

10 TeV MuCol

MEMORY
CONSUMPTION
ISSUES +
electrons



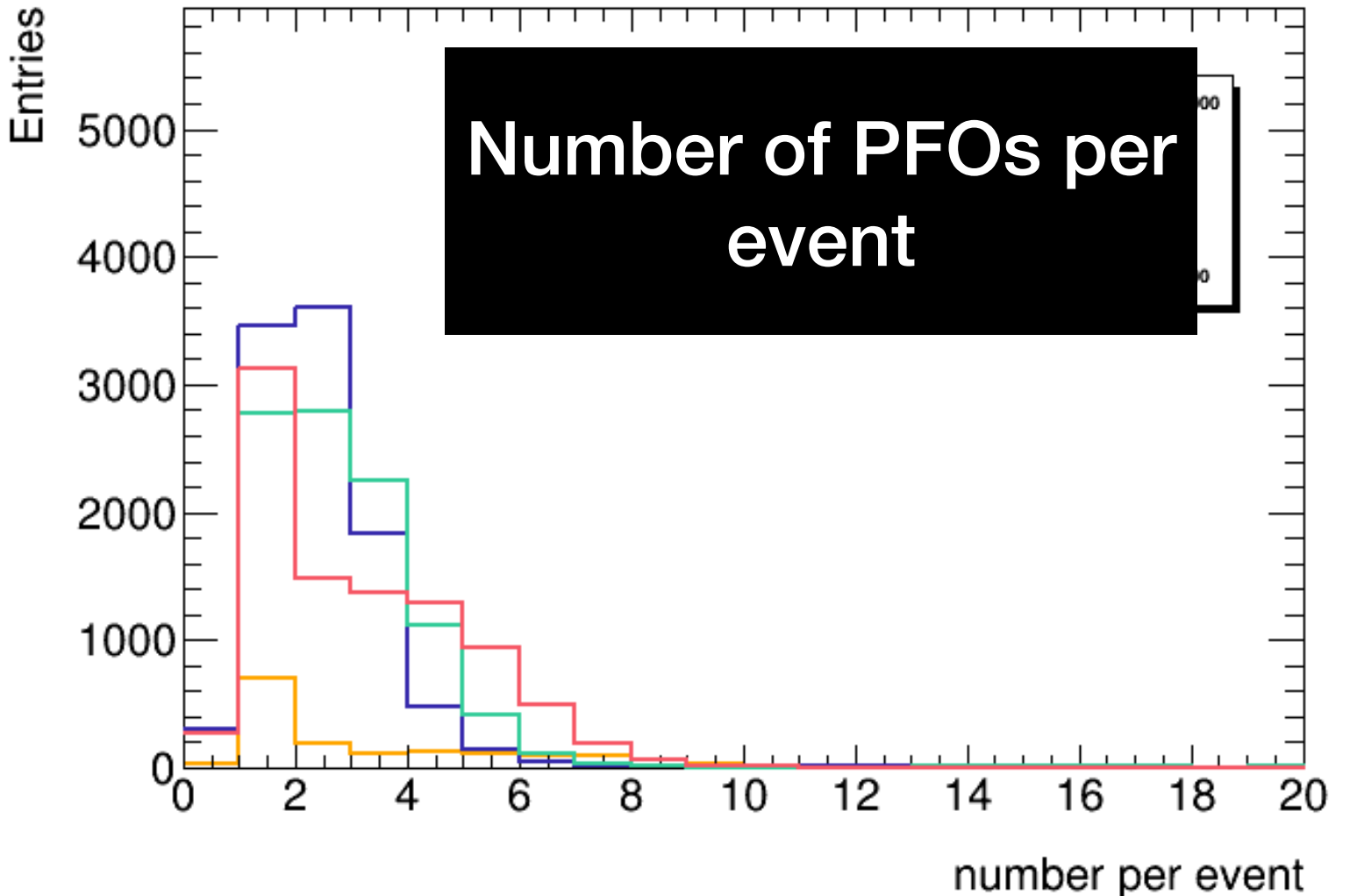
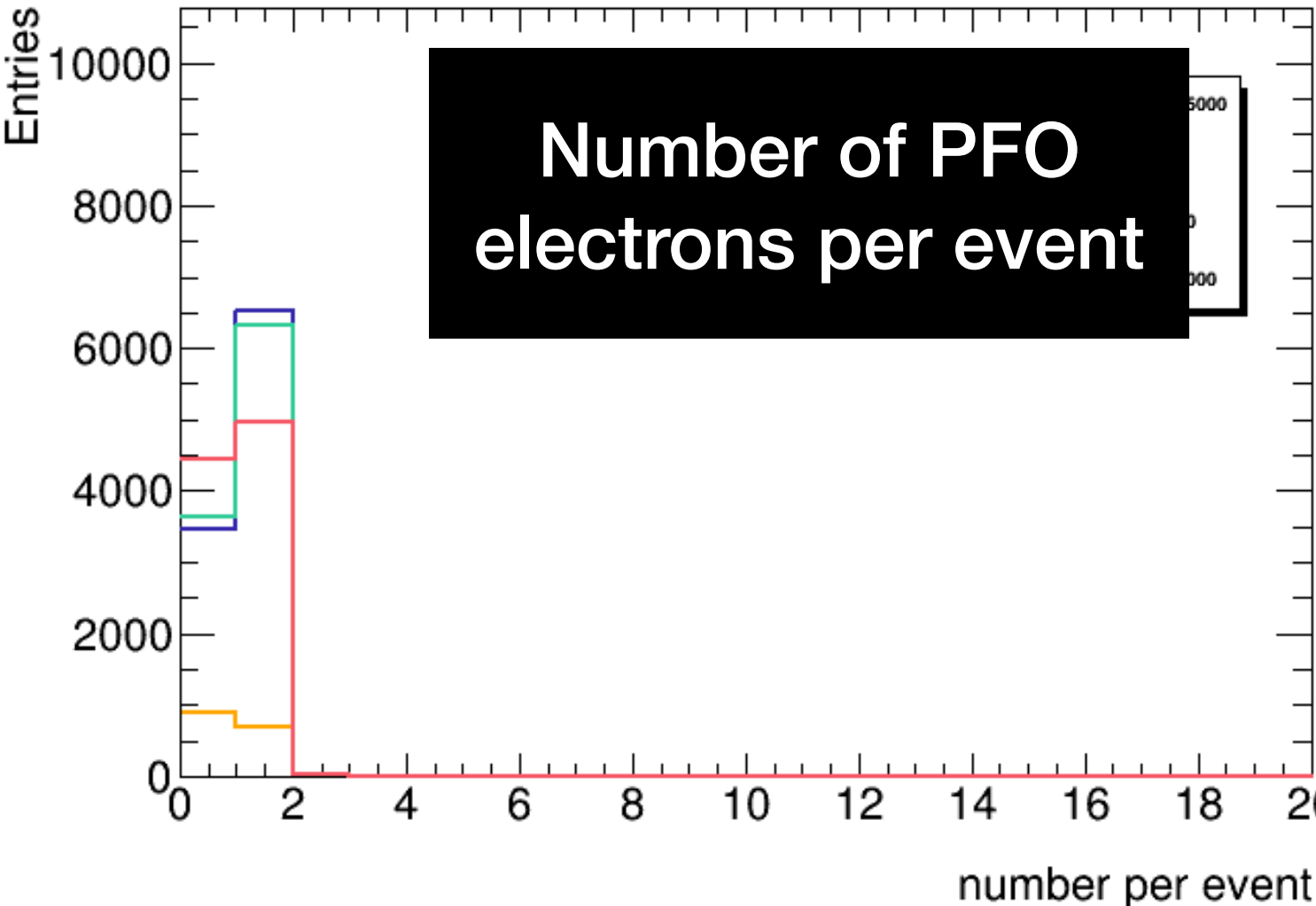
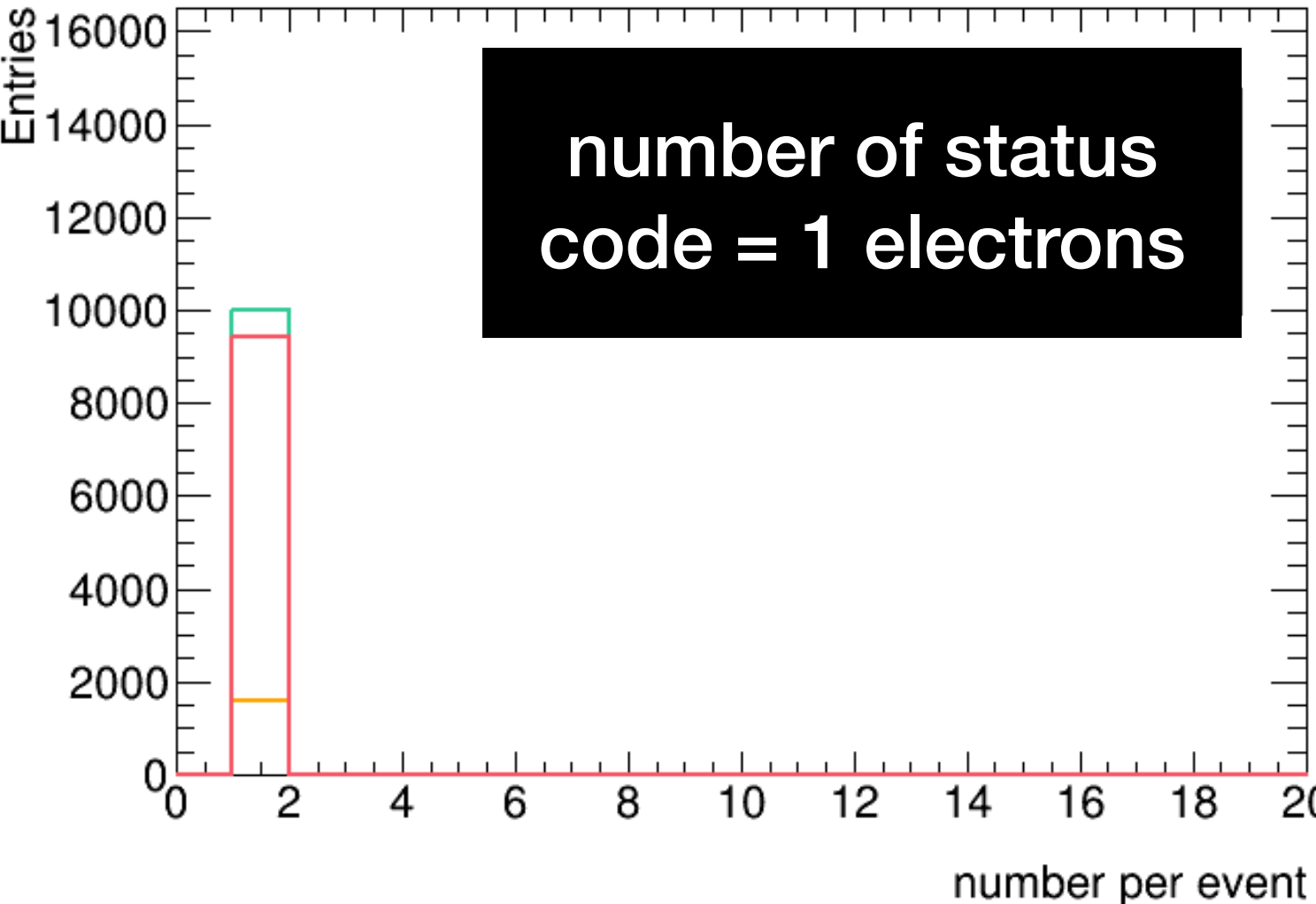
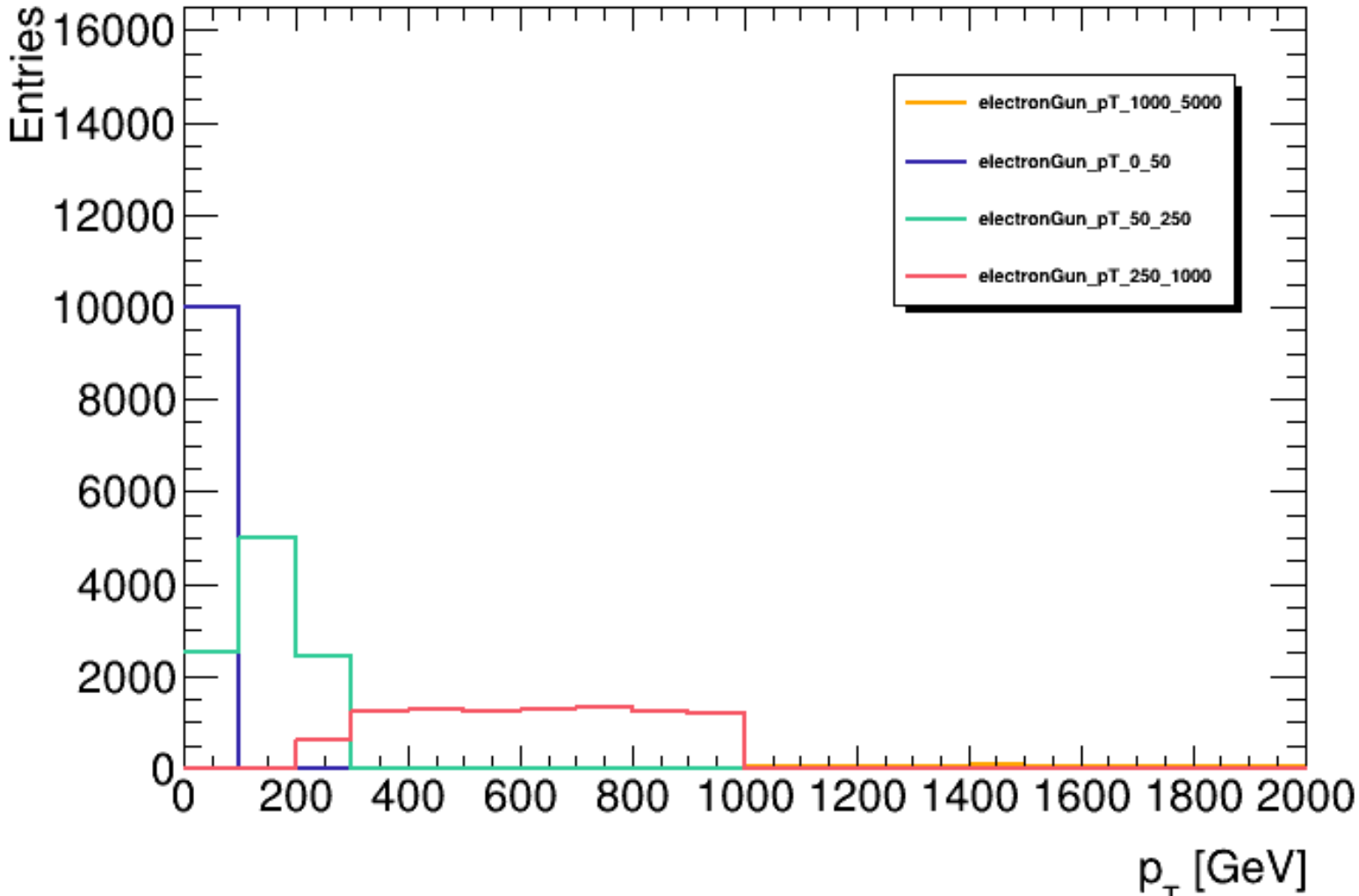
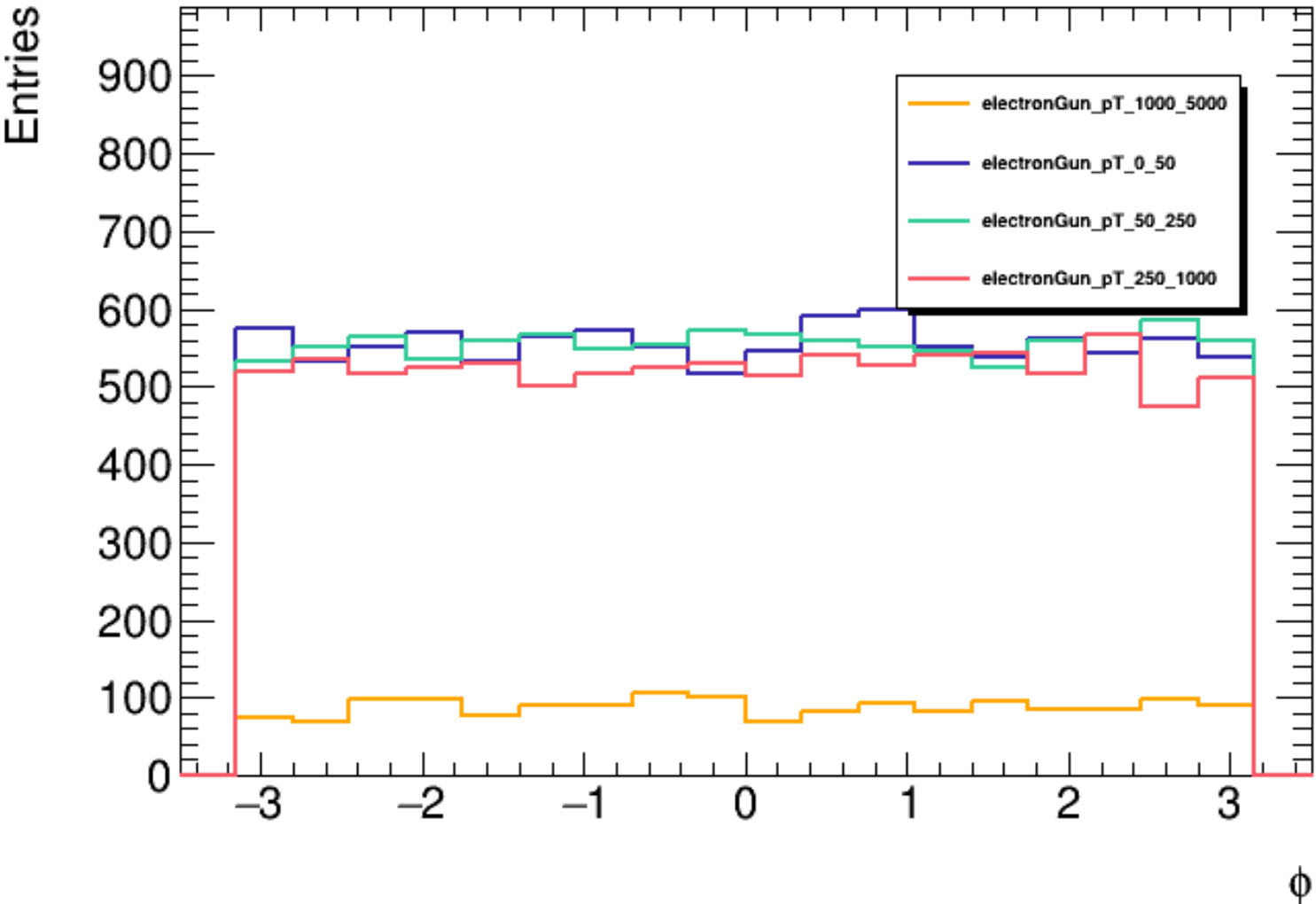
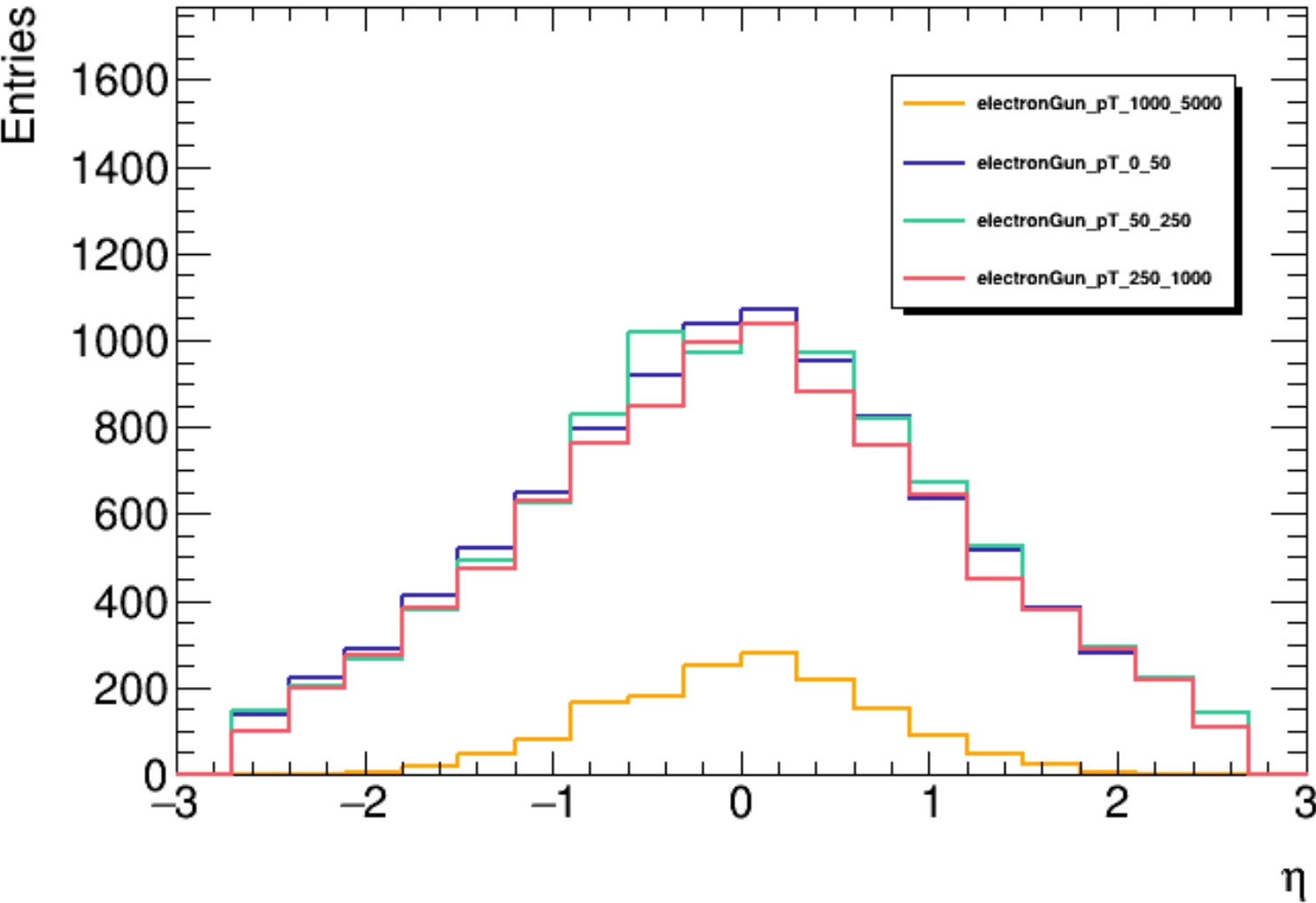
TOVA HOLMES, U. OF TENNESSEE
10 TEV MUCOL STUDIES
OCTOBER 7, 2023

