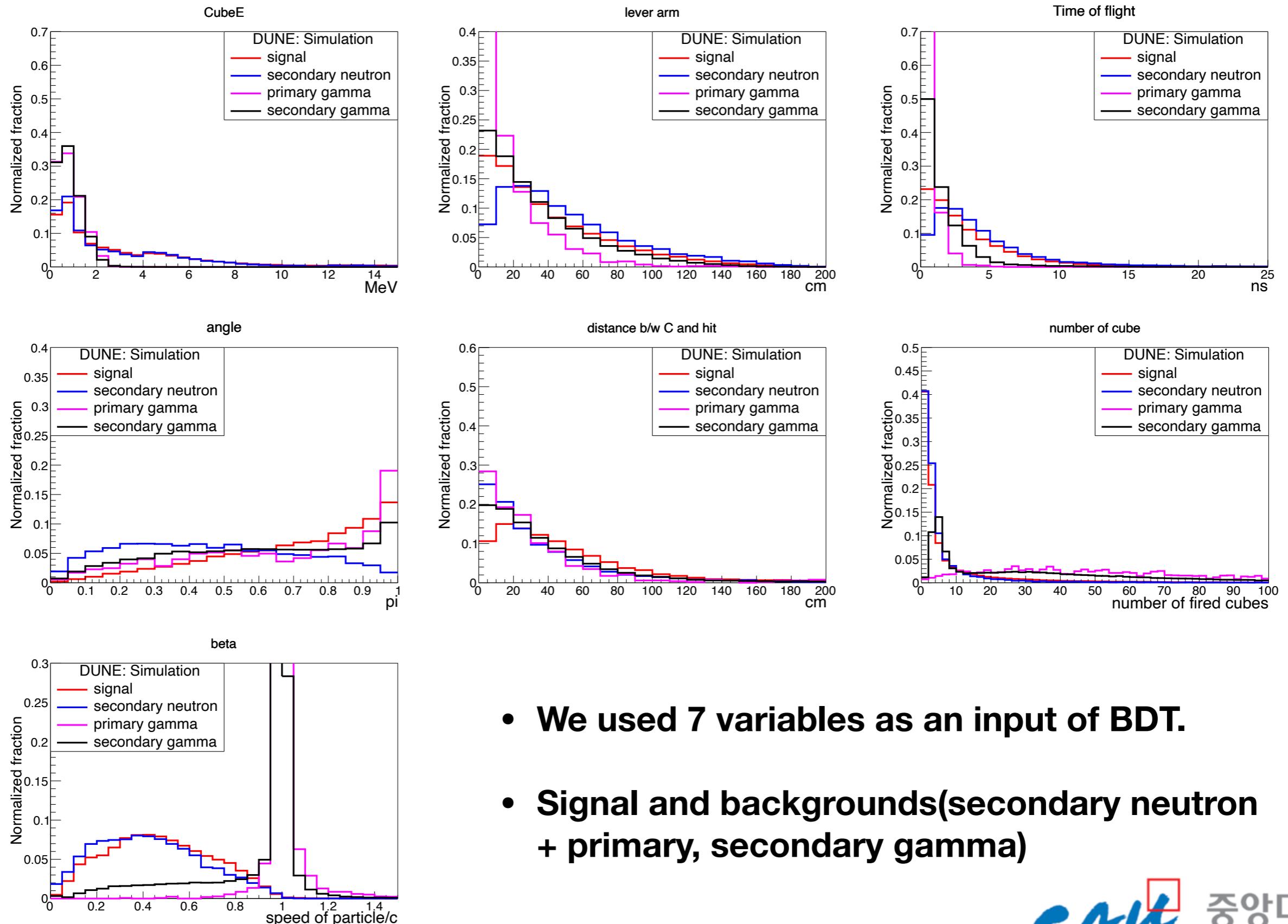


Secondary background in 3DST

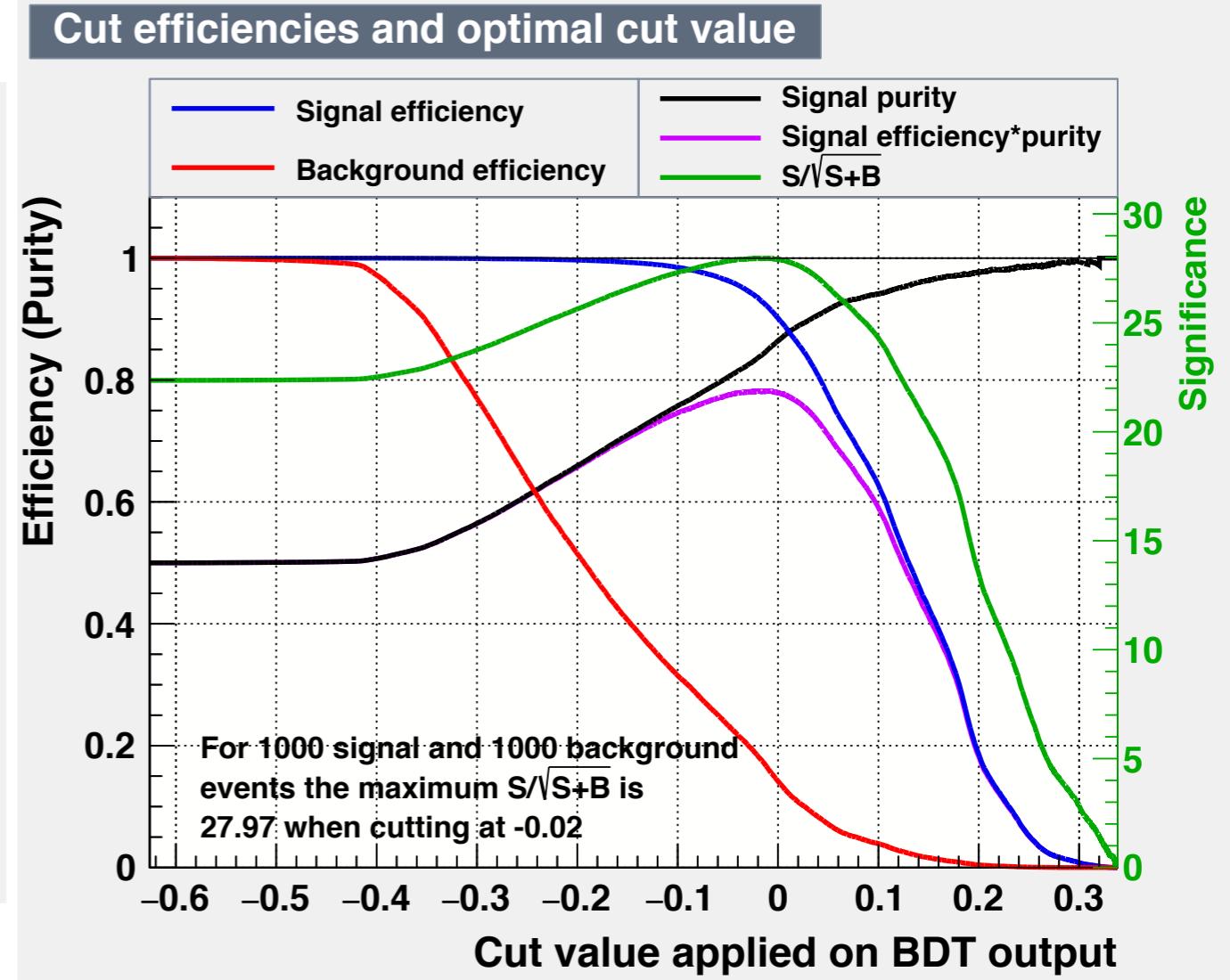
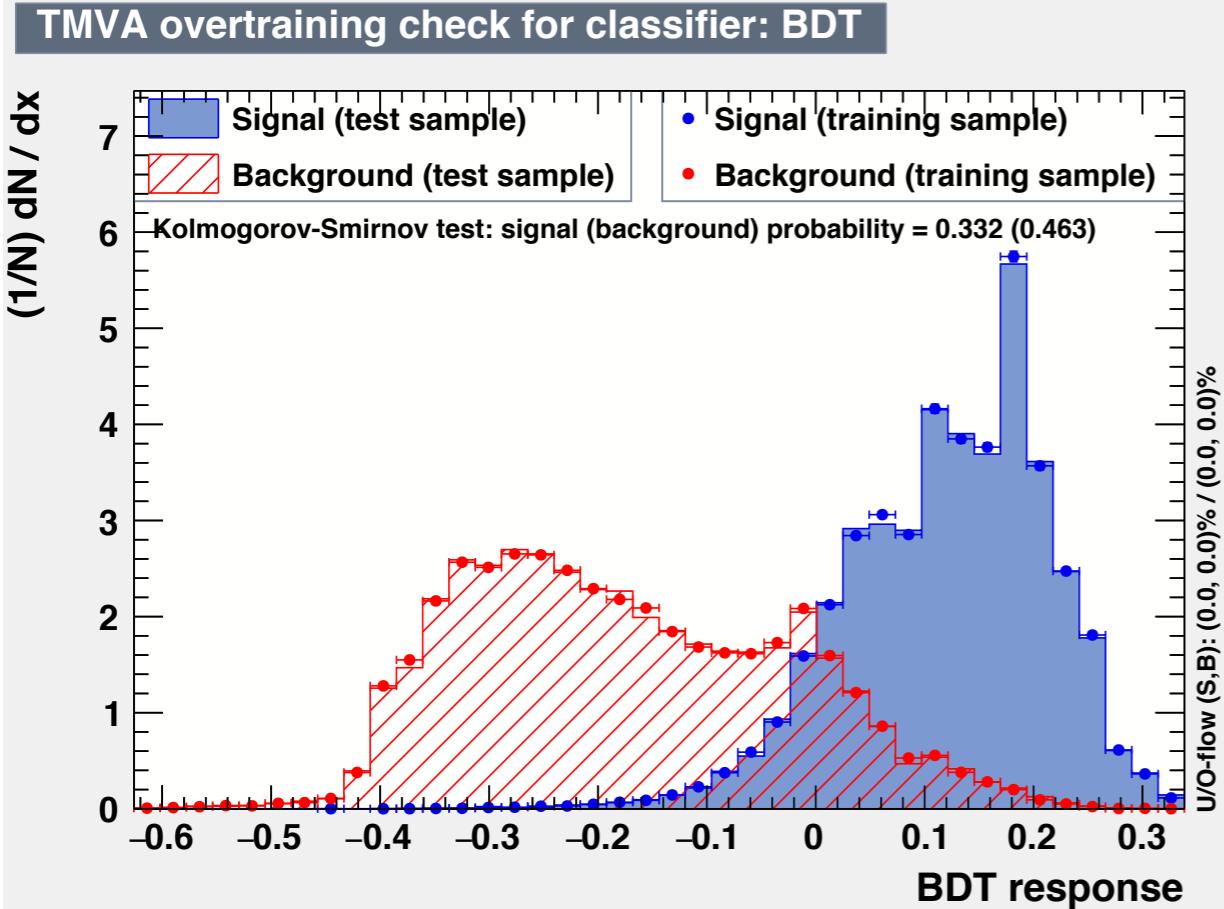
