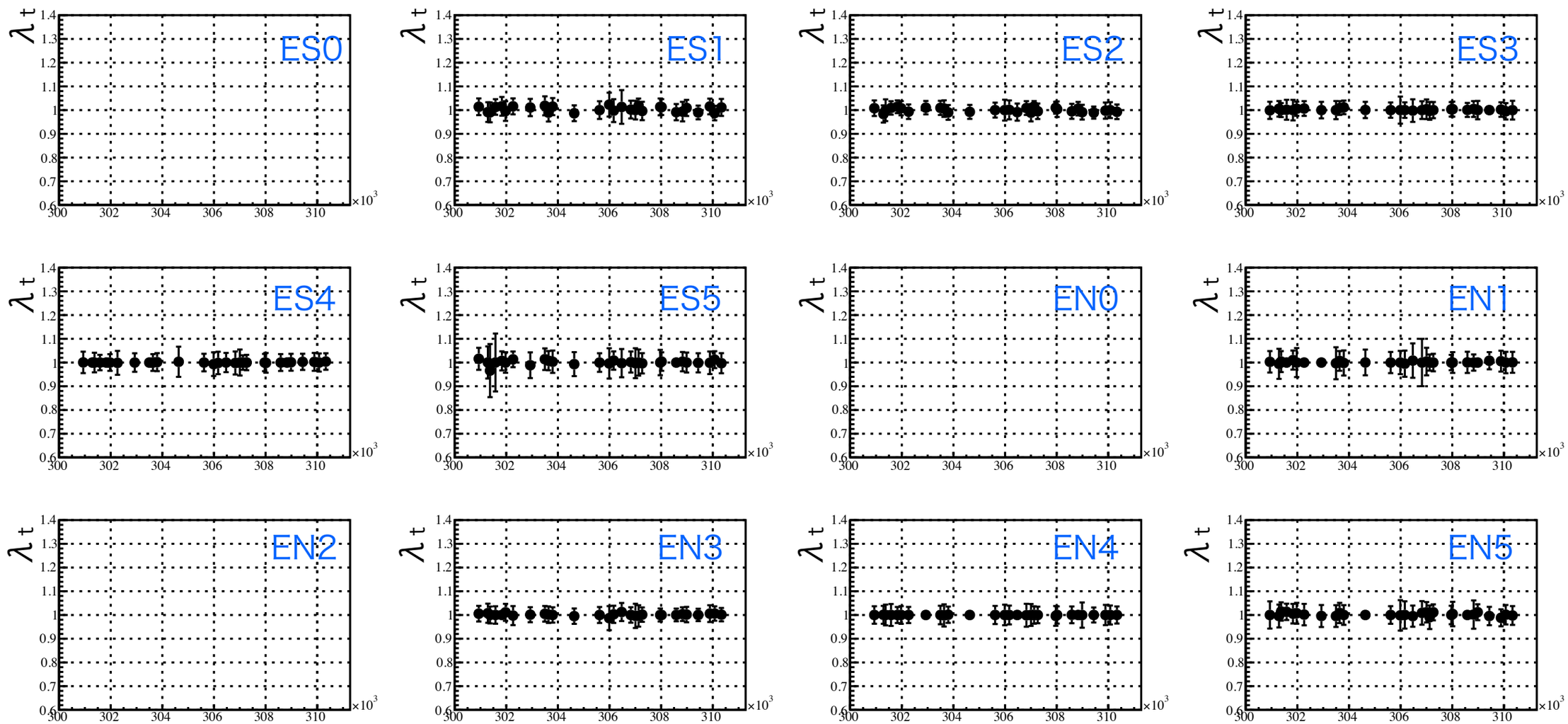
Extraction of an electron signal



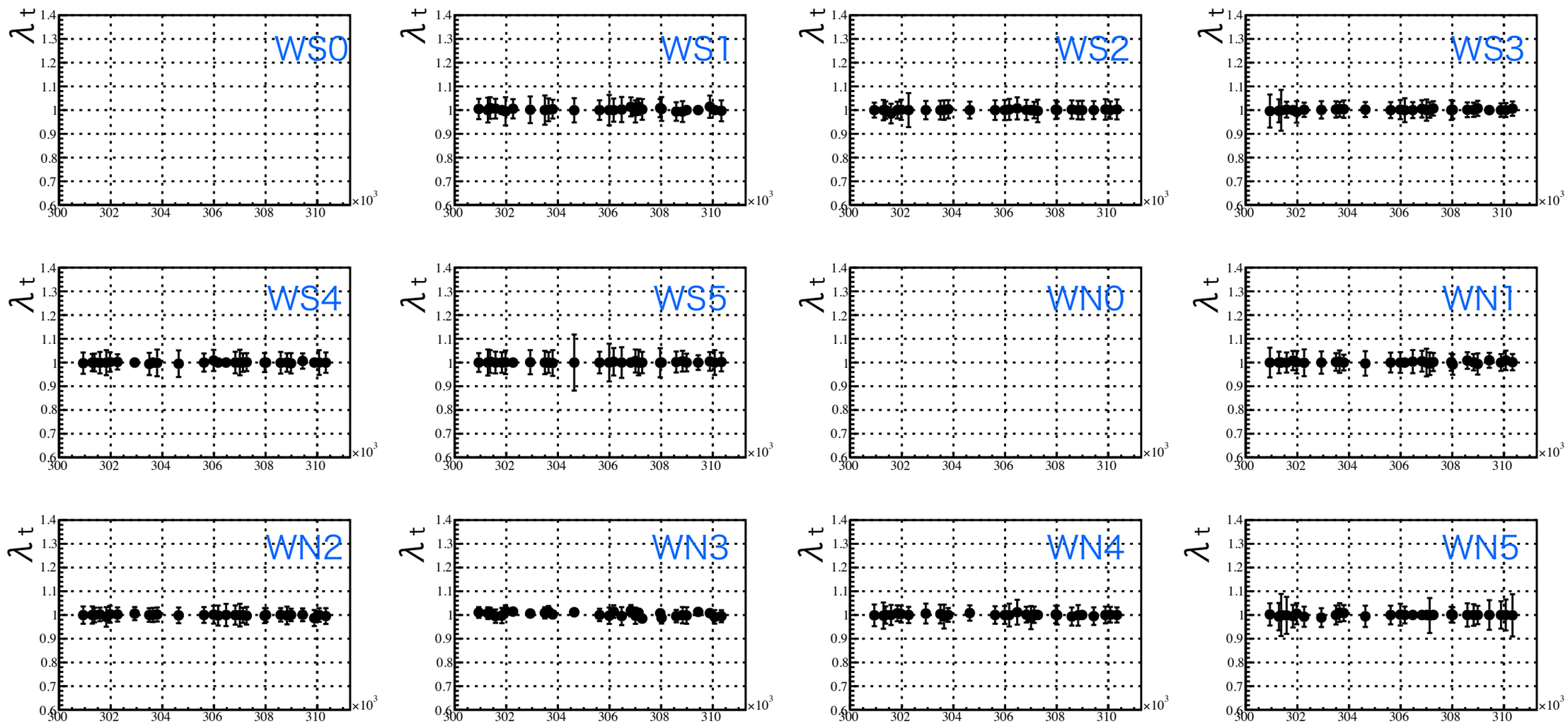
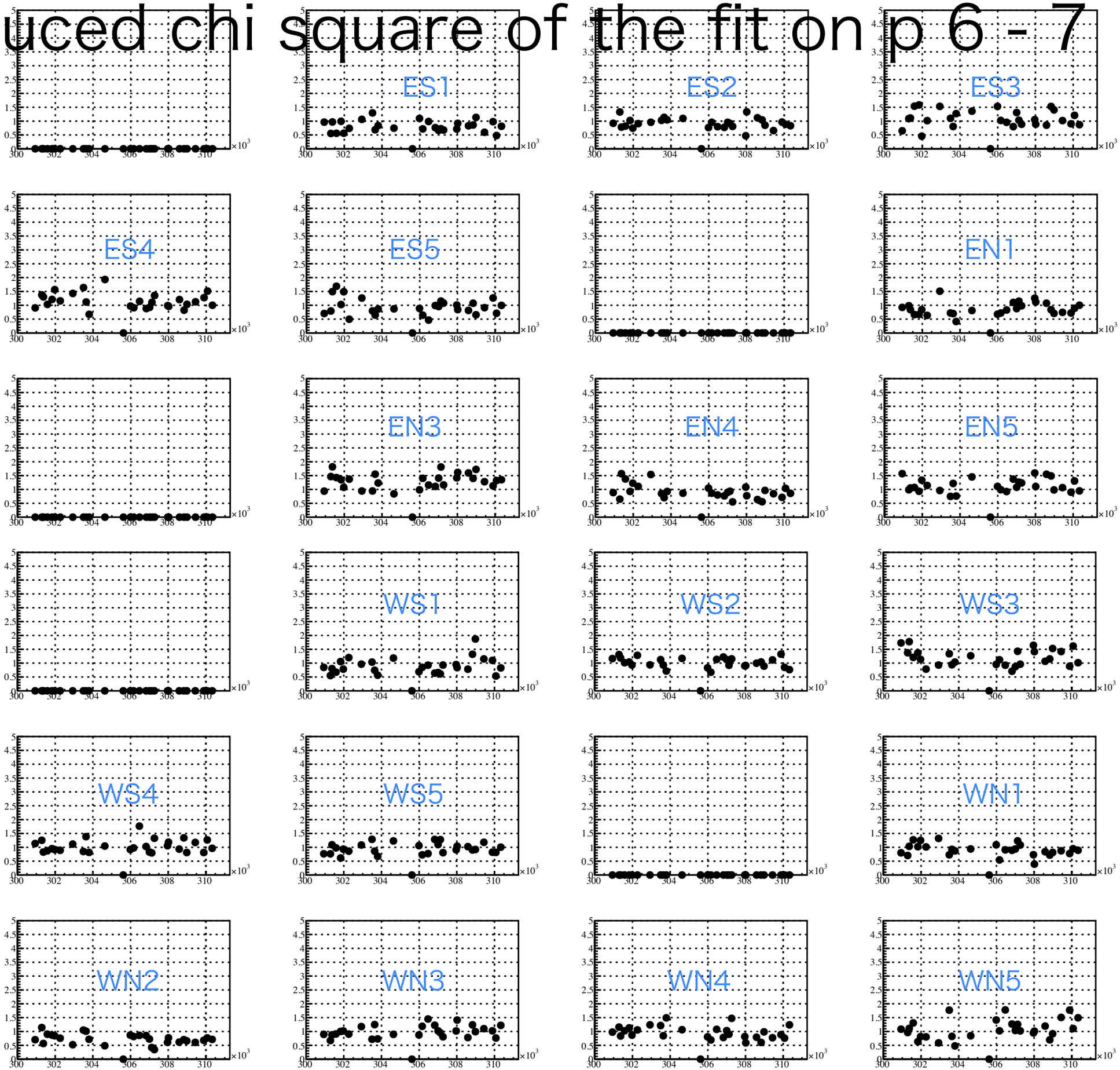


- 200GeV, Centrality: 60-92%
- WisClusterizer in CVS
- CA eid cut in backup
- The background is estimated by swapping technique.
- The background is normalized to the matching distributions tail-to-tail
- The hbdcharge distribution is obtained after 3 sigma matching cut

λ_t vs run number (after correction: east)



λ_t vs run number (after correction: west)



Reduced chi square of the fit on p 6 - 7