Technical details

- Plotting code here:
 - <https://github.com/trholmes/mucolstudies/blob/main/electronStudies.py>
- Running on input:
 - /data/fmeloni/DataMuC_MuColl10_v0A/k4reco/electronGun*.root (10 TeV, no BIB)
 - Using slcio files
 - 0-50, 50-250, 250-1000, 1000-5000 (currently missing) GeV
 - All plotted separately without weighting

MCP electron plots

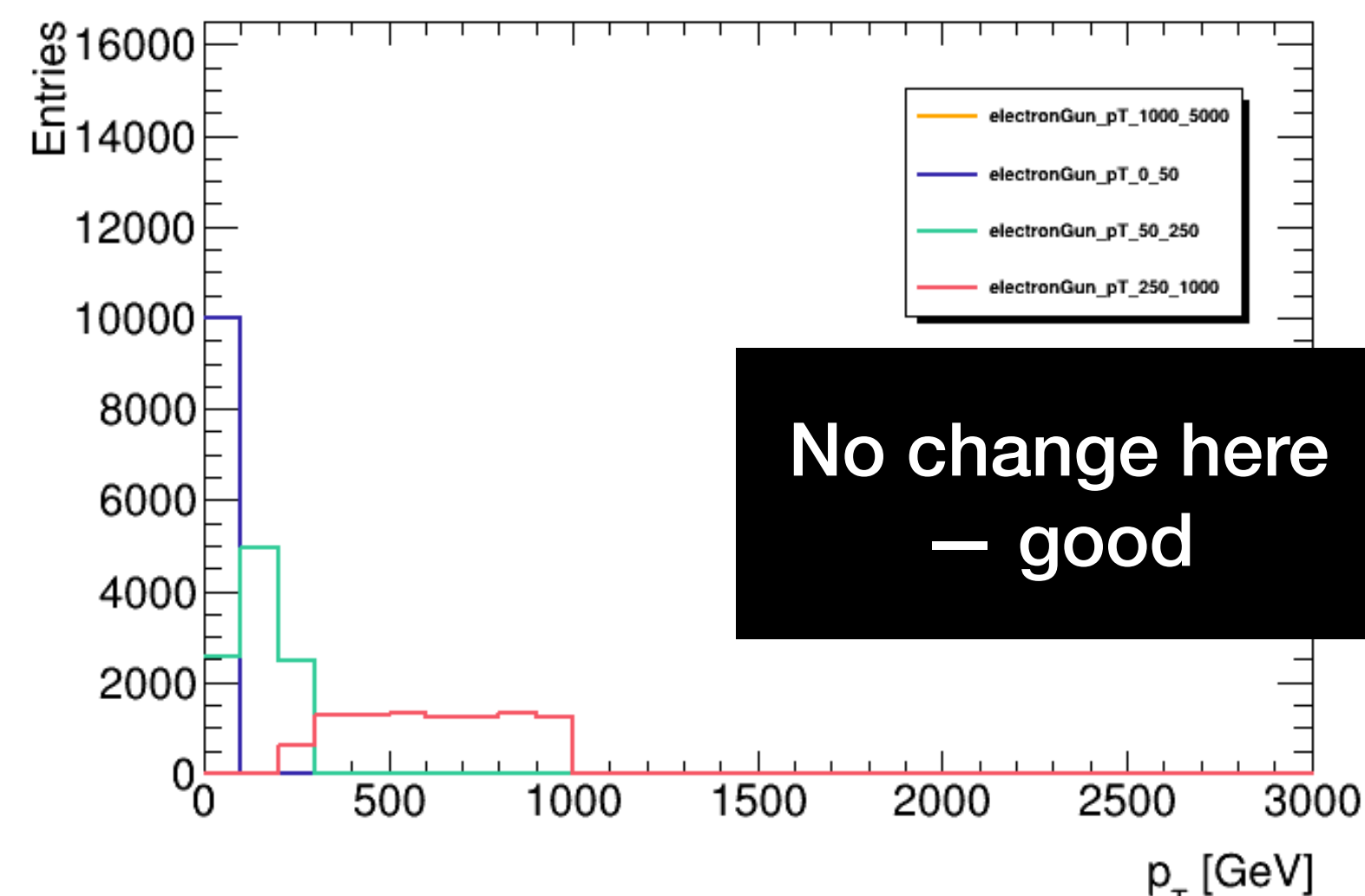
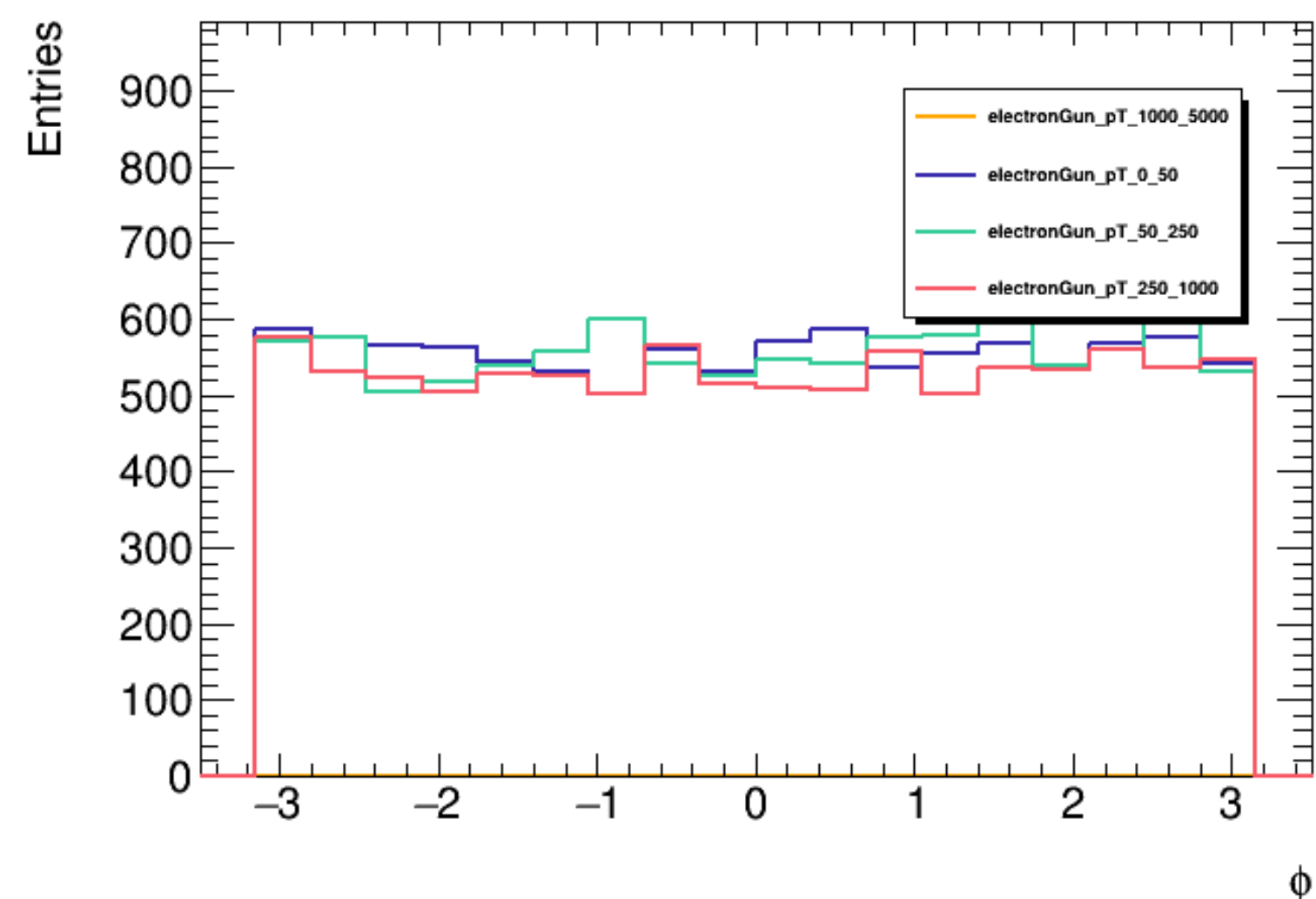
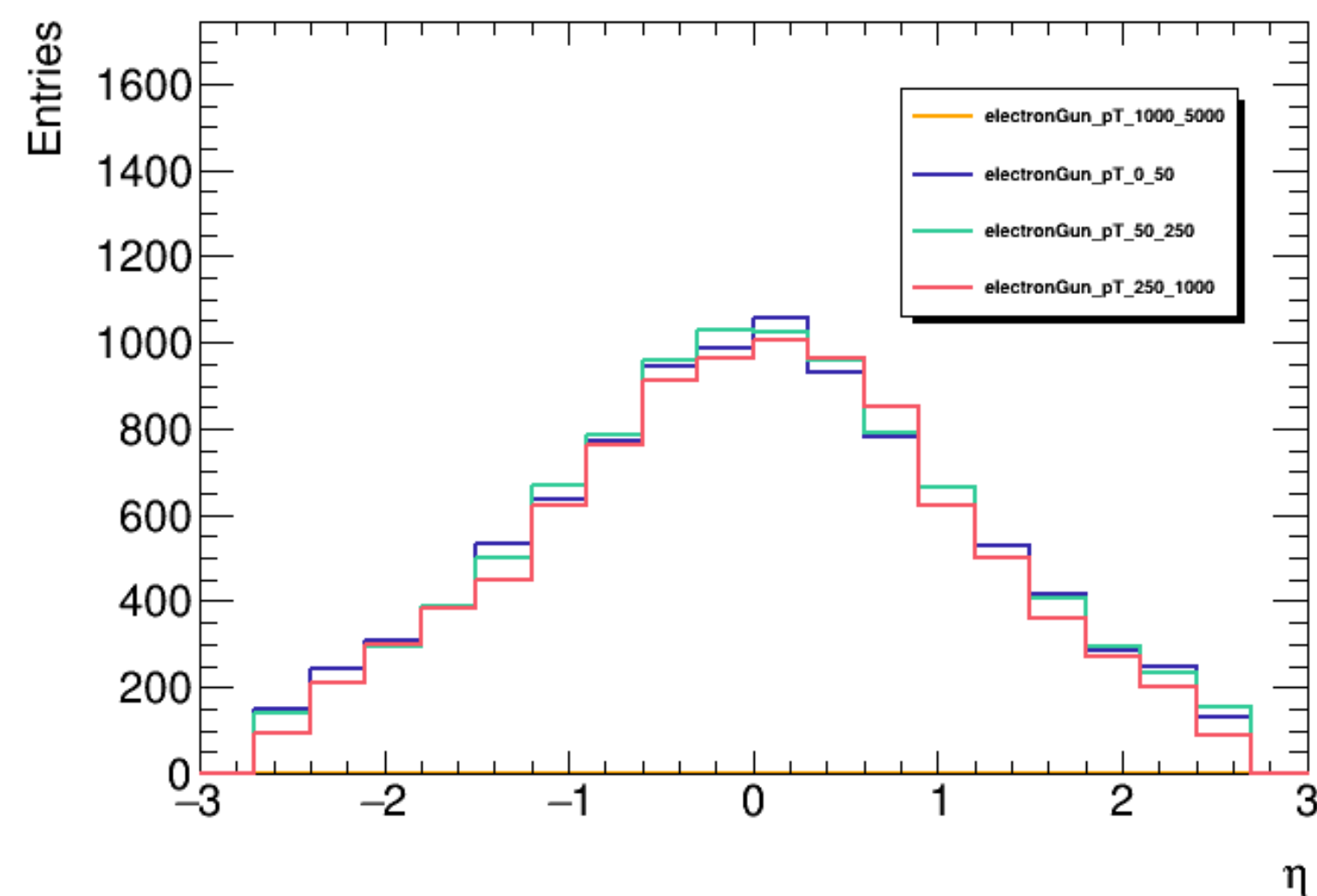
No BIB