Sunwoo Gwon, Wonseok Bae, Guang Yang, Kim Siyeon

BDT inputs



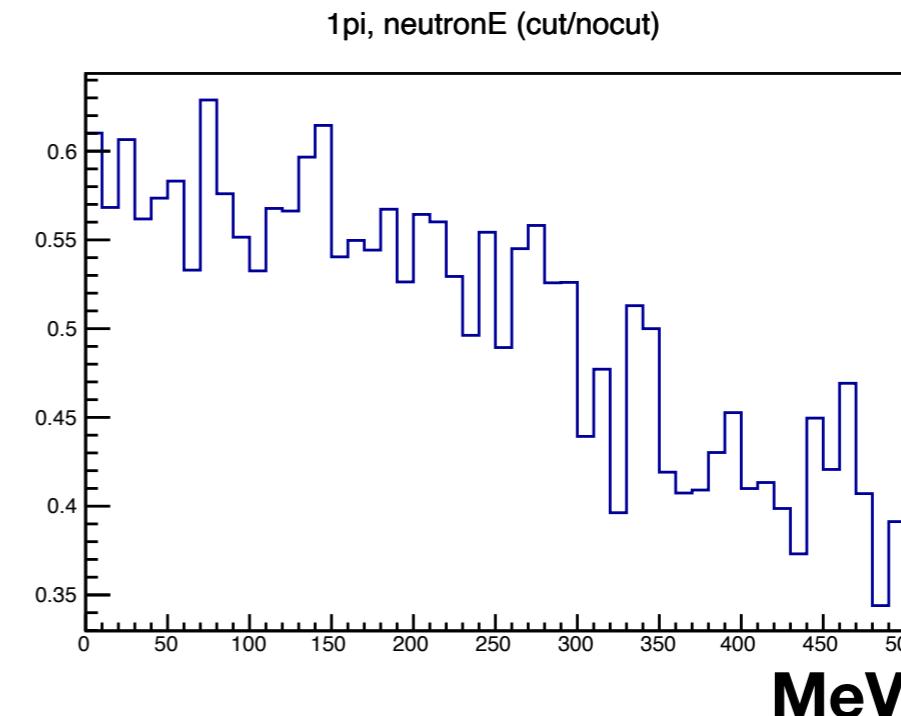
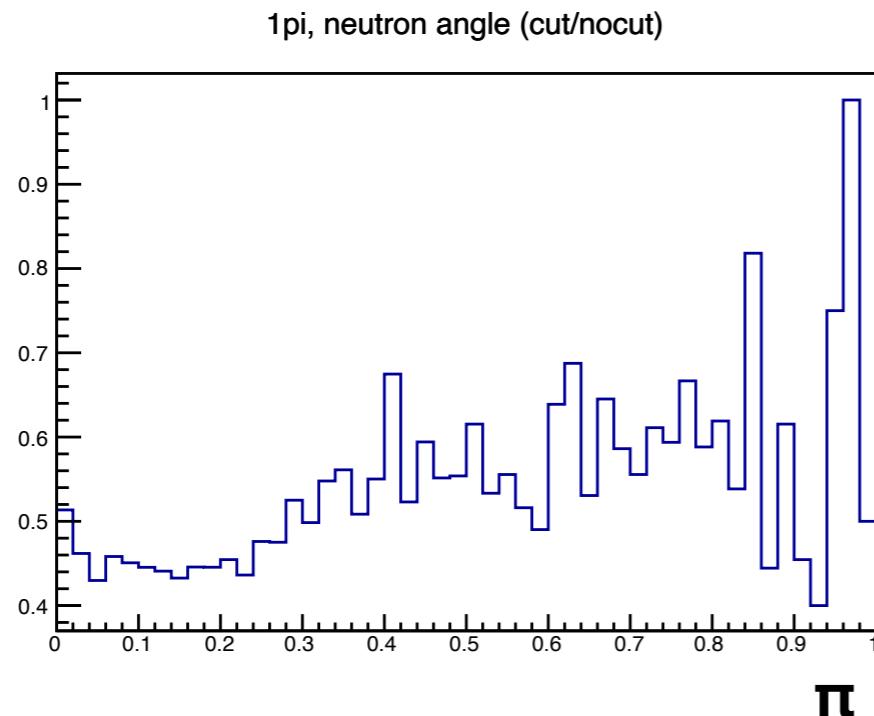
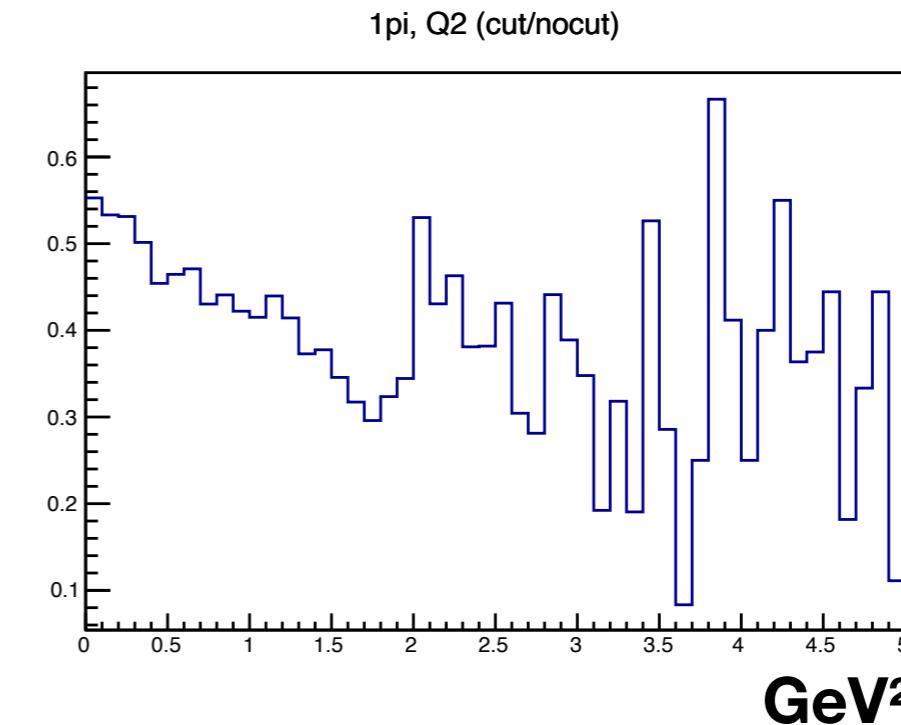
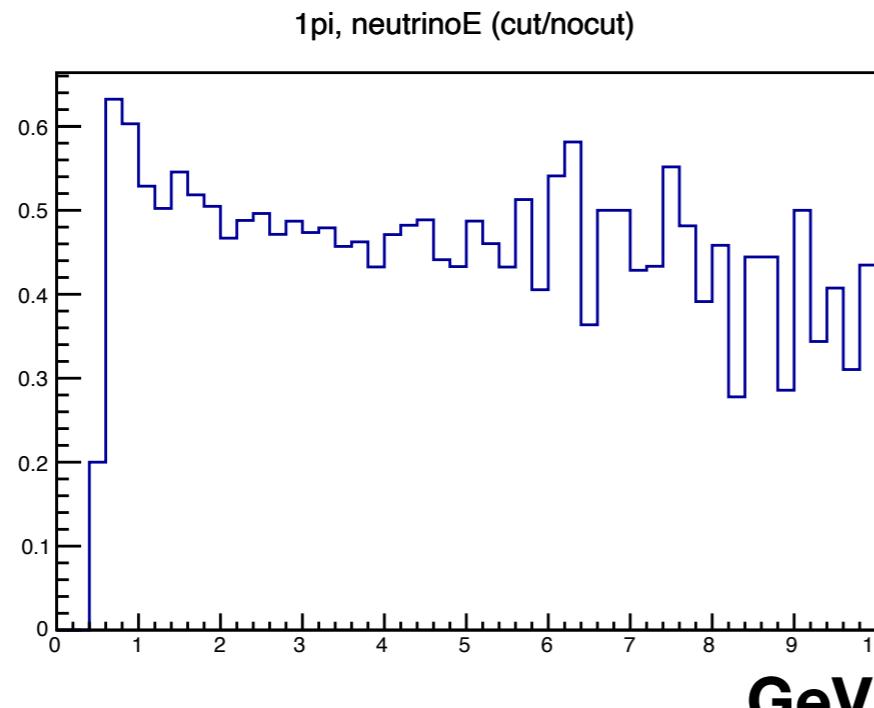
- We used 7 variables as an input of BDT.