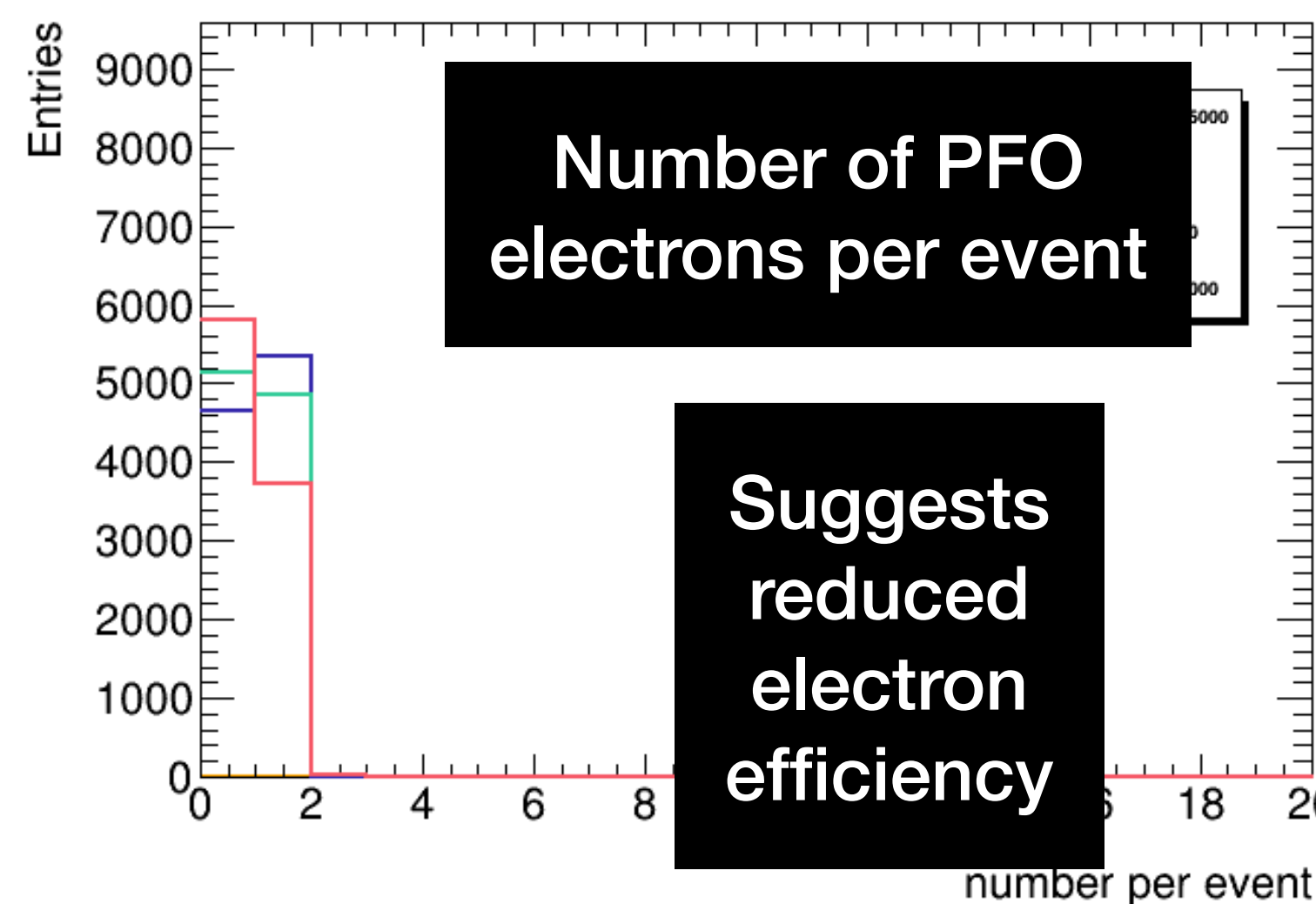
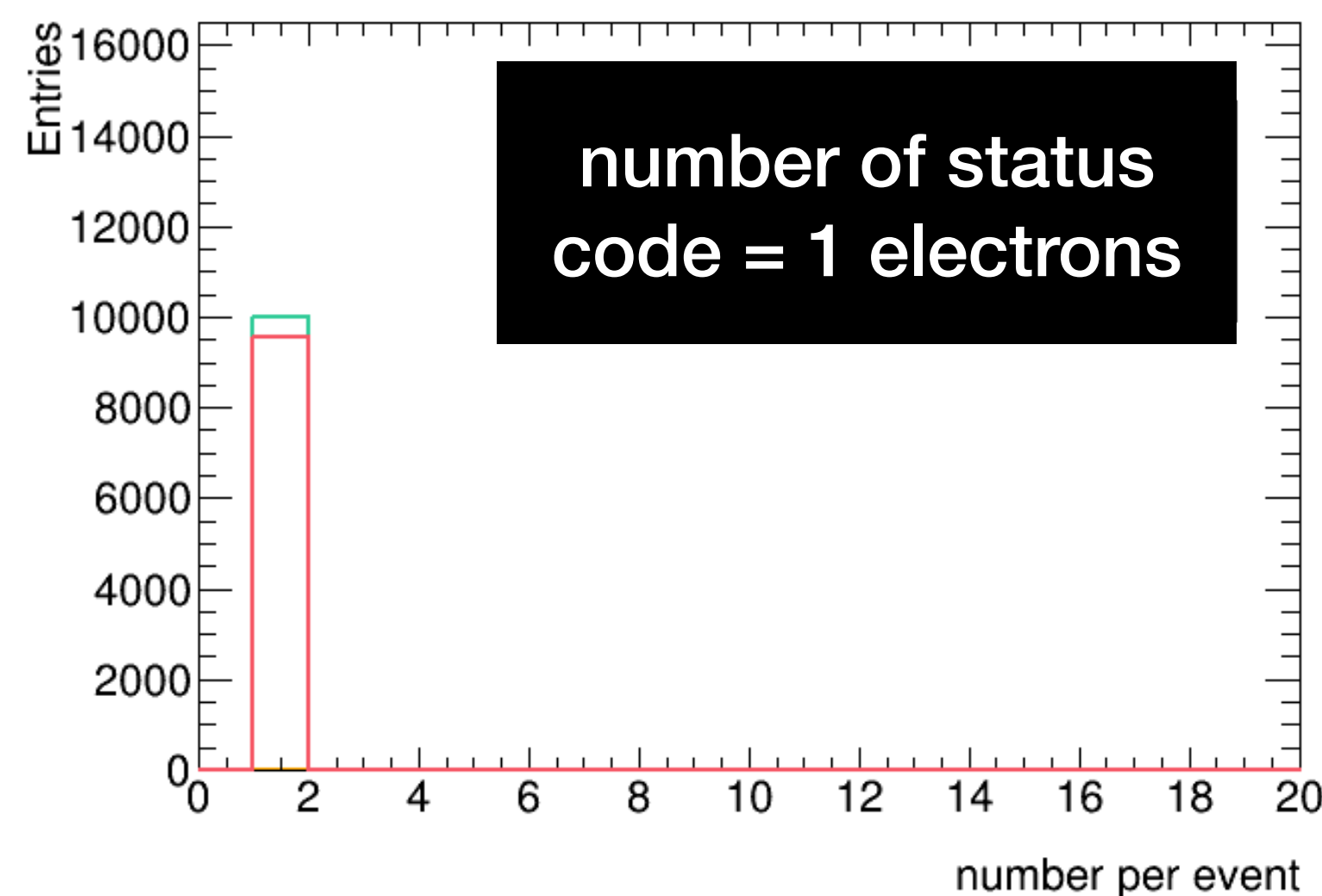
MCP electron plots

w/ BIB fix and updated tracking window

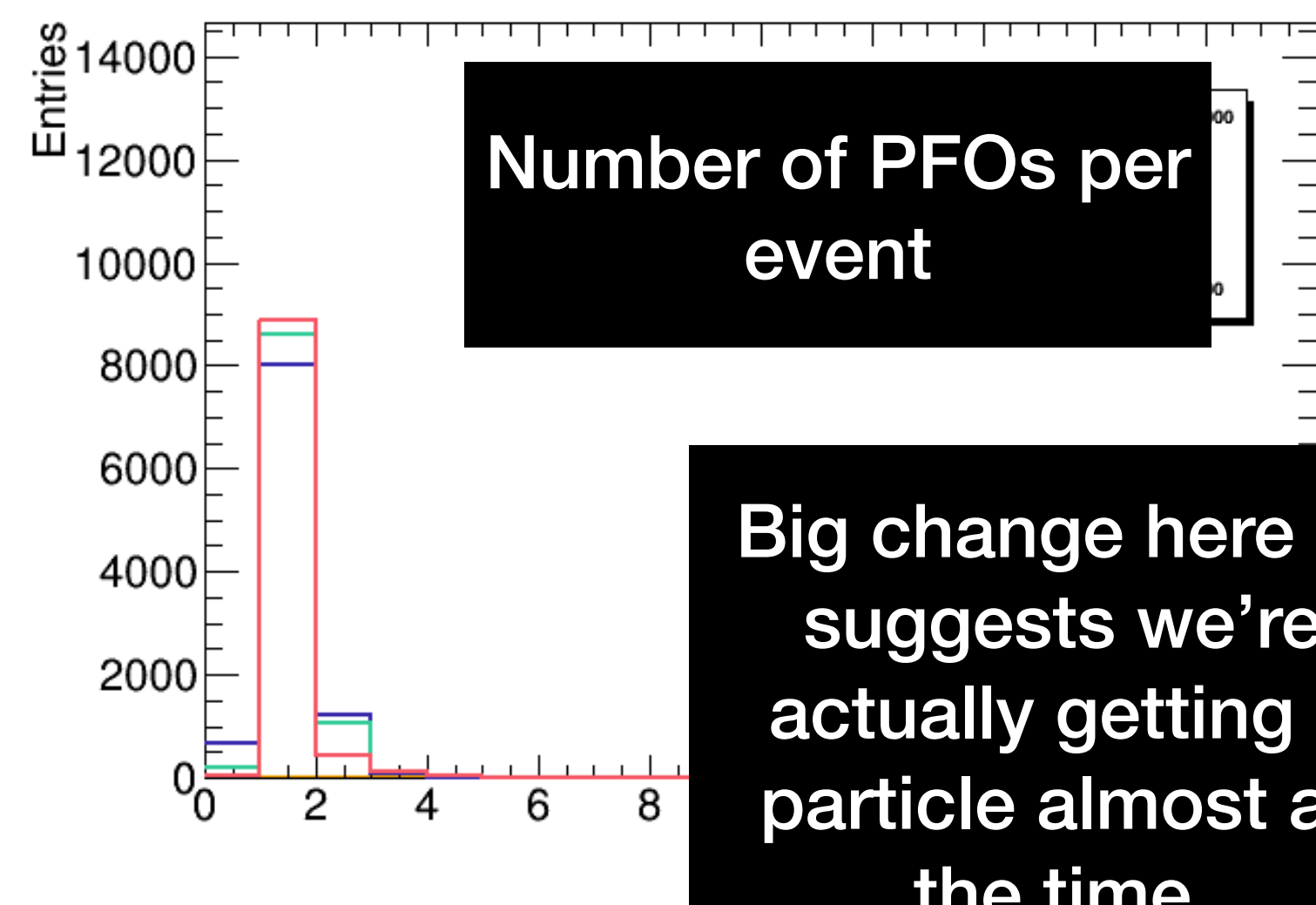
No BIB



No change here
— good



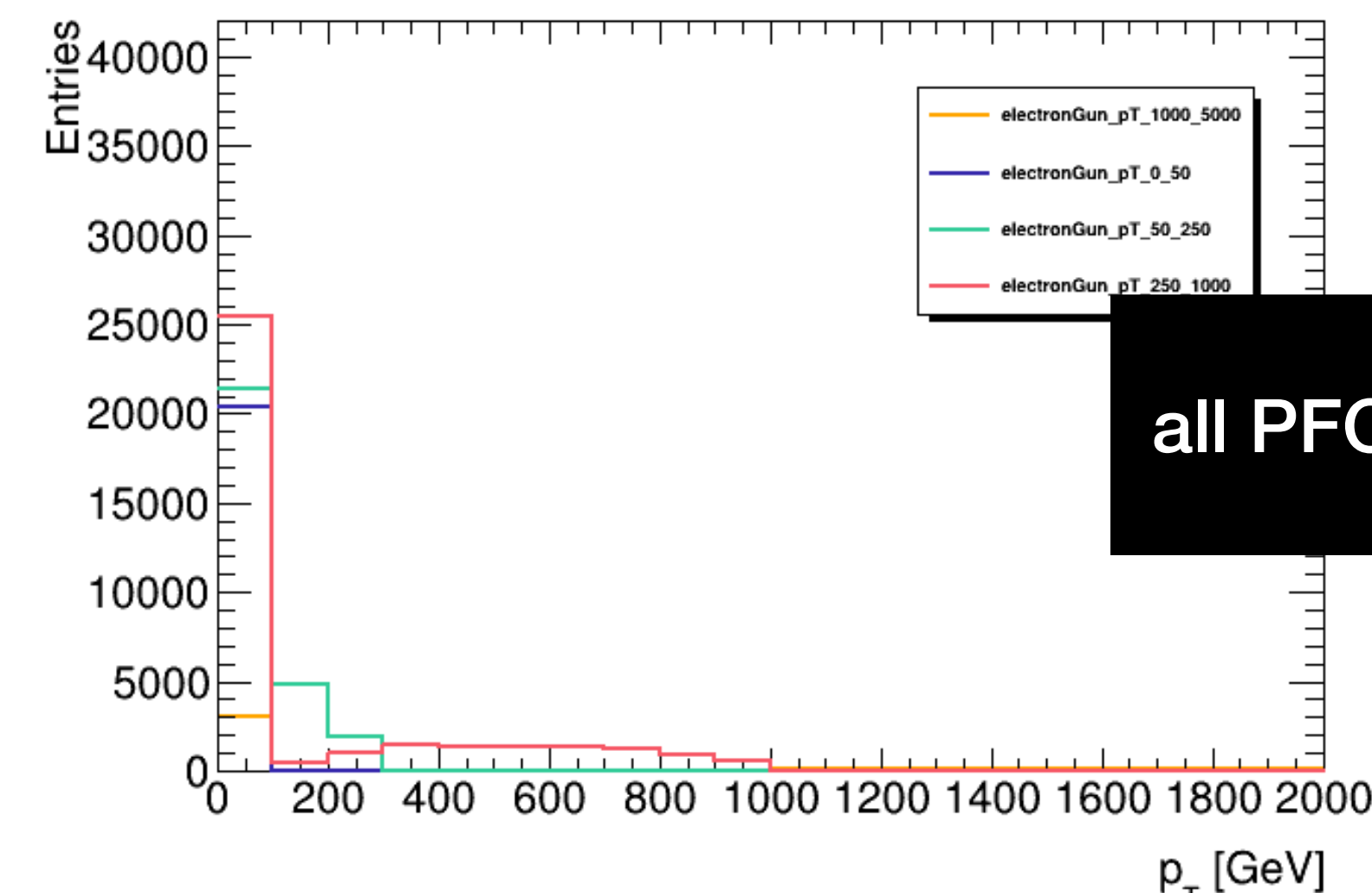
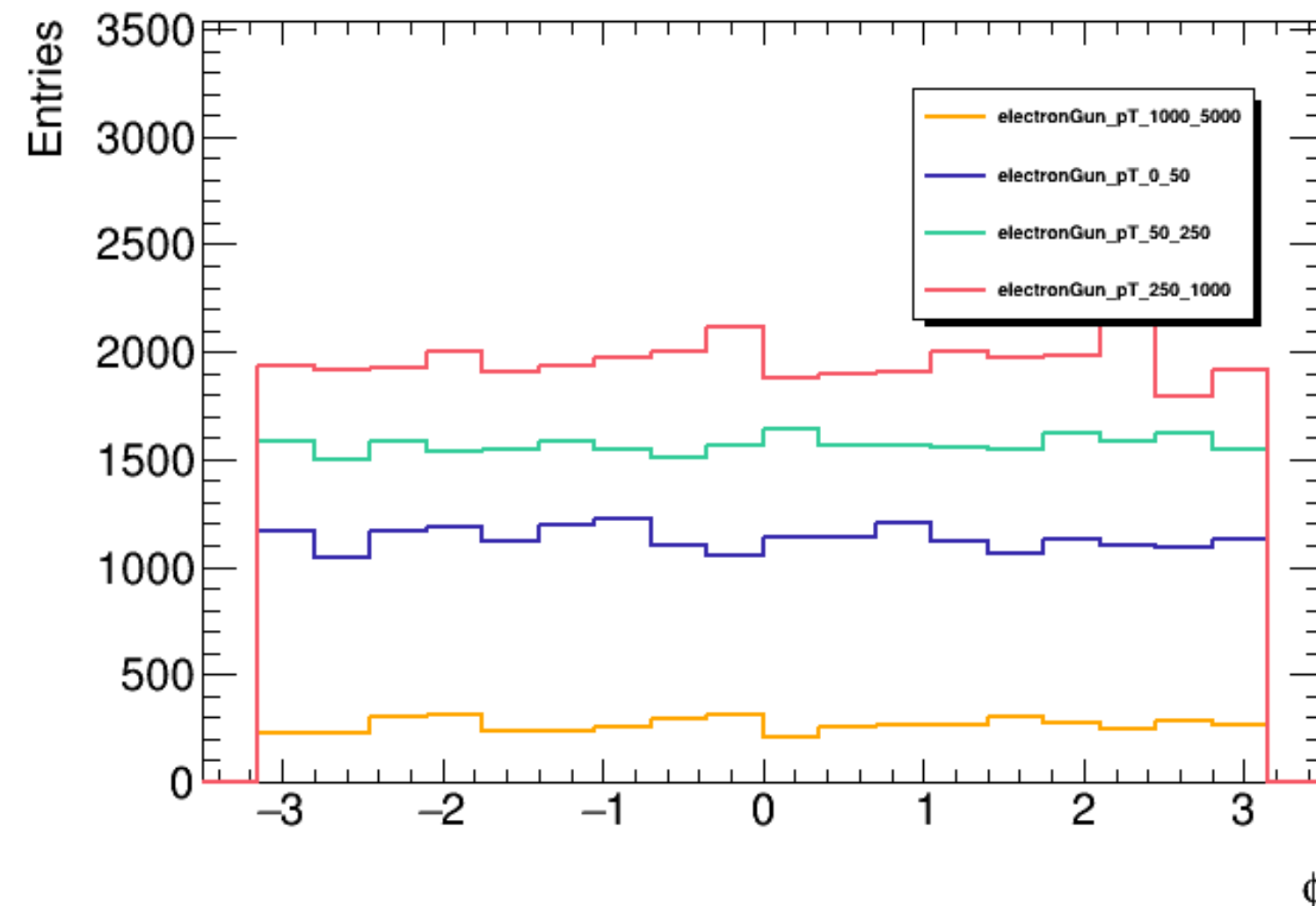
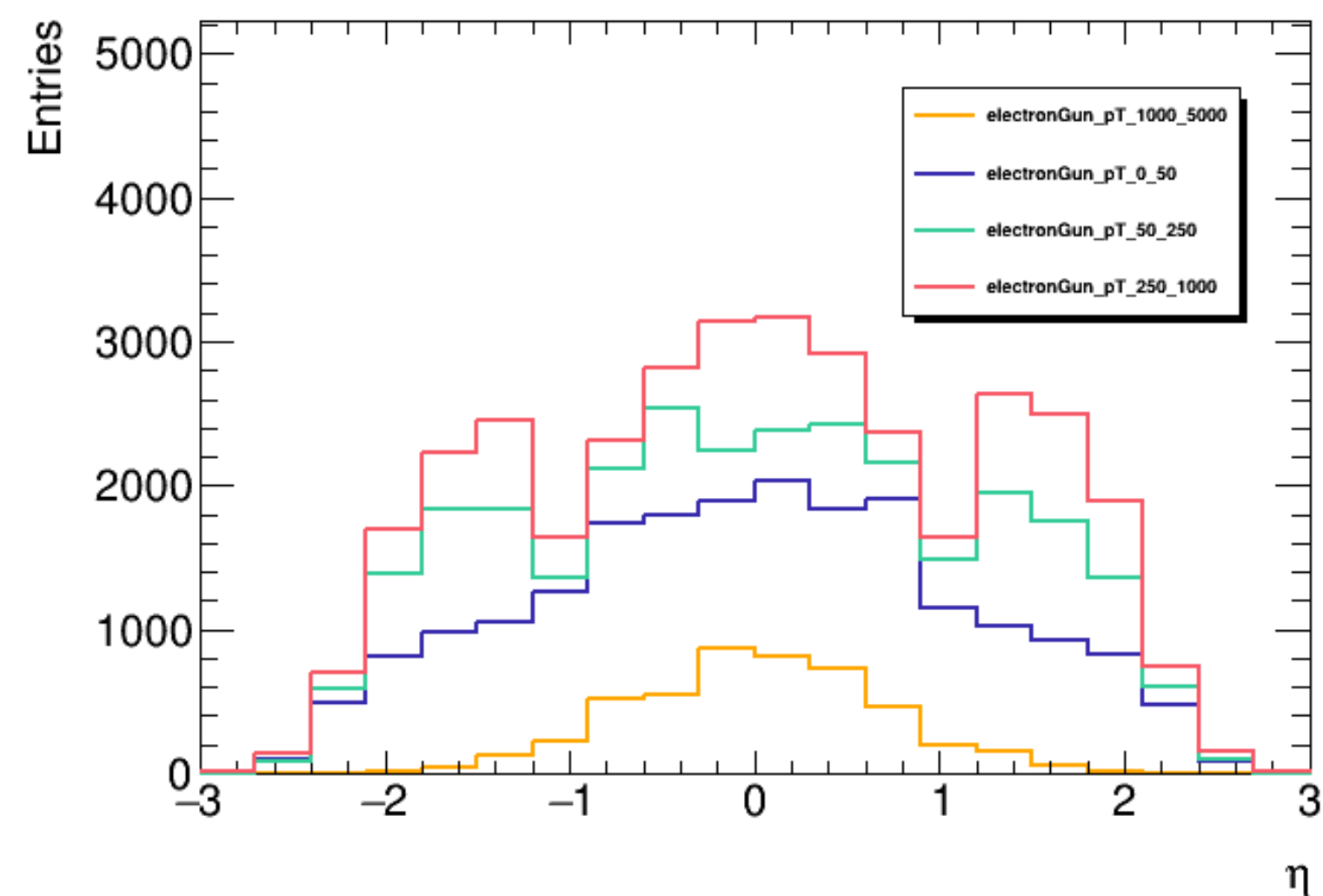
Suggests reduced electron efficiency