- Signal and backgrounds(secondary neutron + primary, secondary gamma)

BDT result



- Combined channel (1pi0P + 0pi1P + 0pi0P) case:
95% purity with 60% efficiency.

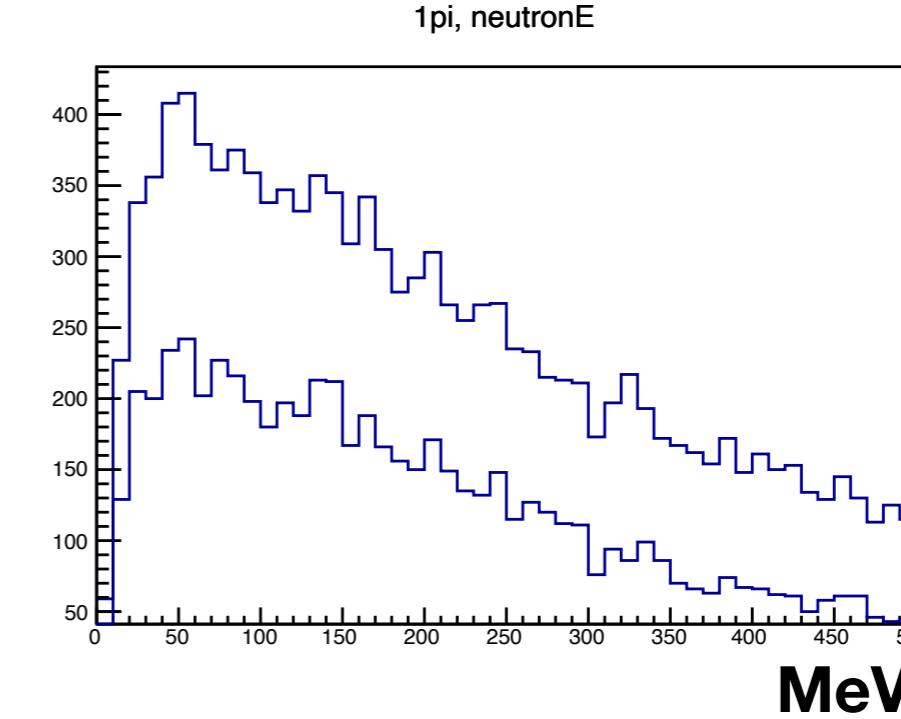
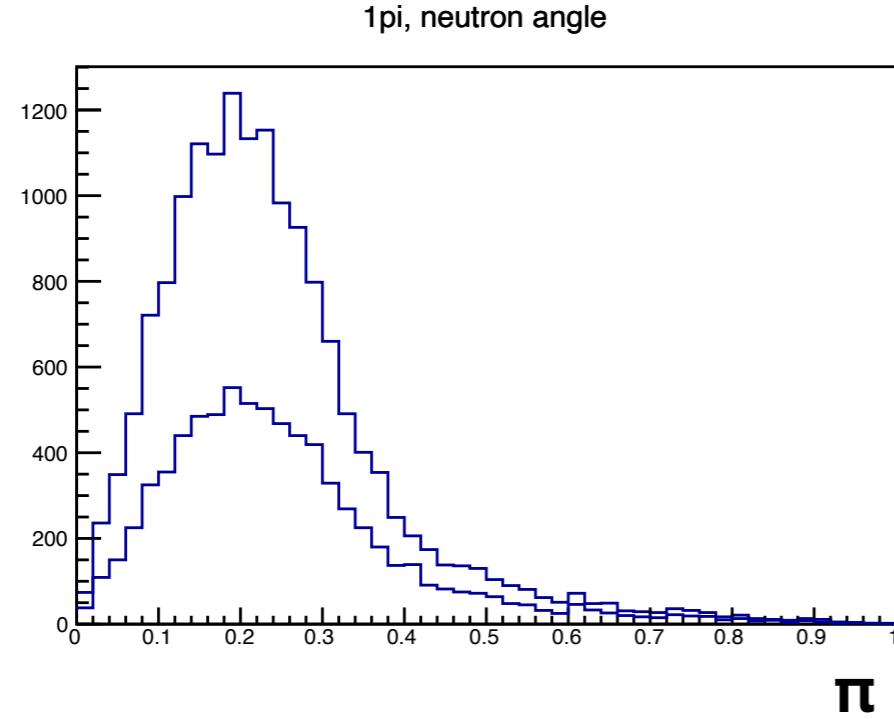
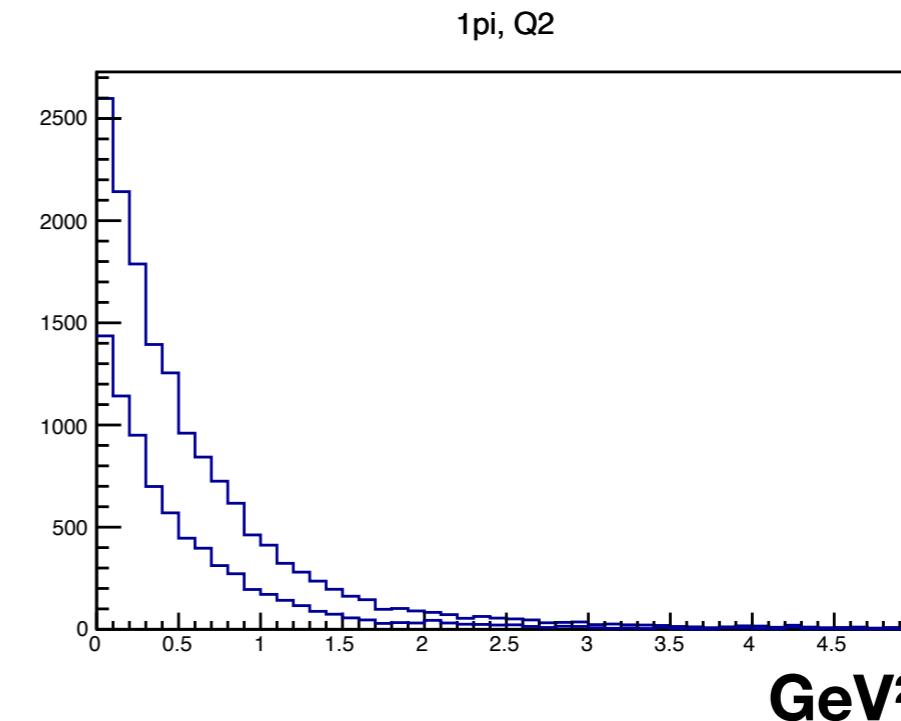
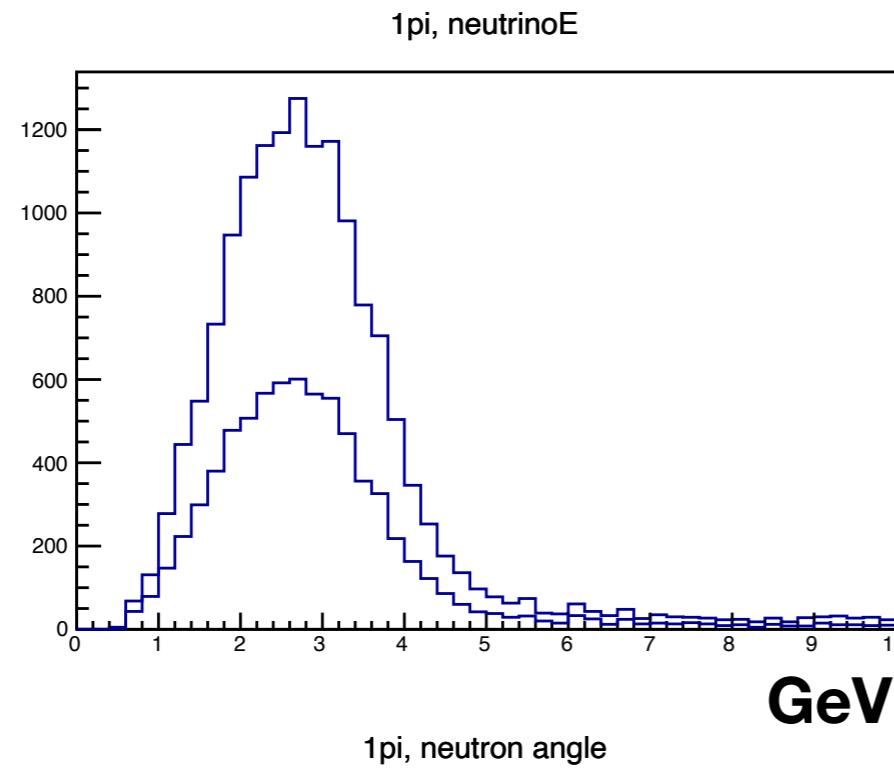
1pi 0P channel



For 1pi0P channel, signal efficiency(signal after cut/before cut) curve after applying BDT > 0.1 cut.