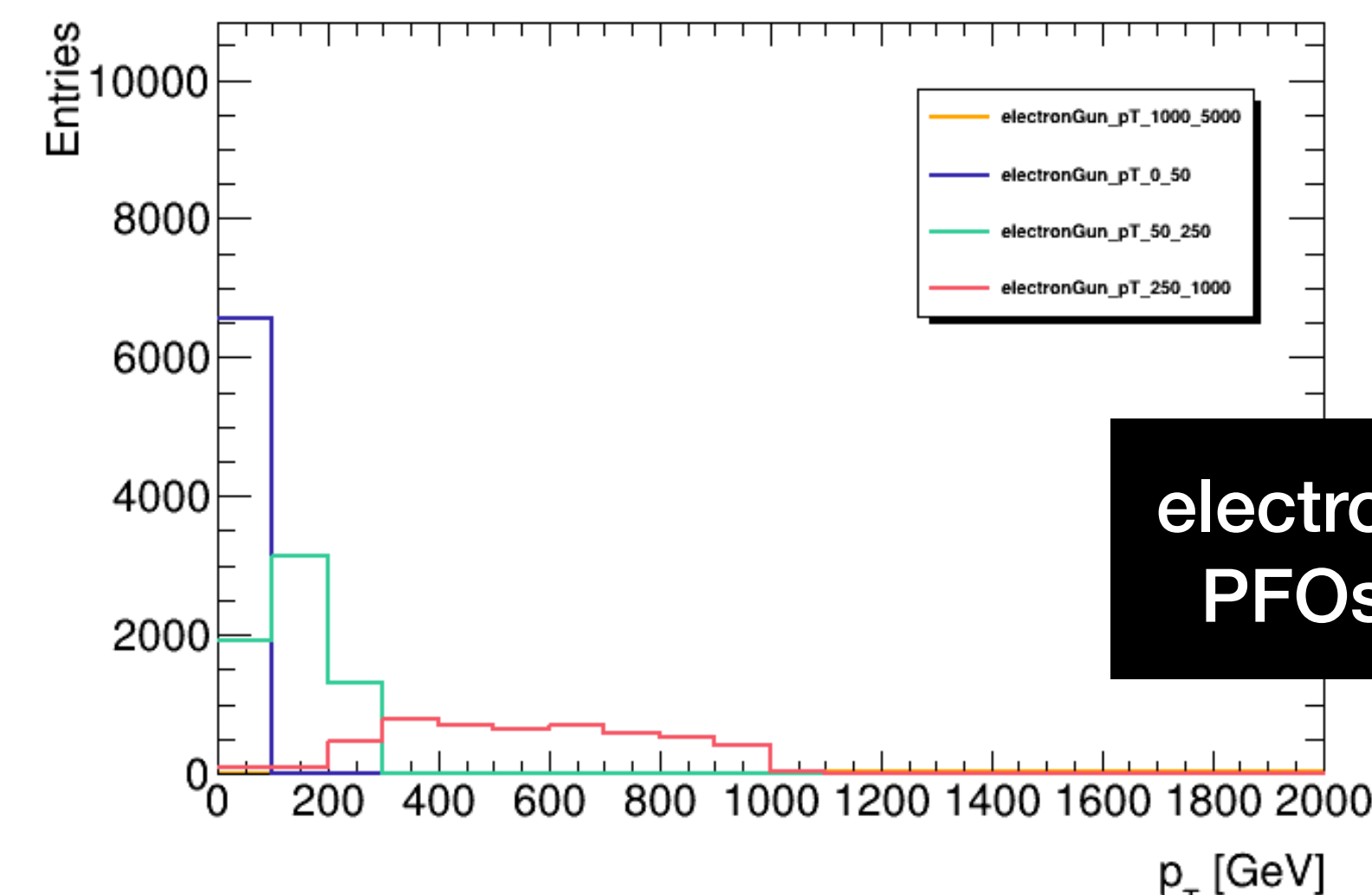
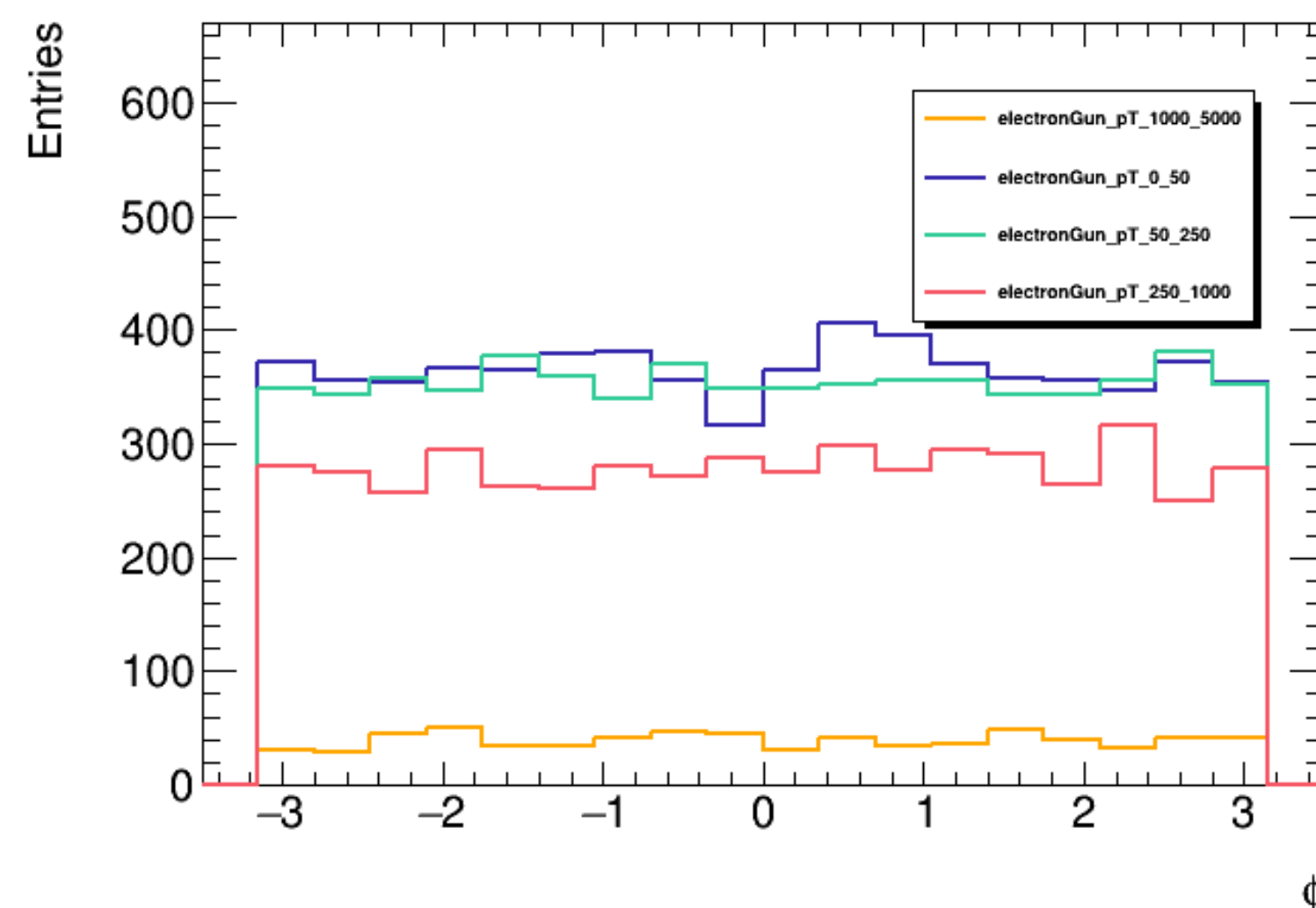
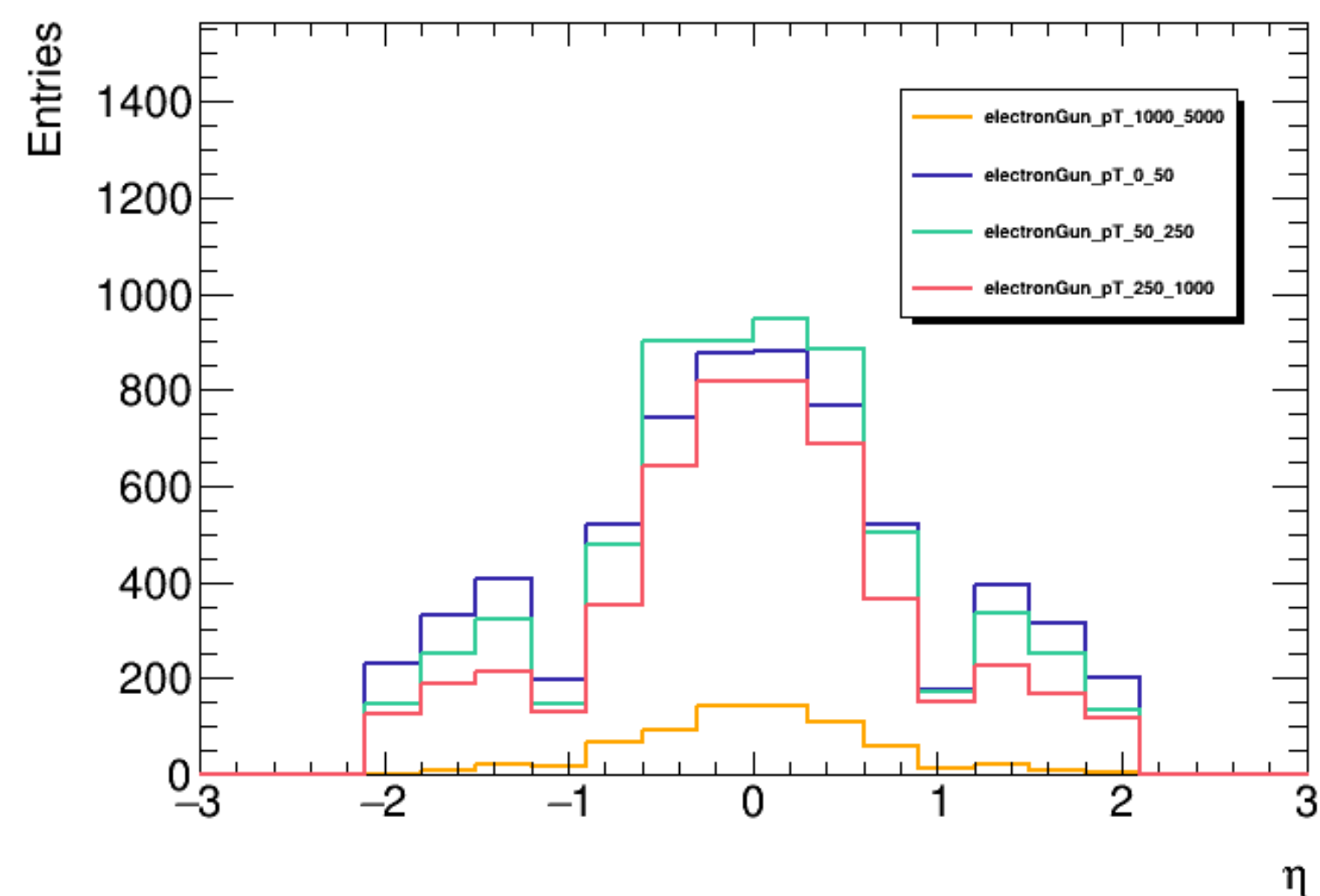
Big change here — suggests we're actually getting 1 particle almost all the time.