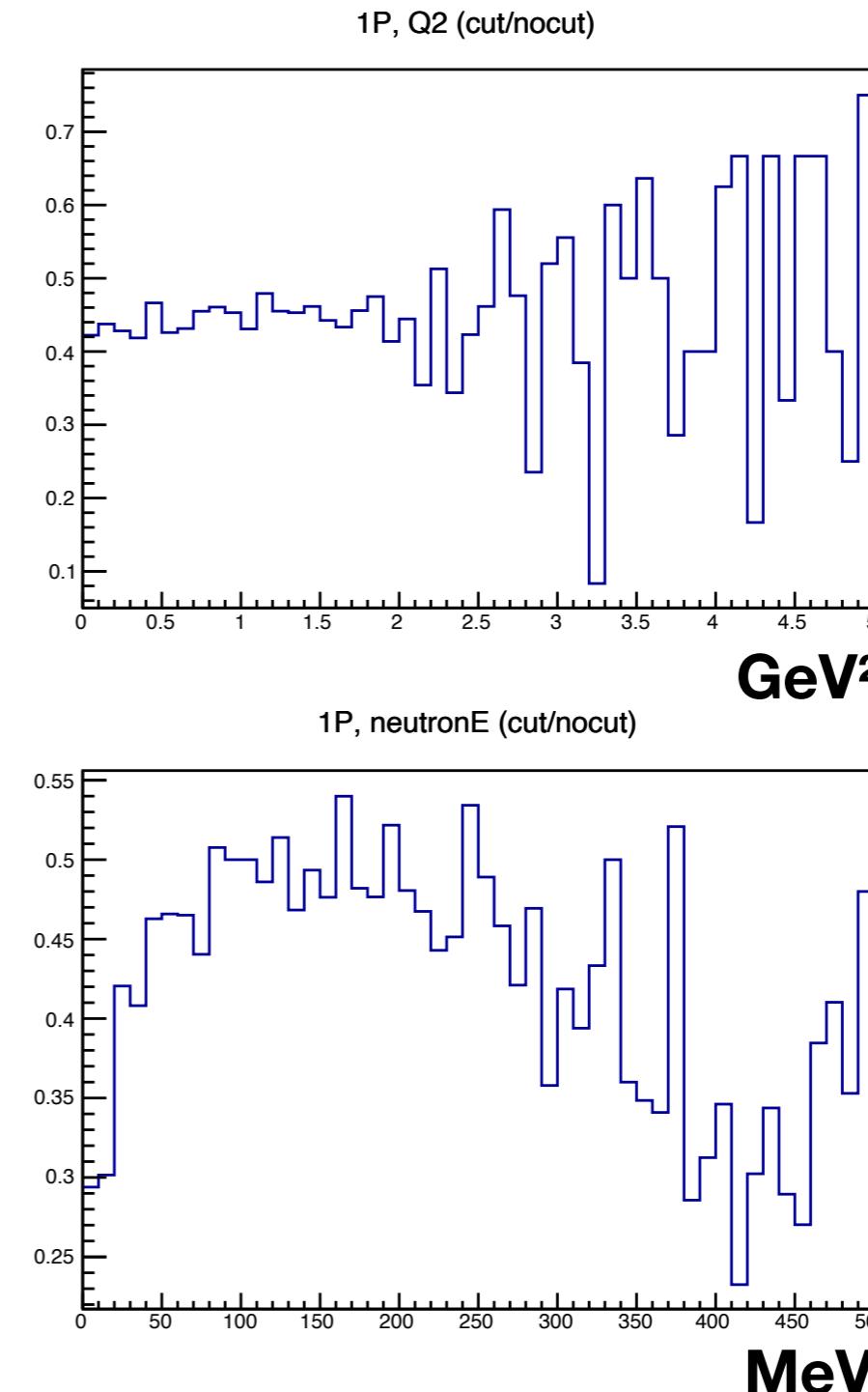
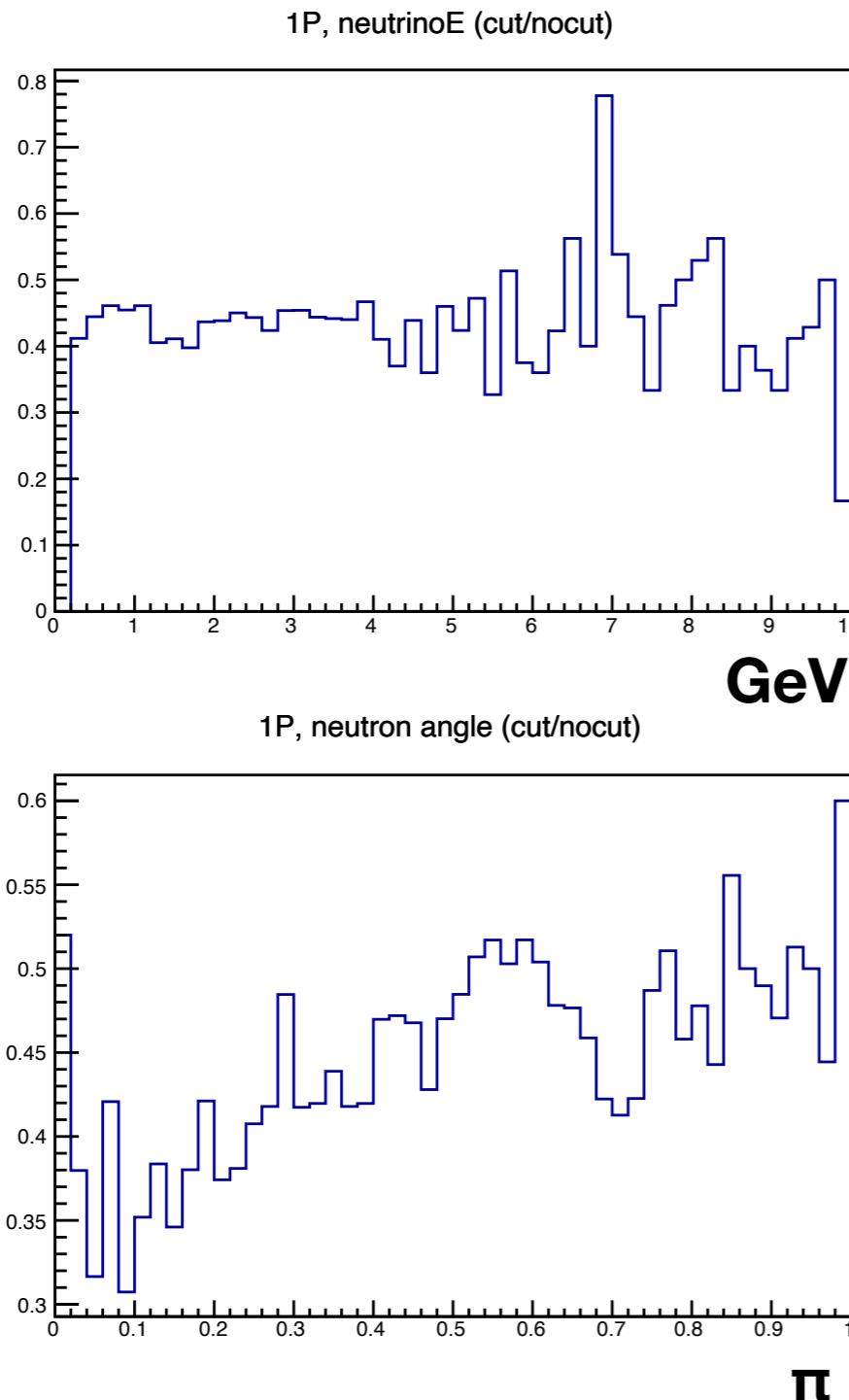
$Q^2 = 4E_\nu E_\mu \sin^2(\theta_\mu/2)$, which θ_μ is angle between neutrino beam direction and muon momentum.

1pi 0P channel



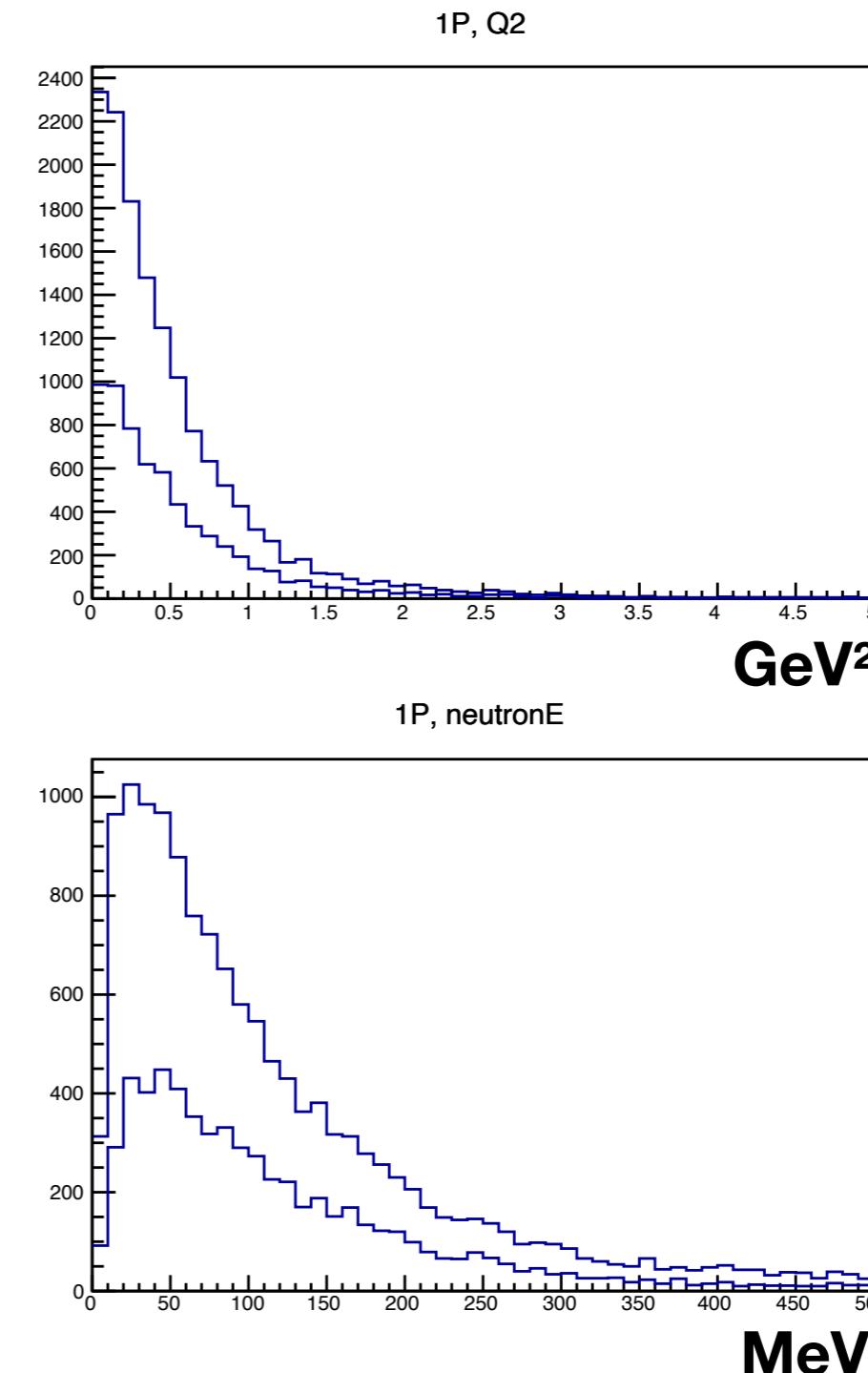
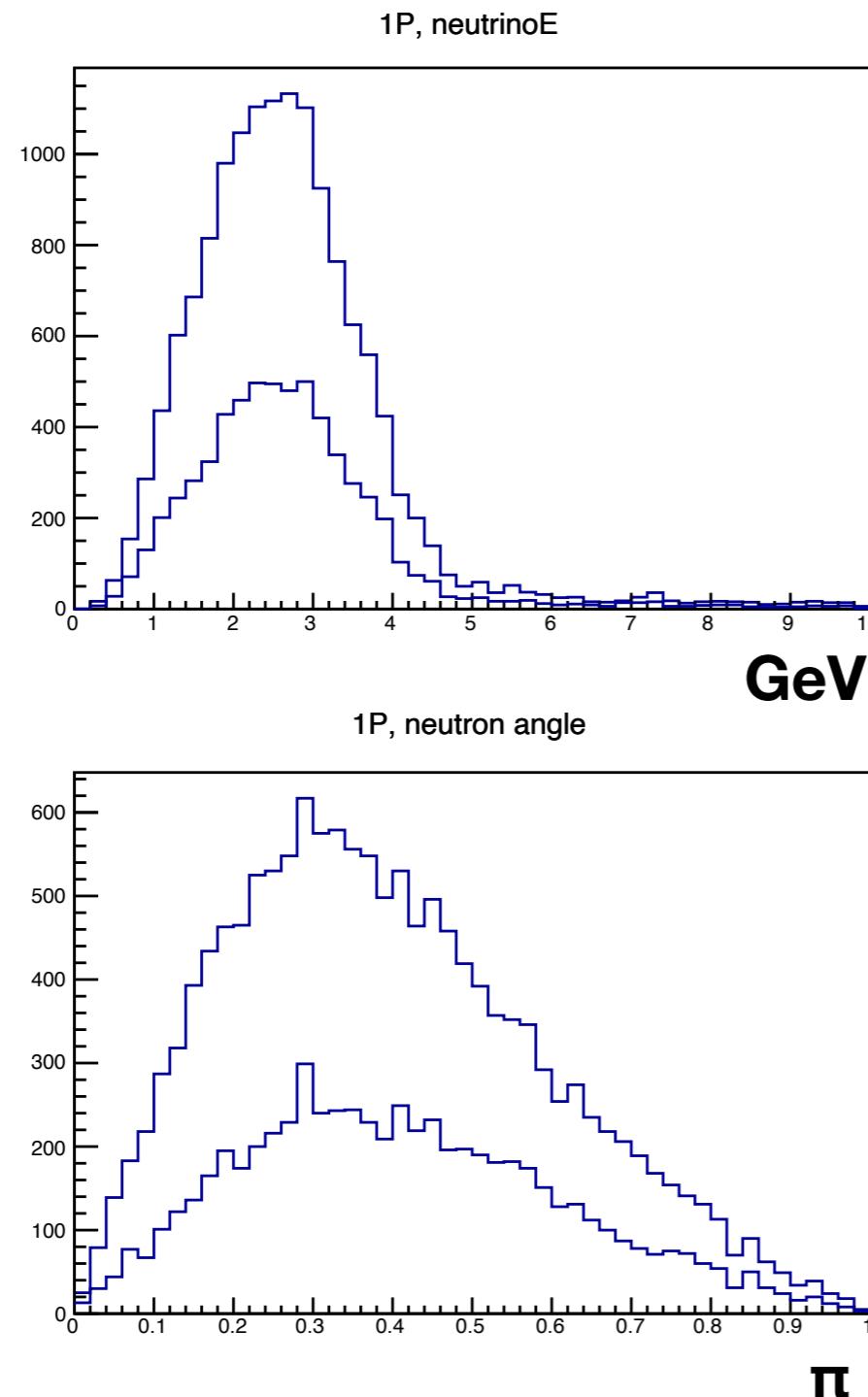
In each figure, upper one is before $BDT > 0.1$ cut, lower one is after the cut for 1pi0P channel signal.