PFO plots

No BIB



all PFOs



electron
PFOs

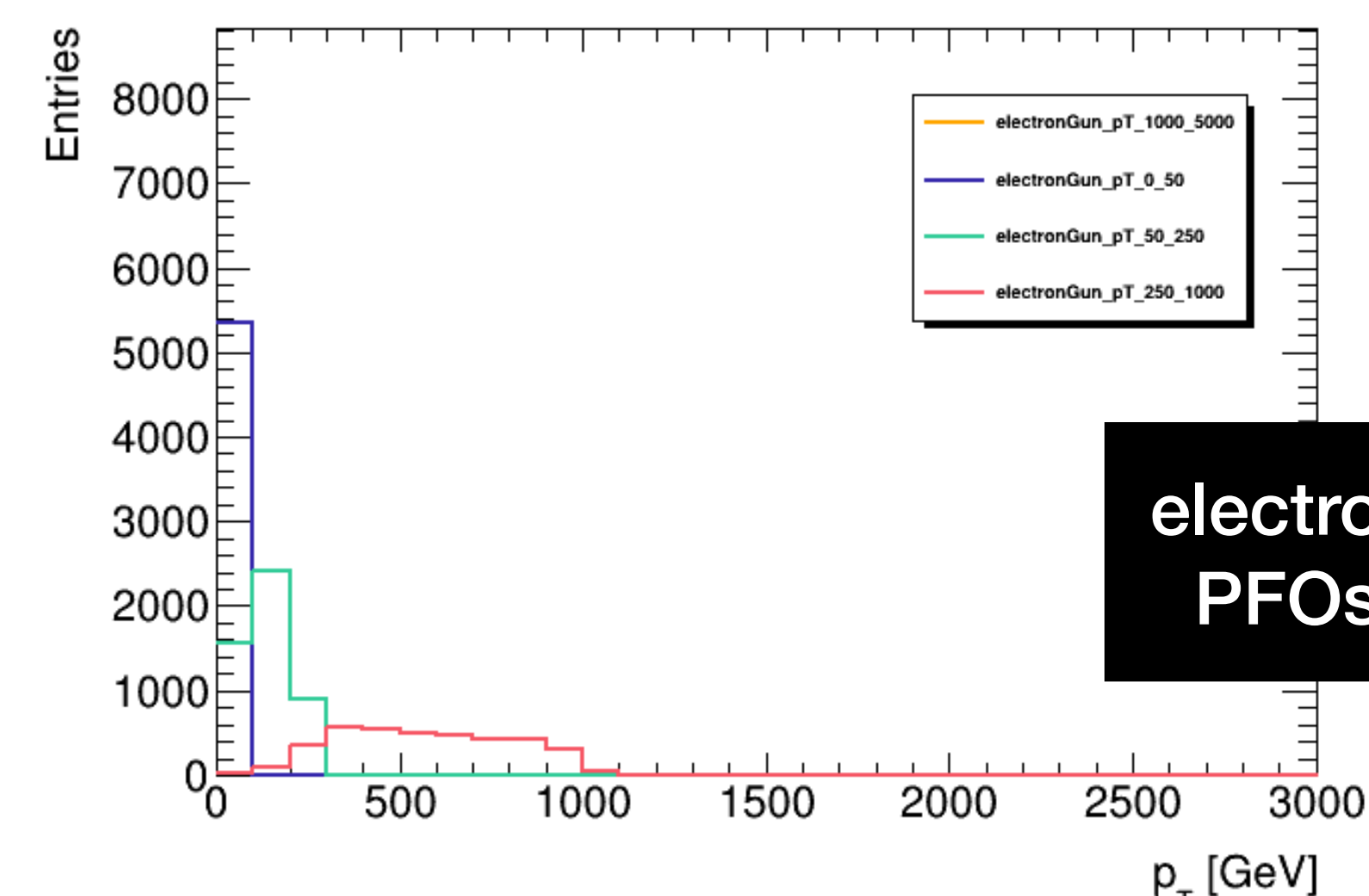
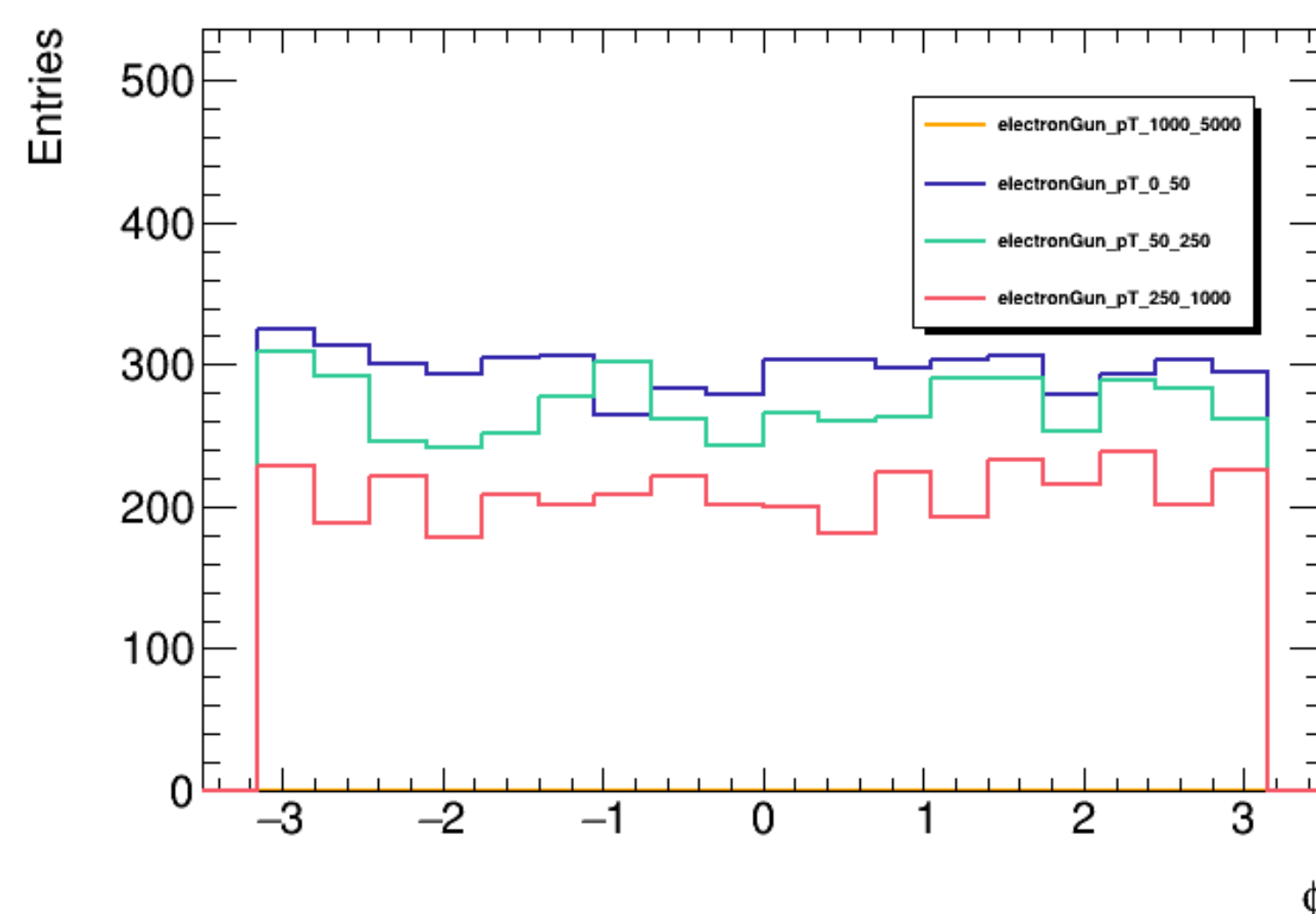
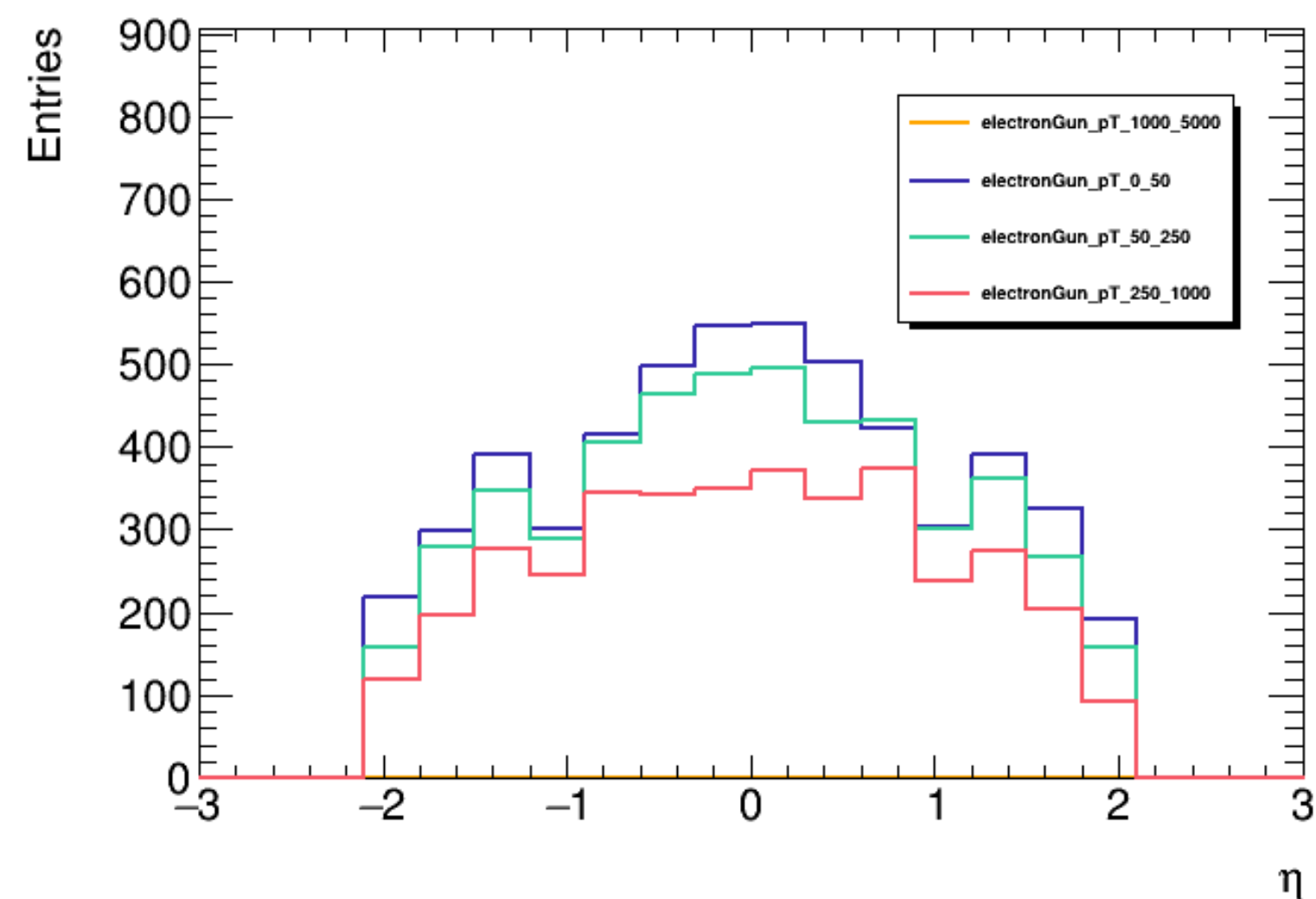
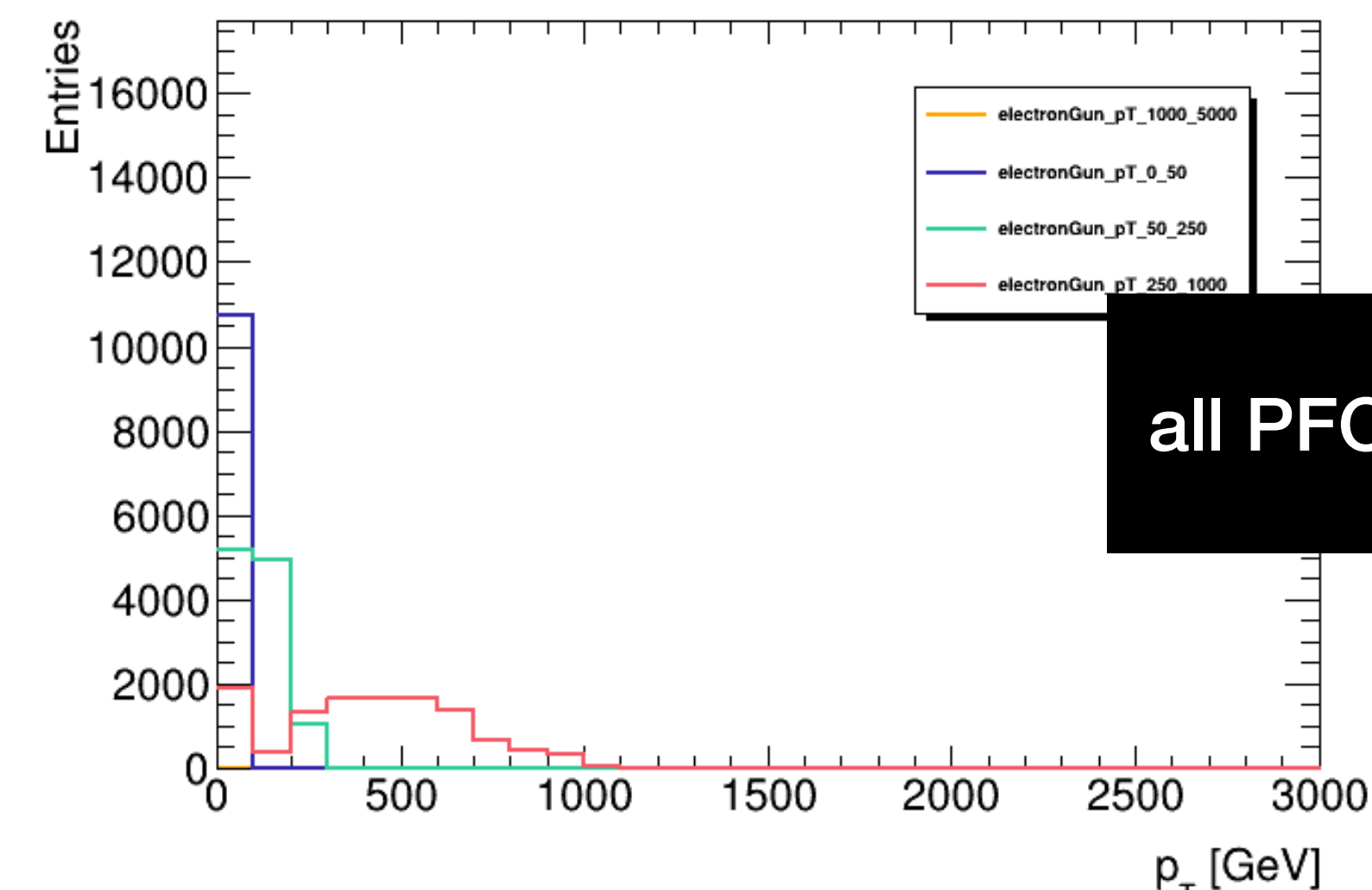
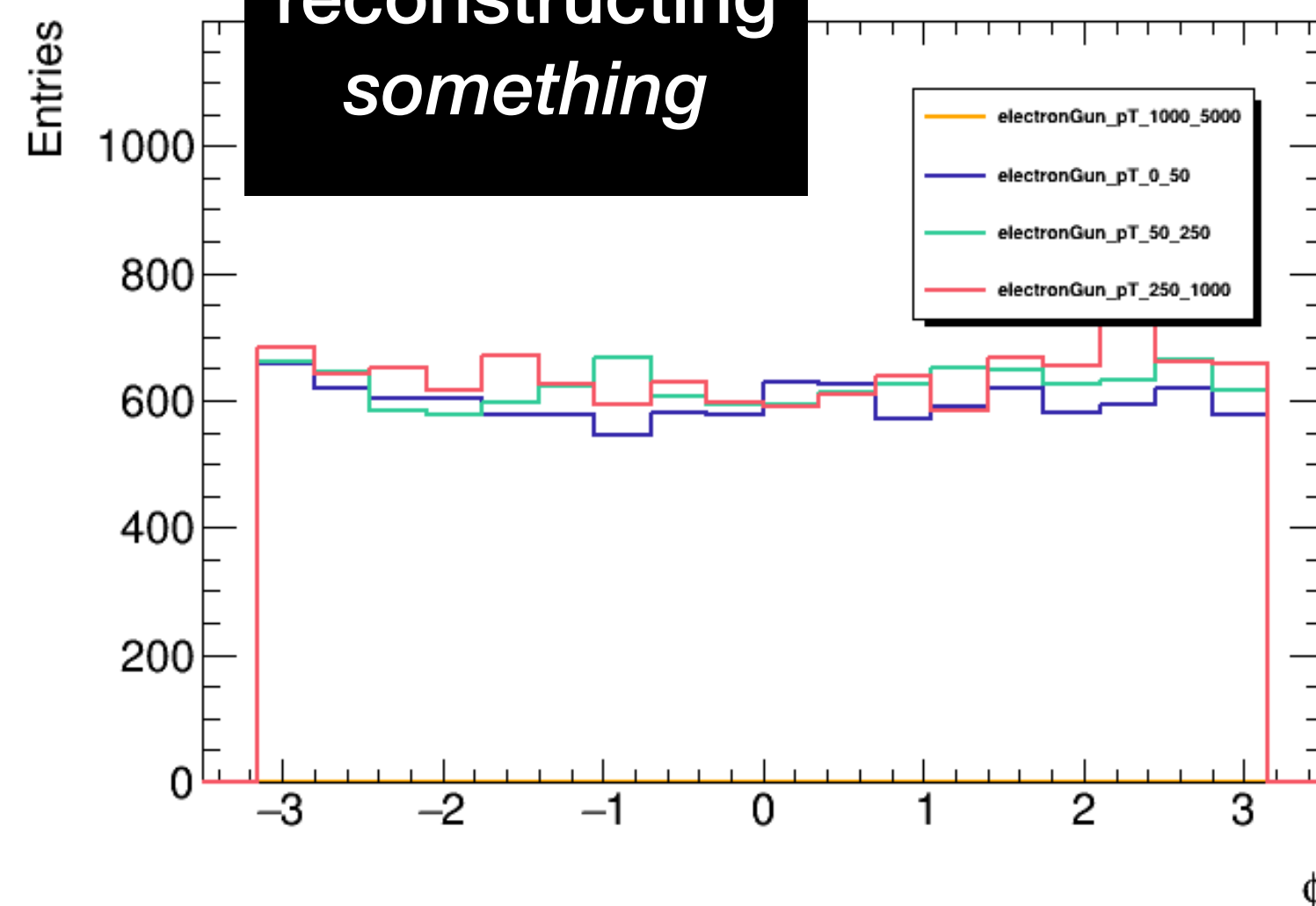
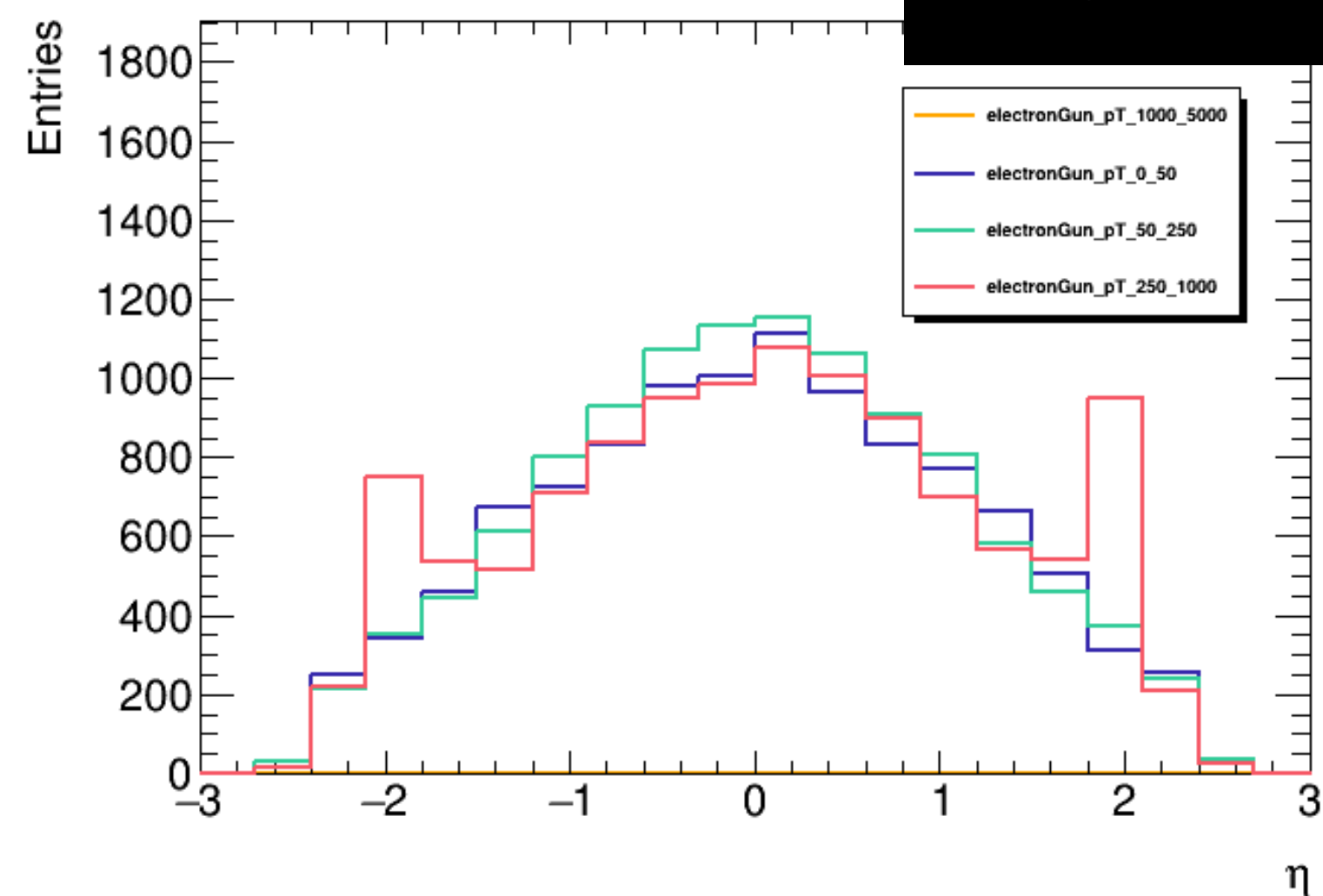
PFO plots

New spikes
for high-pT
gun

Consistently
reconstructing
something

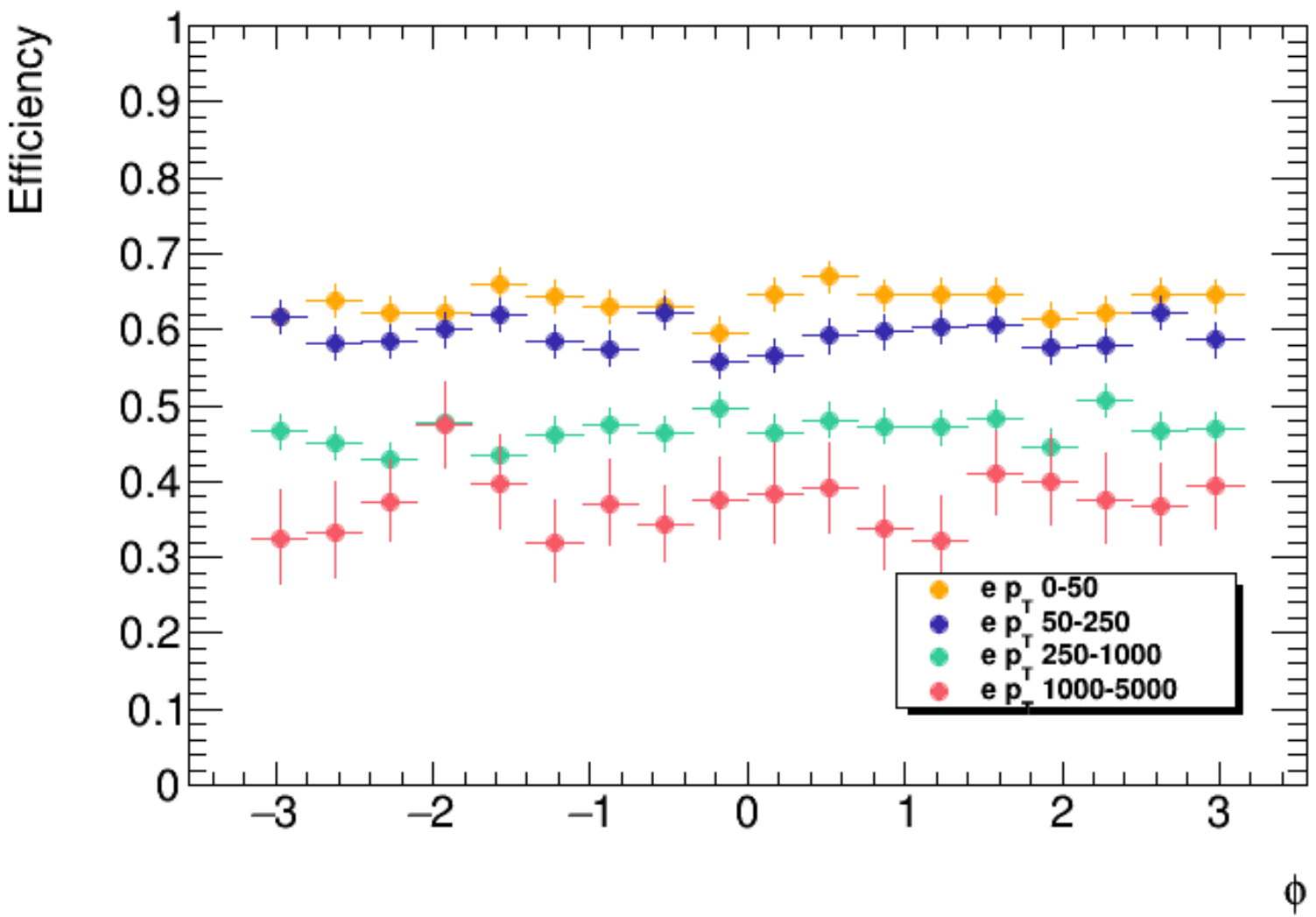
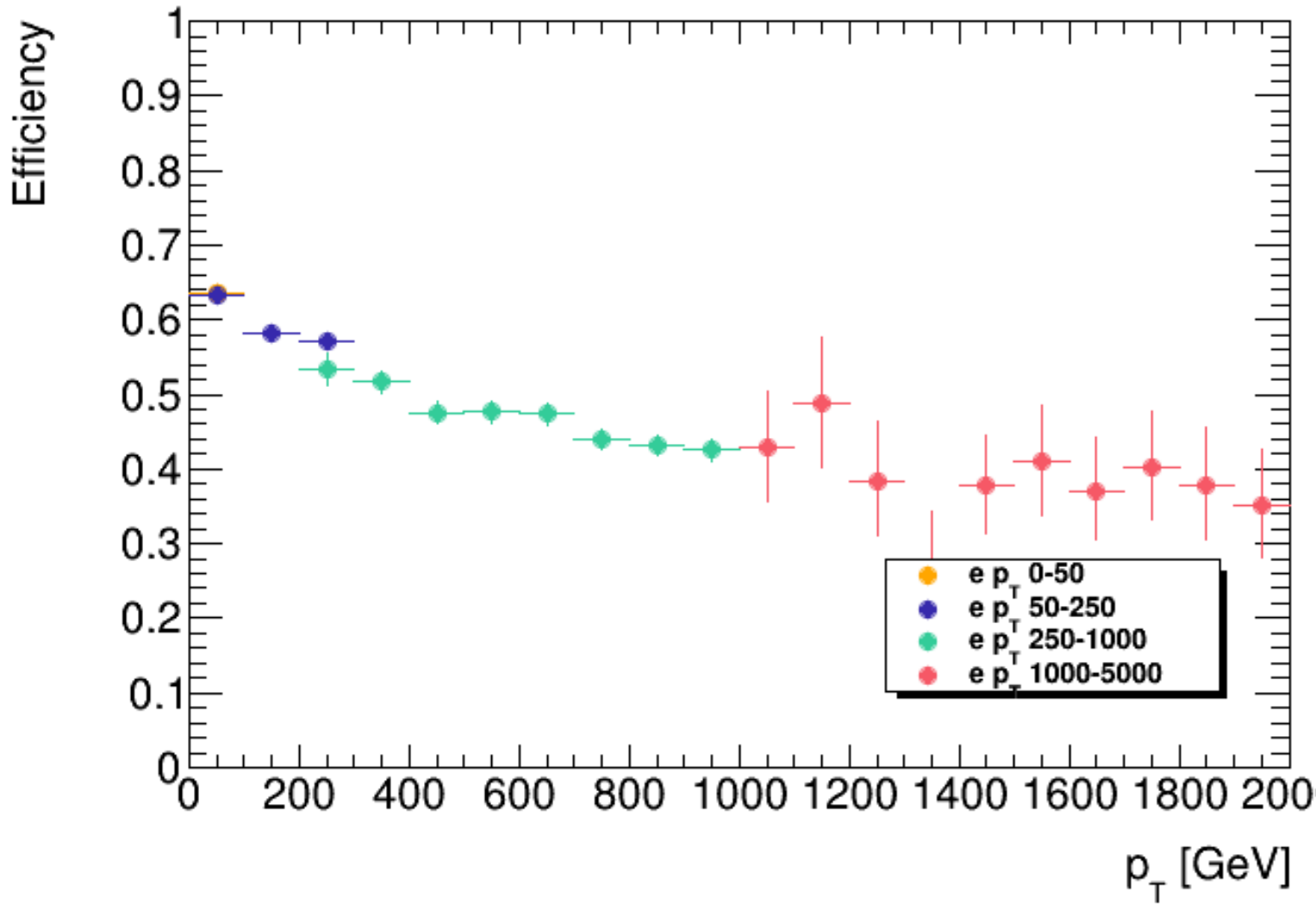
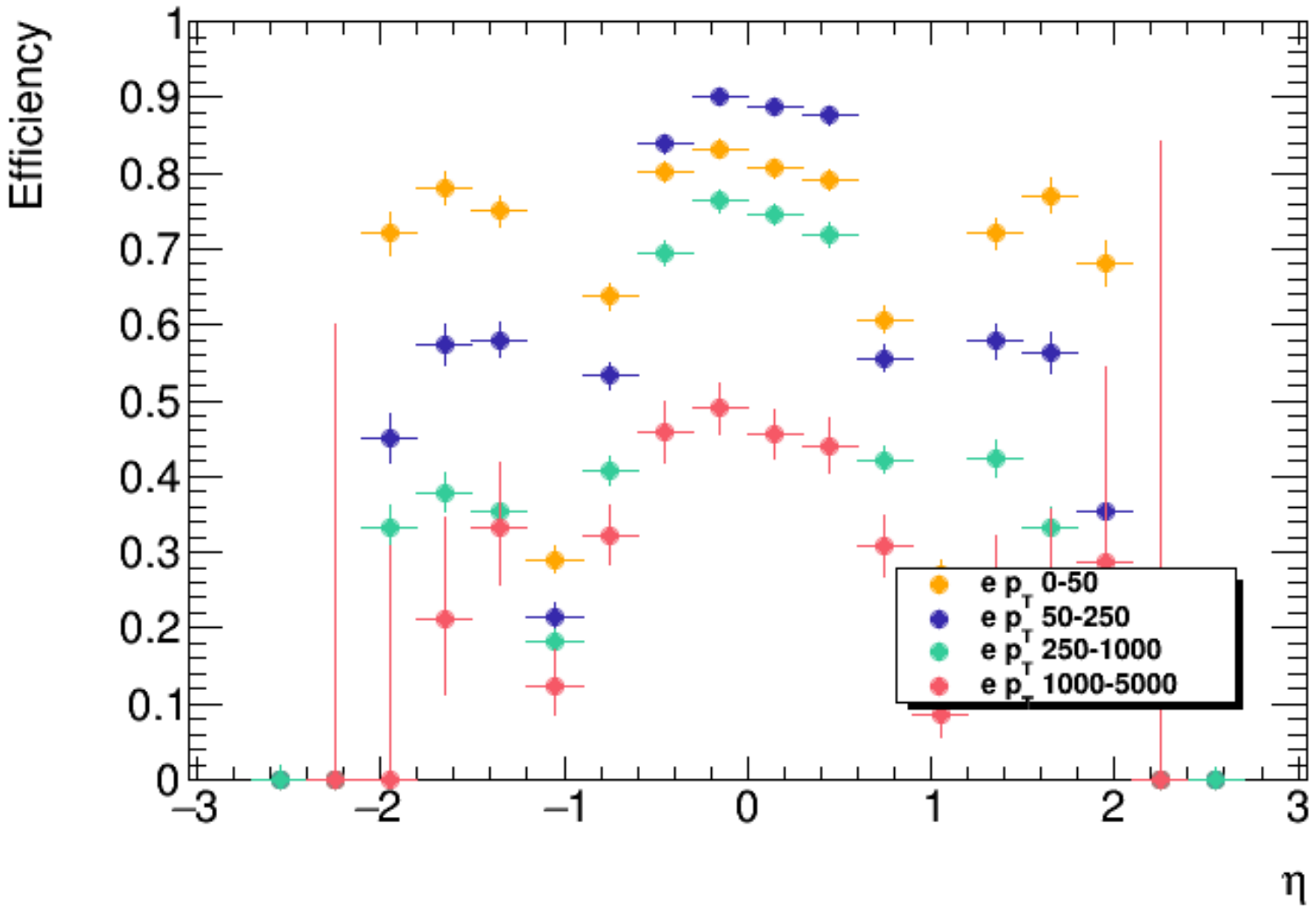
w/ BIB fix and updated
tracking window

No BIB



electron
PFOs

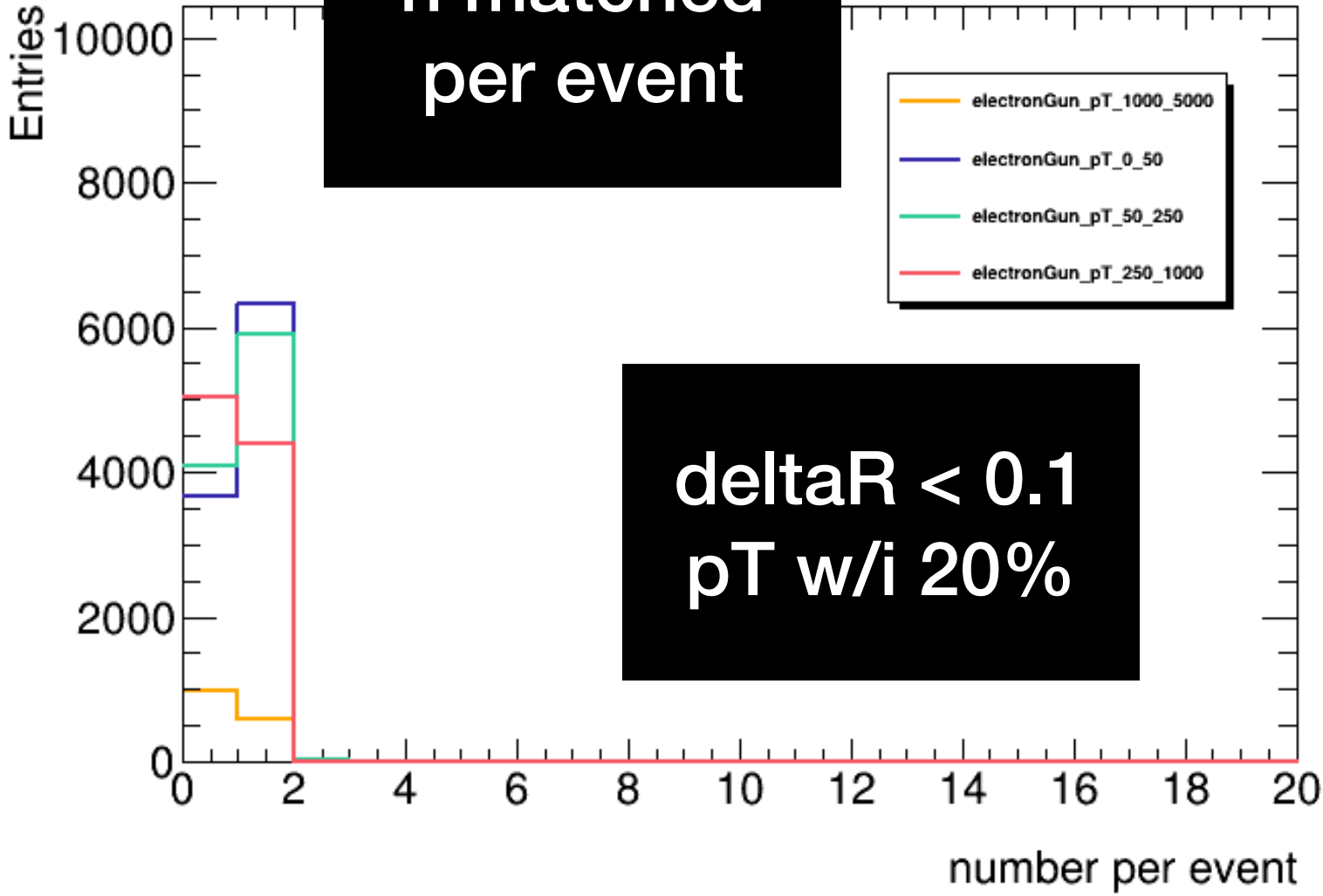
Efficiencies for matched electrons



Low p_T objects relatively flat in eta, but high p_T have low efficiency in endcaps.
No distinct phi features.
Transition region 🥲

No BIB

n matched per event



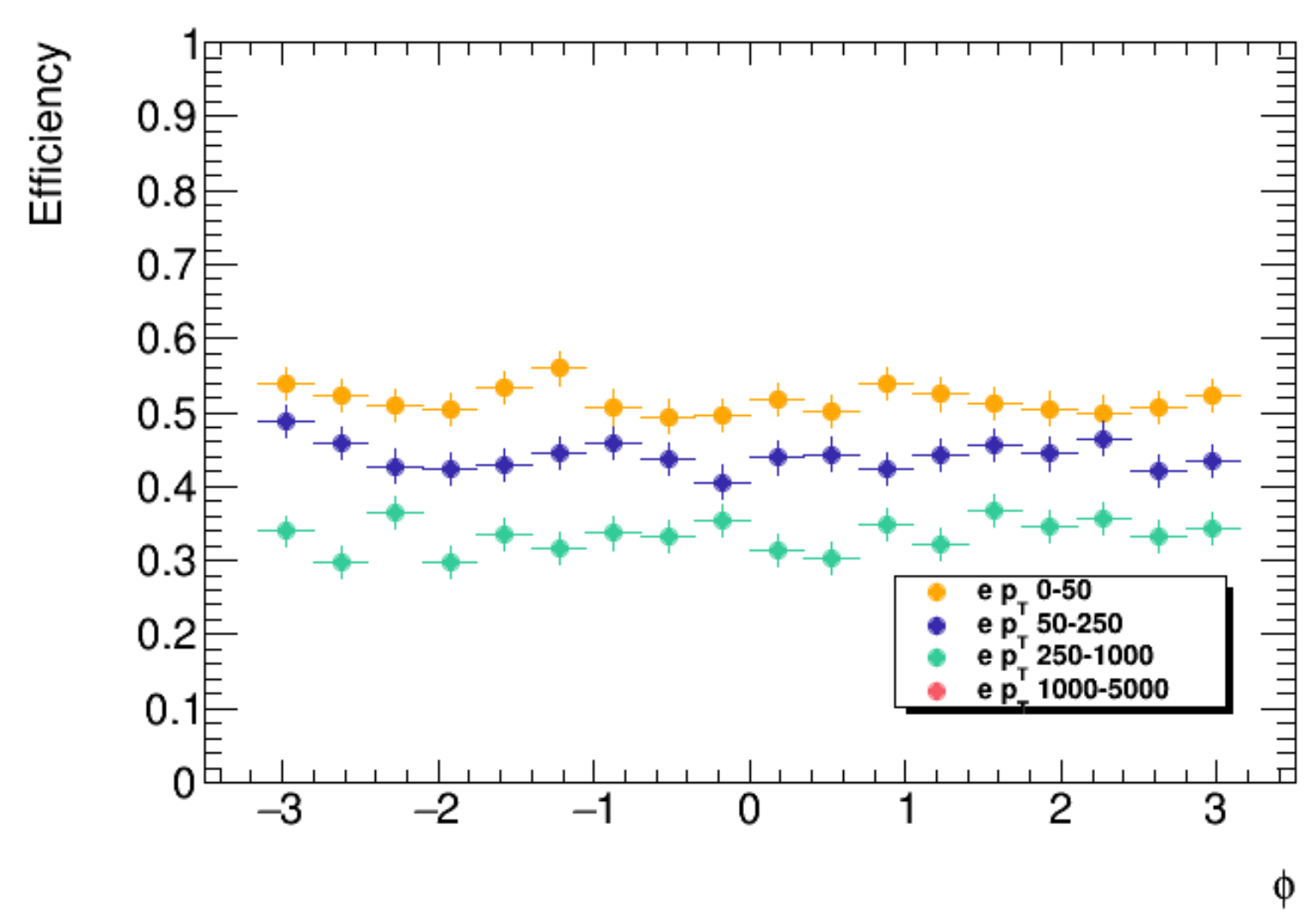
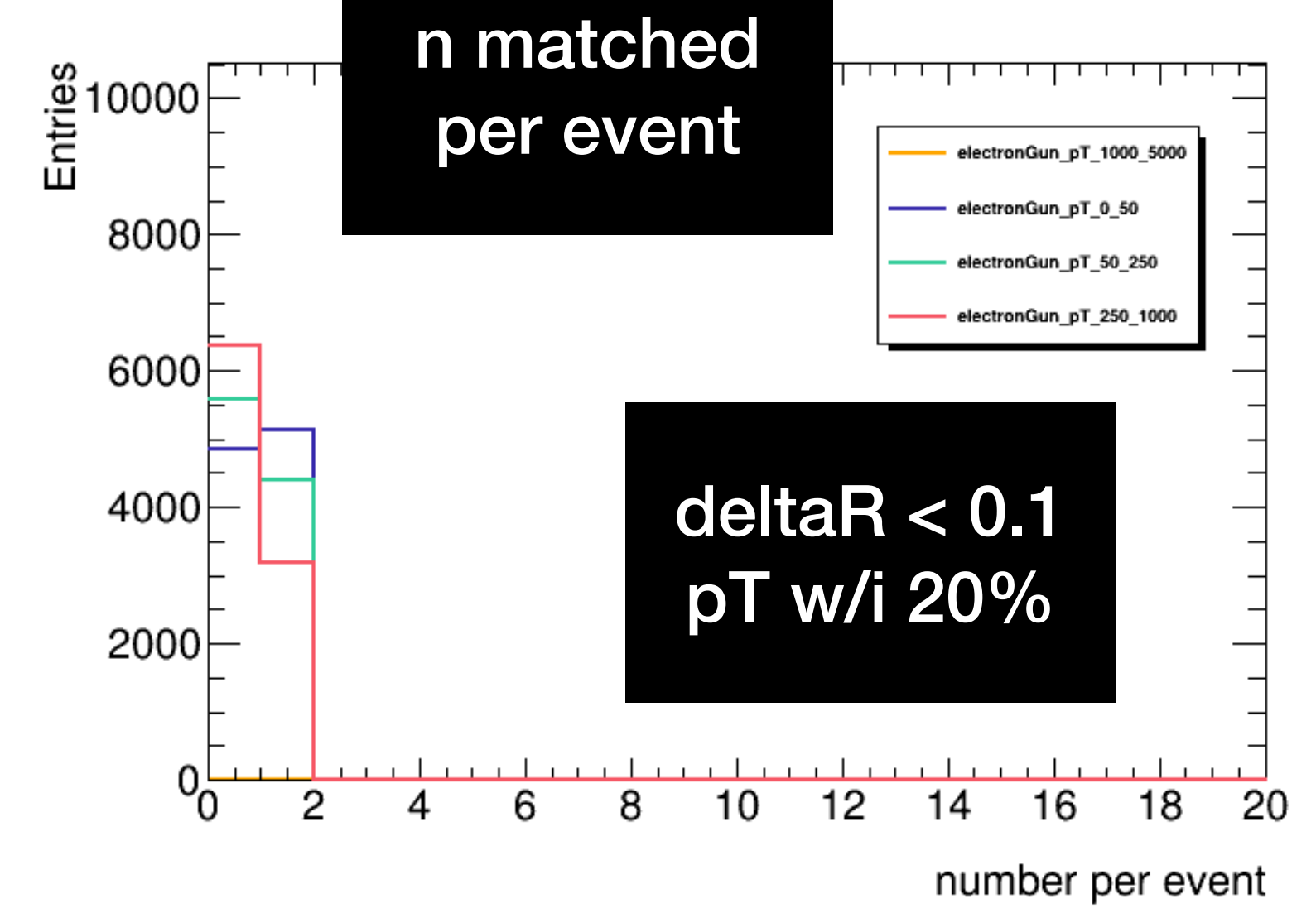
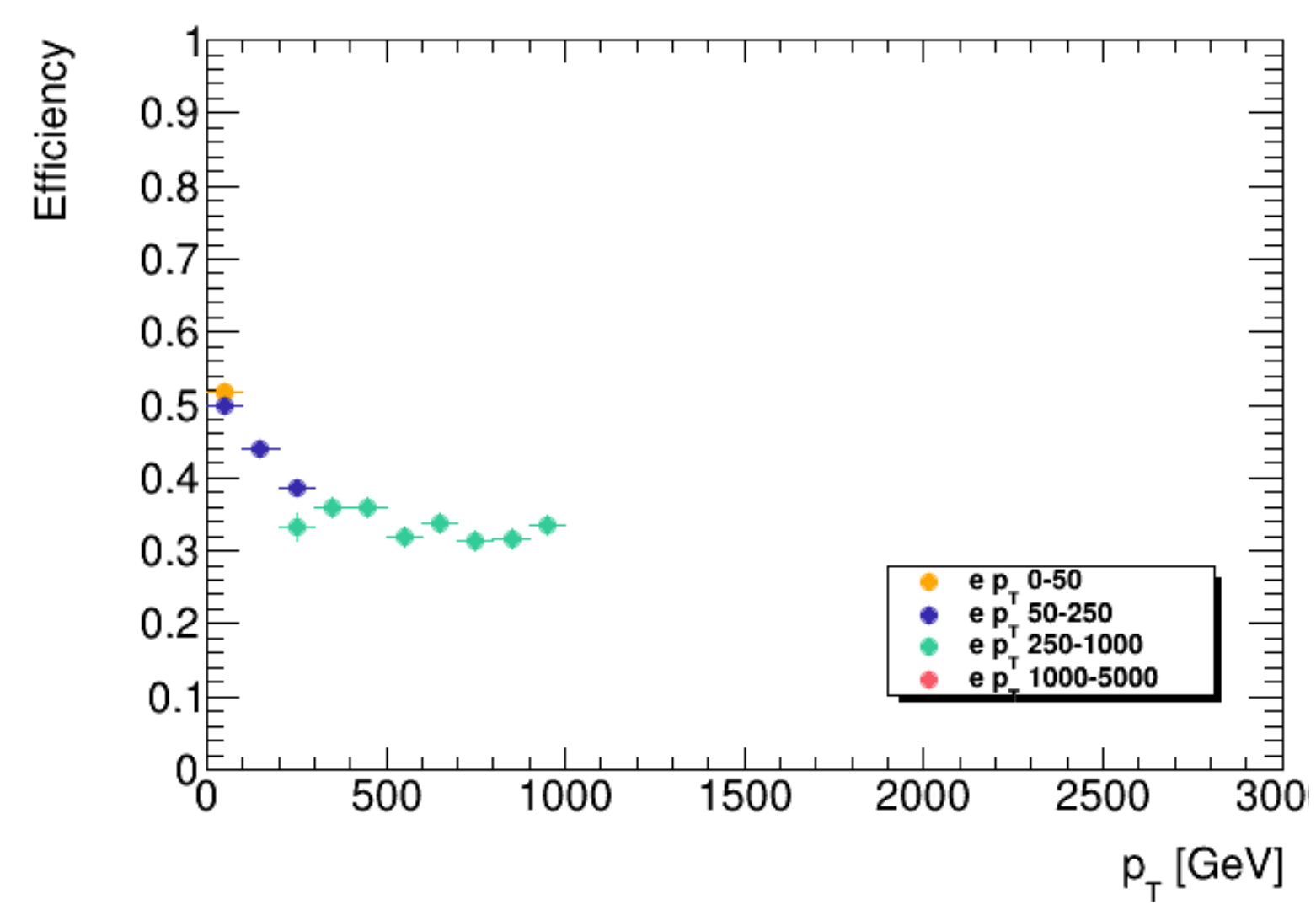
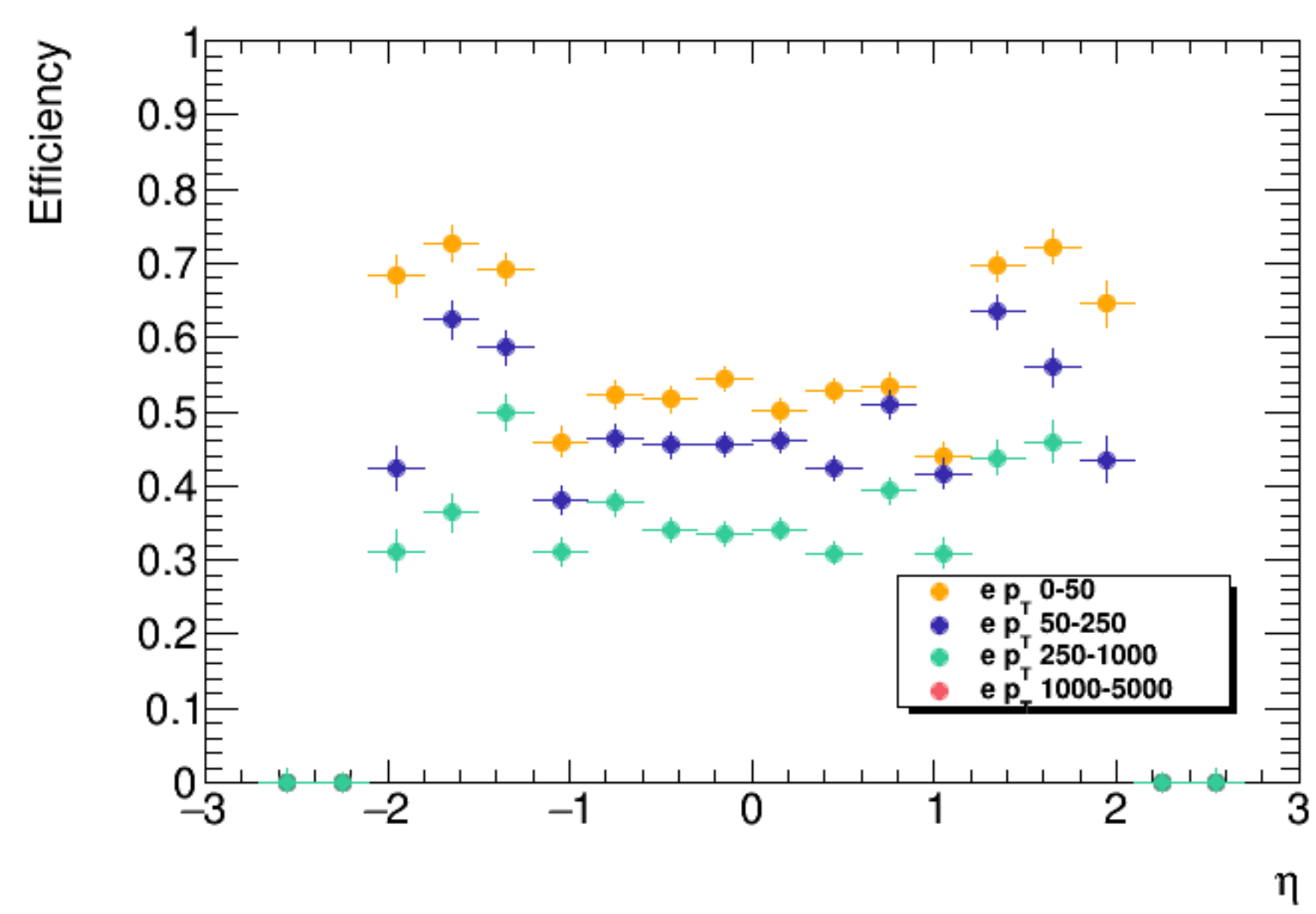
$\Delta R < 0.1$
 p_T w/i 20%

note: small error in these plots because I very occasionally match more than one electron — need to update spatial matching

Efficiencies for matched electrons

w/ BIB fix and updated tracking window

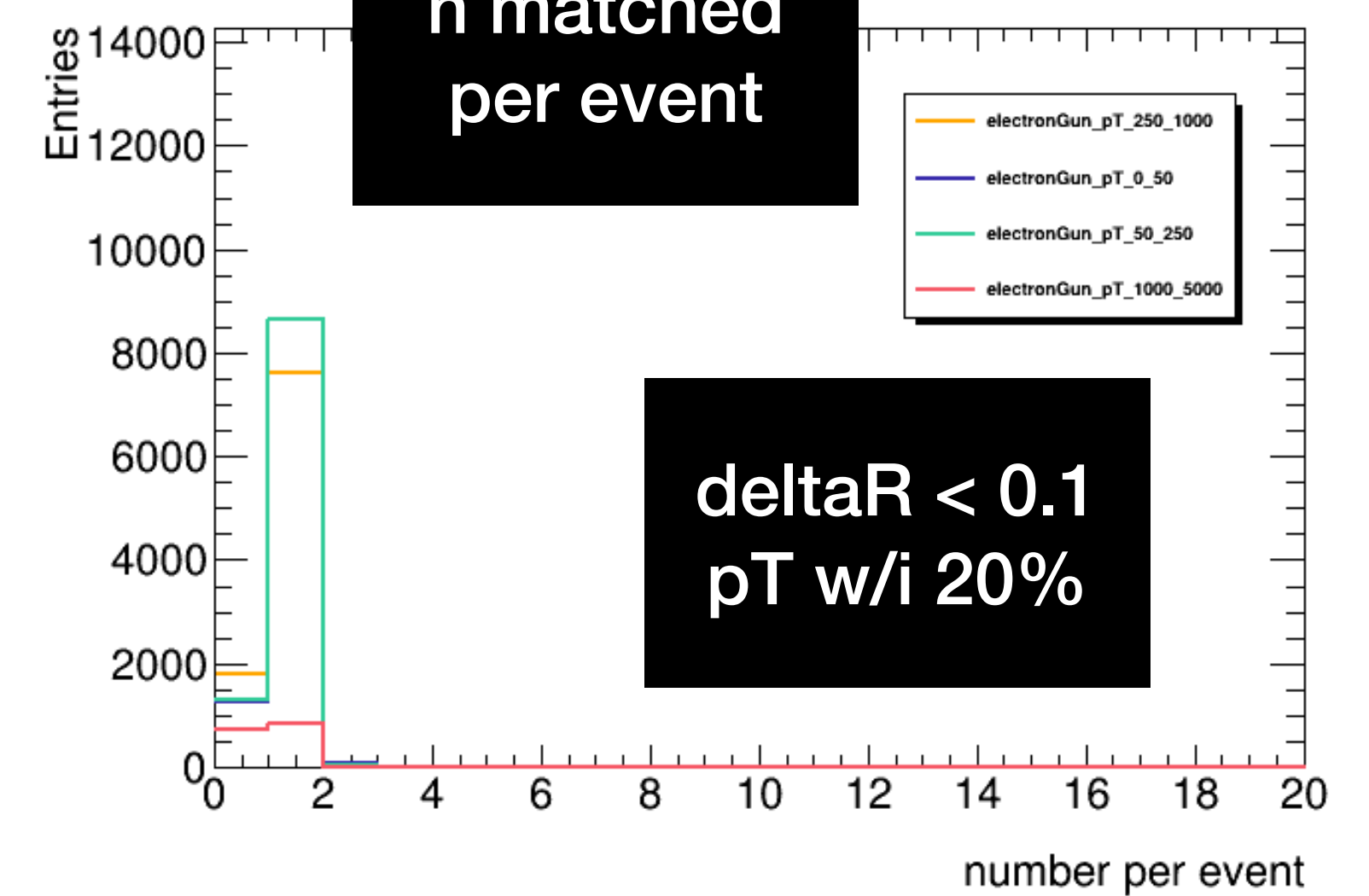
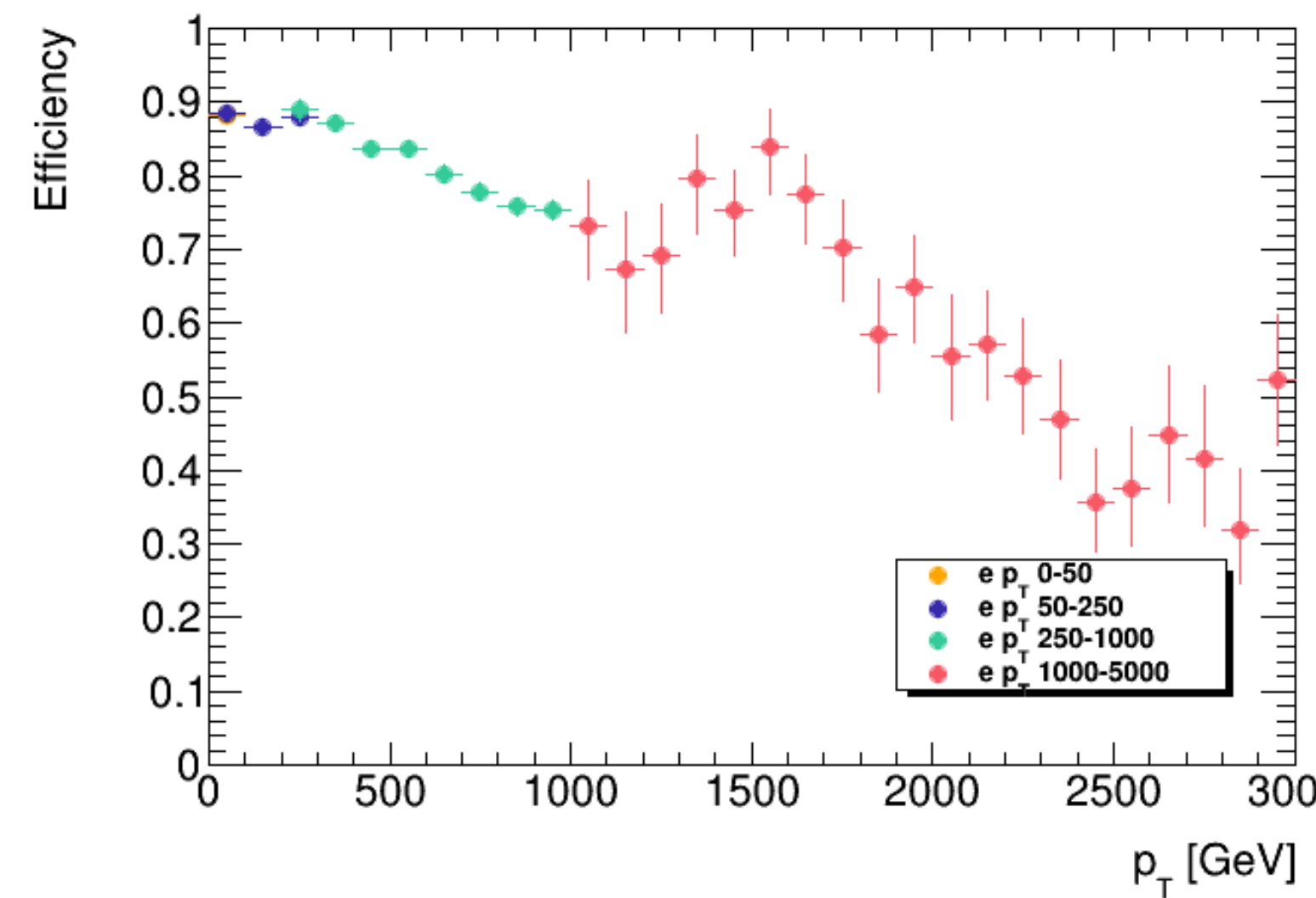
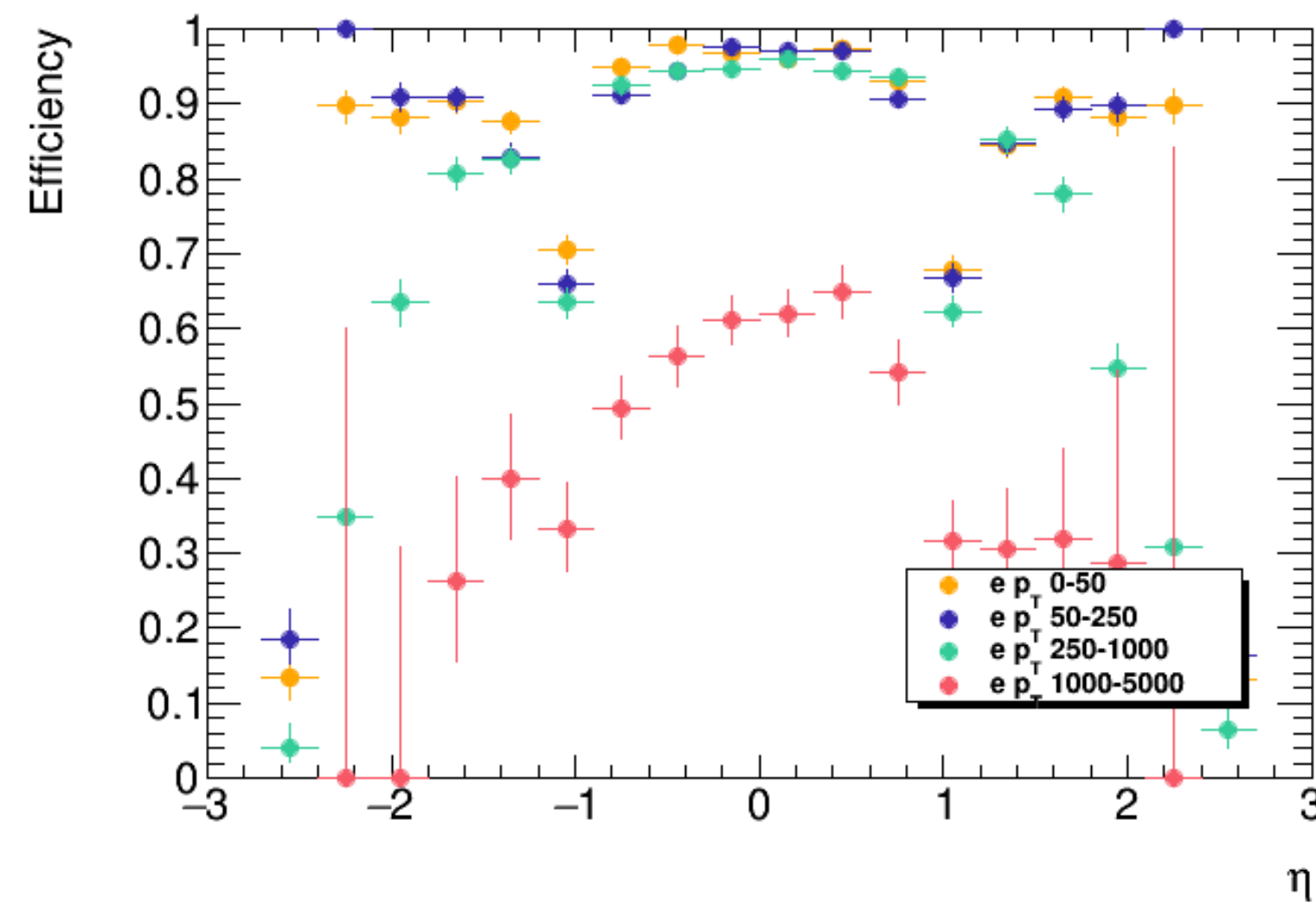
No BIB



Efficiency gets worse
in barrel!!
Transition region improved.

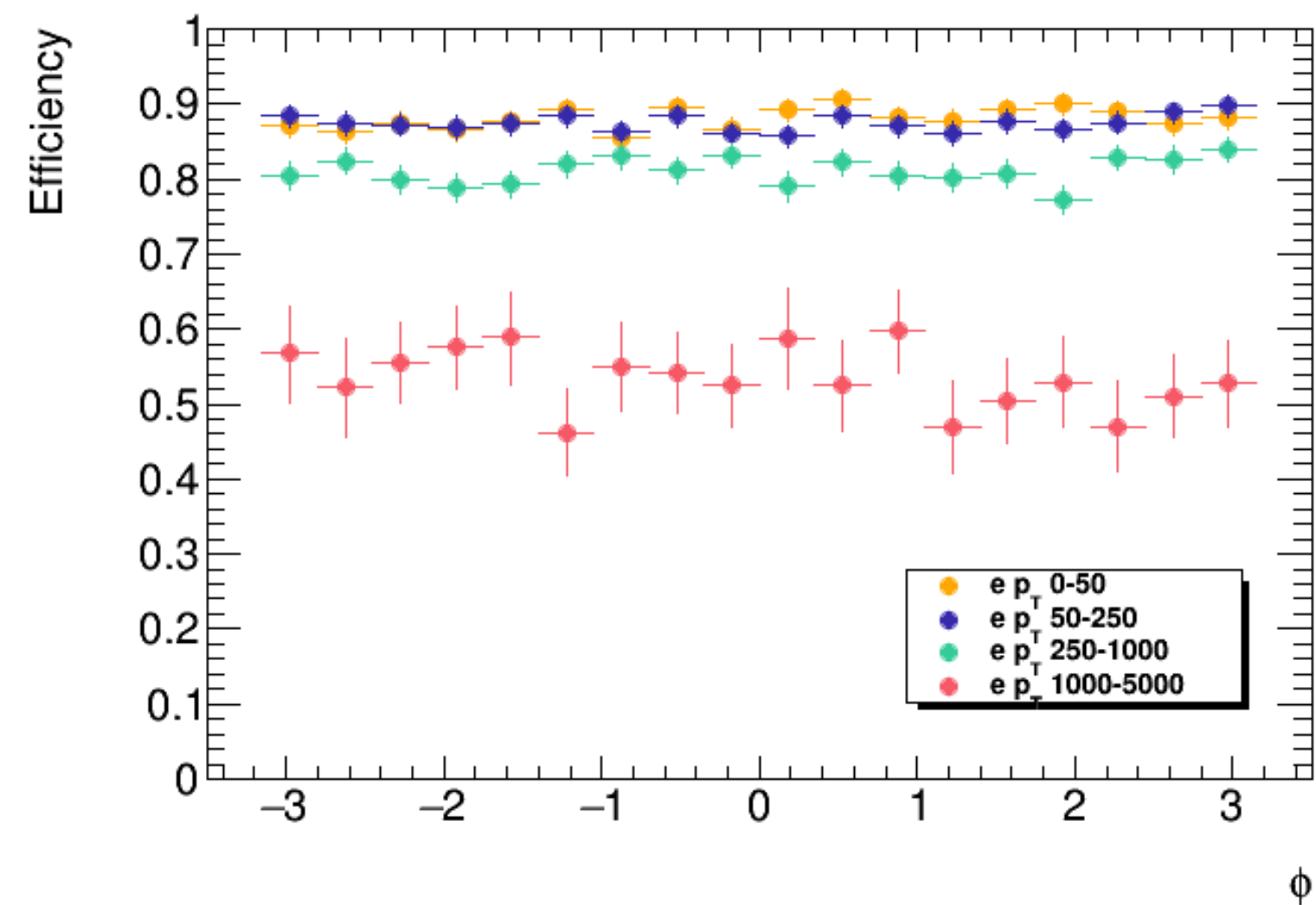
Efficiencies for matched PFOs (no el requirement)

No BIB



n matched
per event

$\Delta R < 0.1$
 p_T w/i 20%



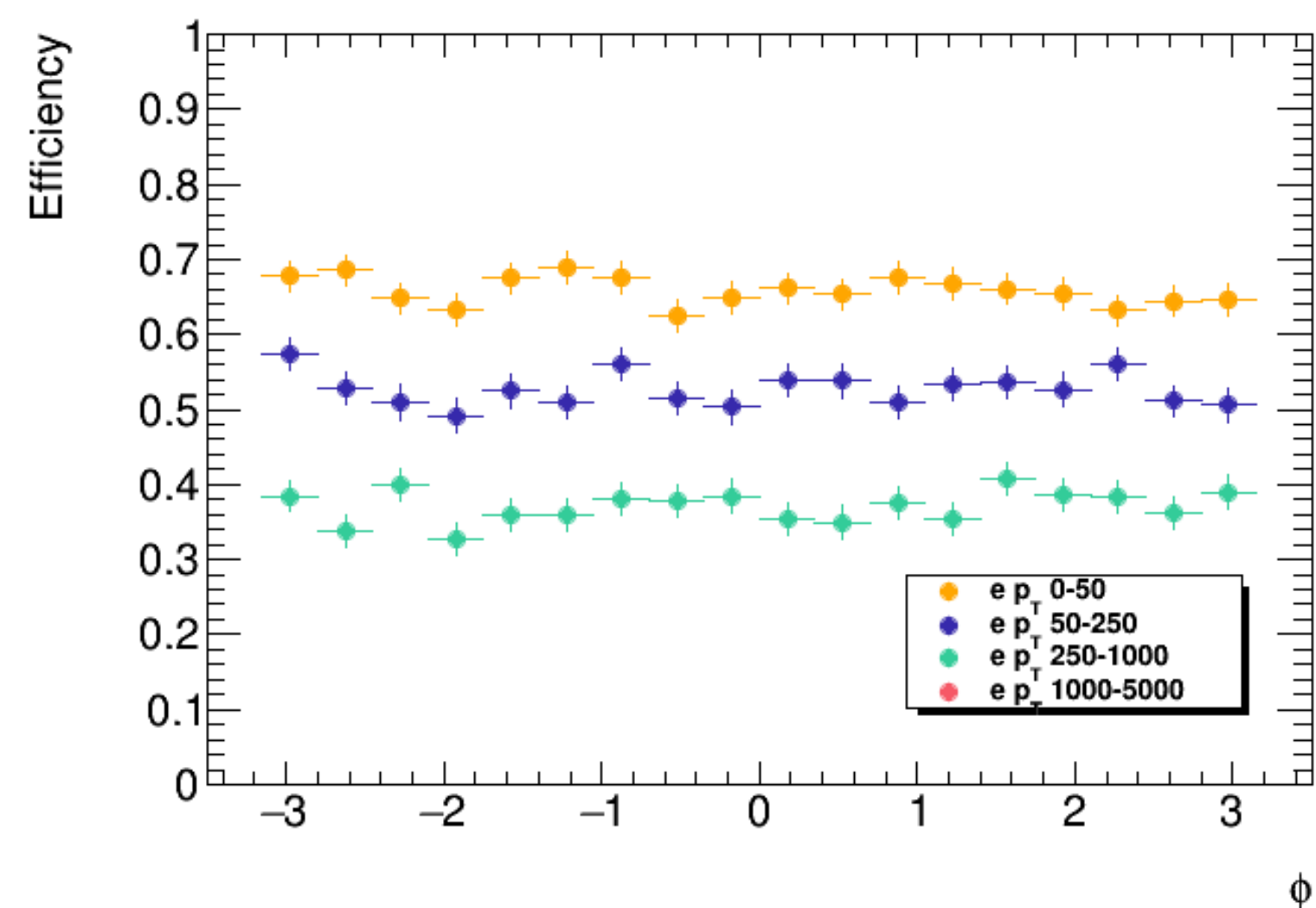
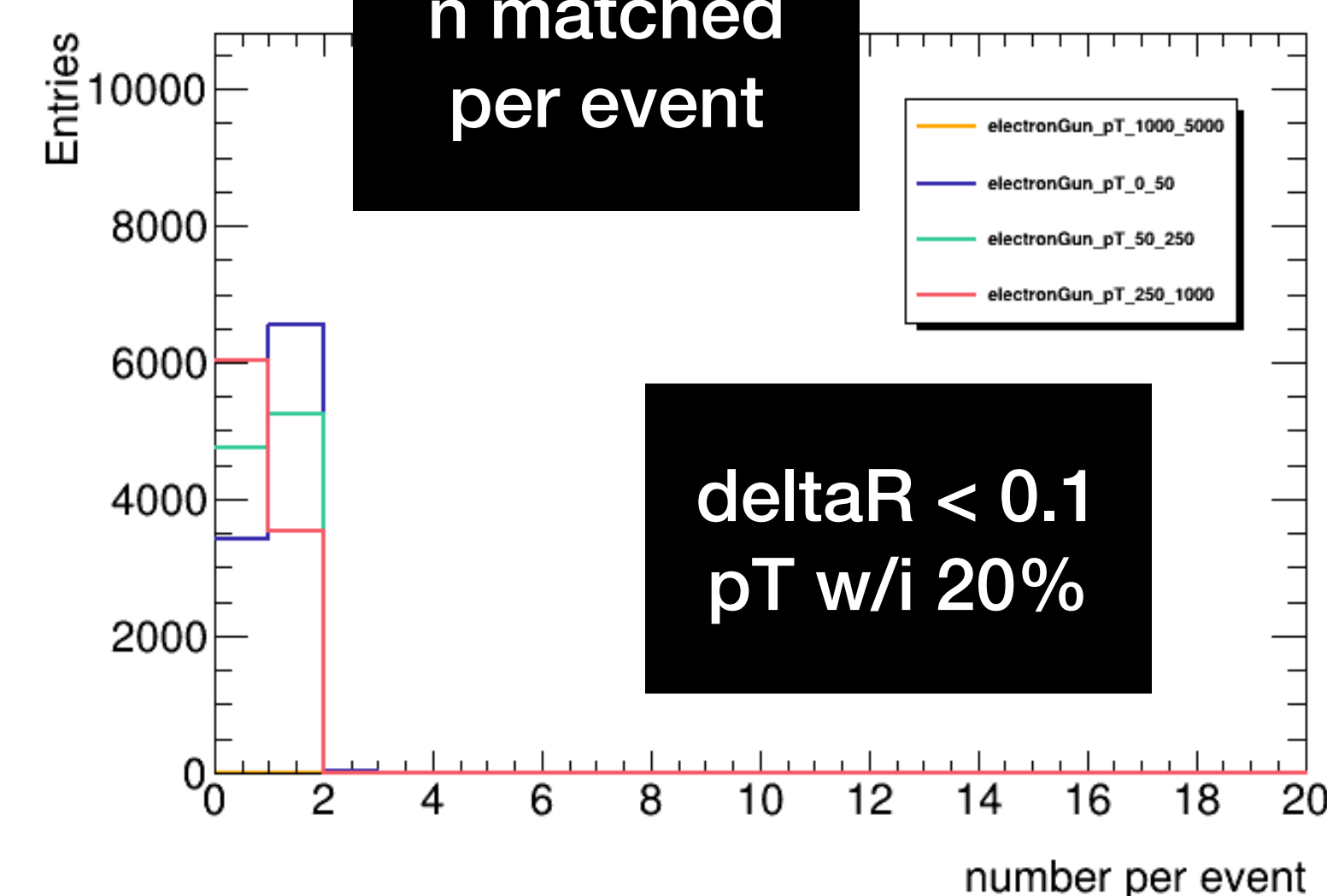
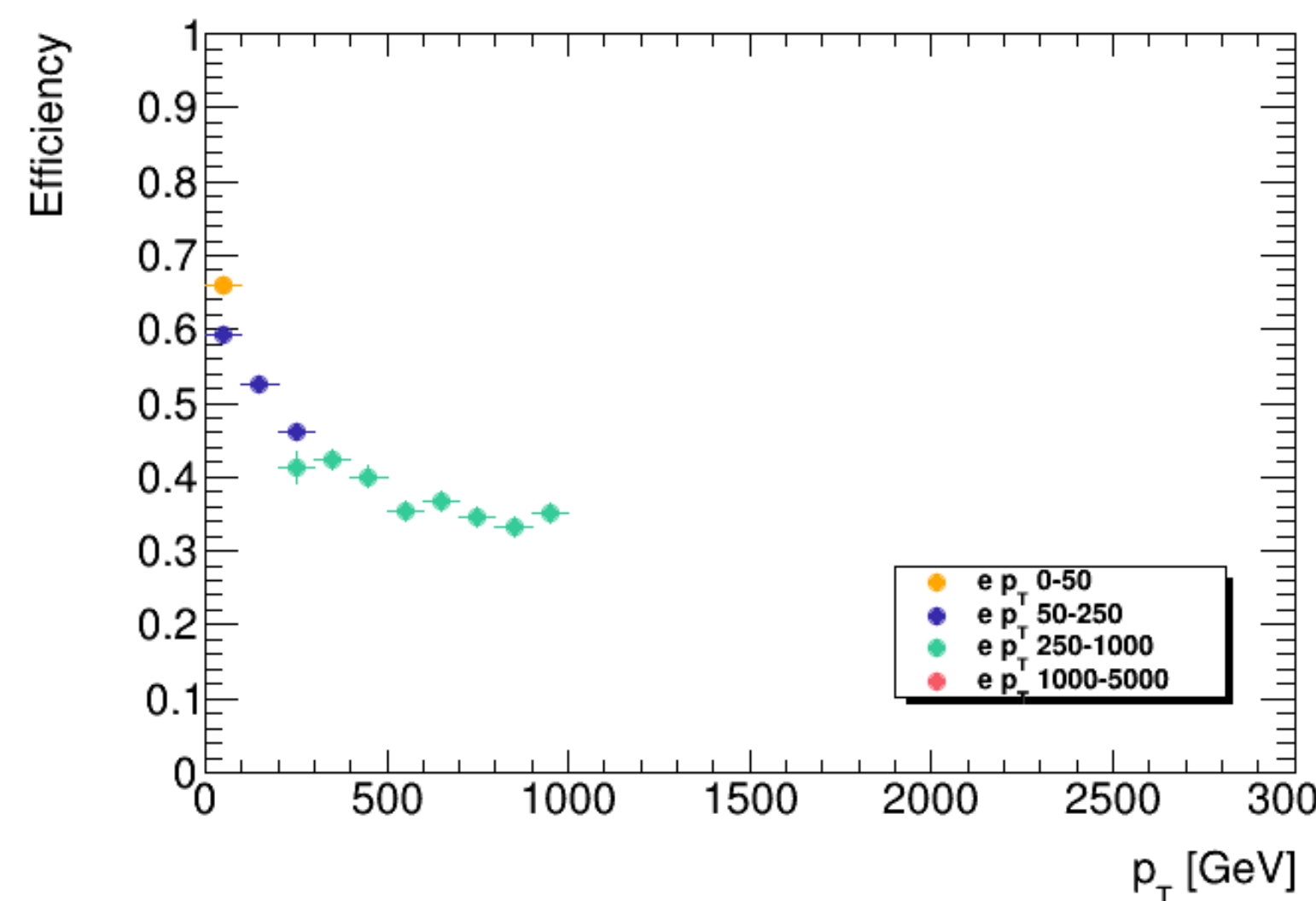
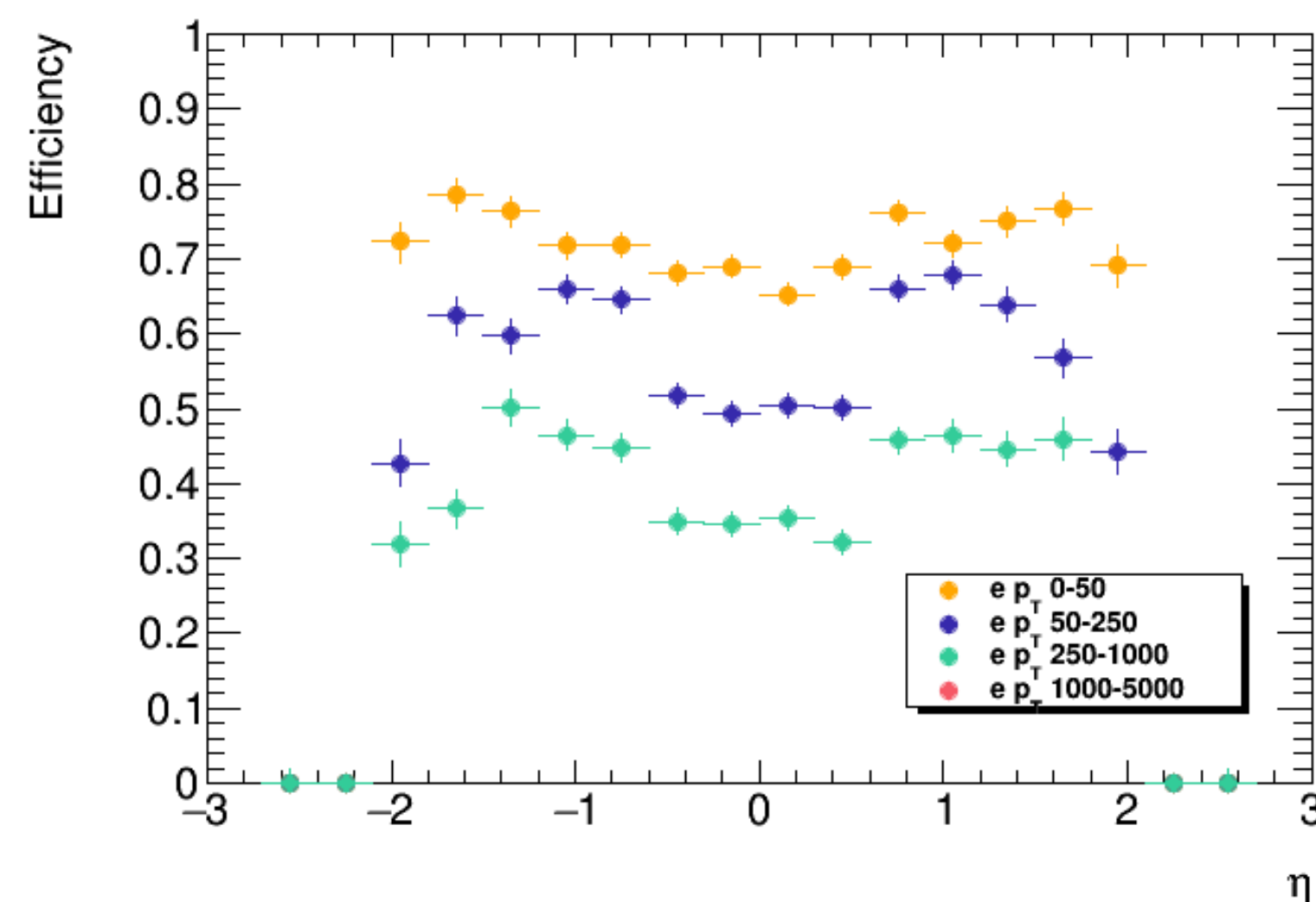
Now do well up to 250 GeV p_T
Interesting shapes, maybe depend
on my p_T criterion – more studies
needed!

note: small error in these
plots because I very
occasionally match more
than one electron – need
to update spatial
matching

w/ BIB fix and updated tracking window

No BIB

Efficiencies for matched PFOs (no el requirement)



This efficiency also goes down, presumably because of the p_T matching requirement. So the question is – what PFOs *are* getting reconstructed?

note: small error in these plots because I very occasionally match more than one electron — need to update spatial matching

What are the PFOs?