0pi 1P channel



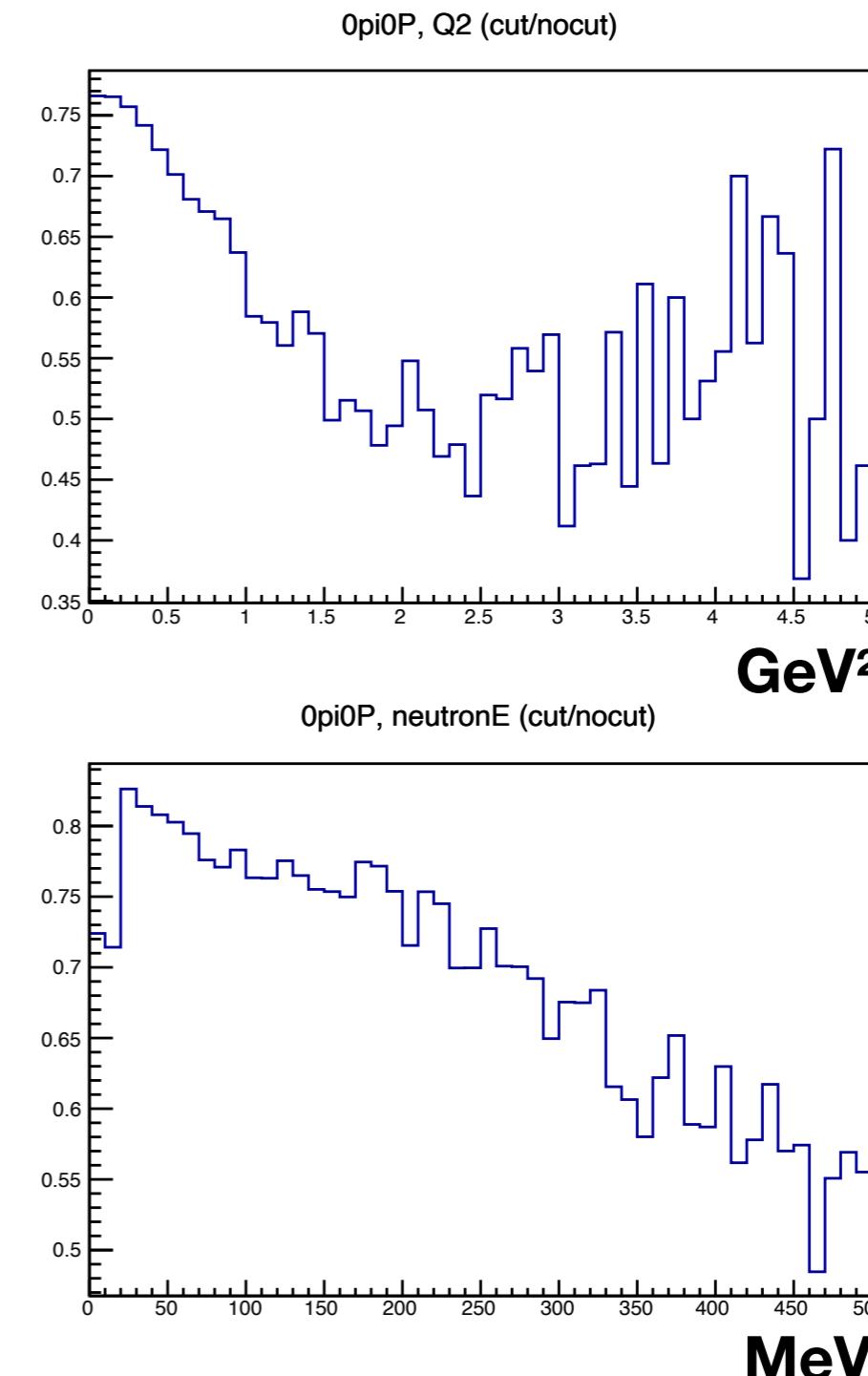
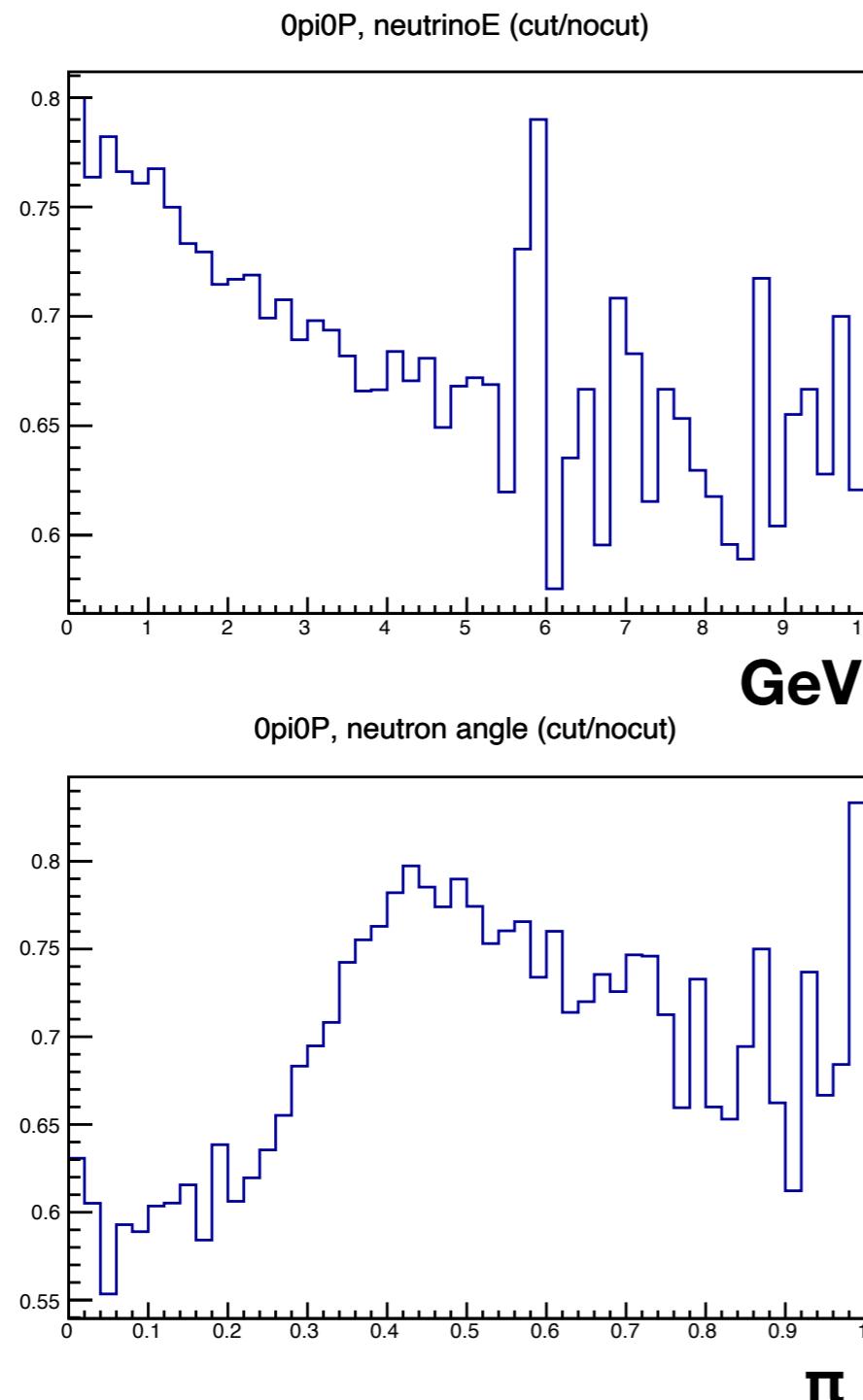
**For 0pi1P channel, signal efficiency(signal after cut/before cut) curve
after applying BDT > 0.1 cut.**

0pi 1P channel



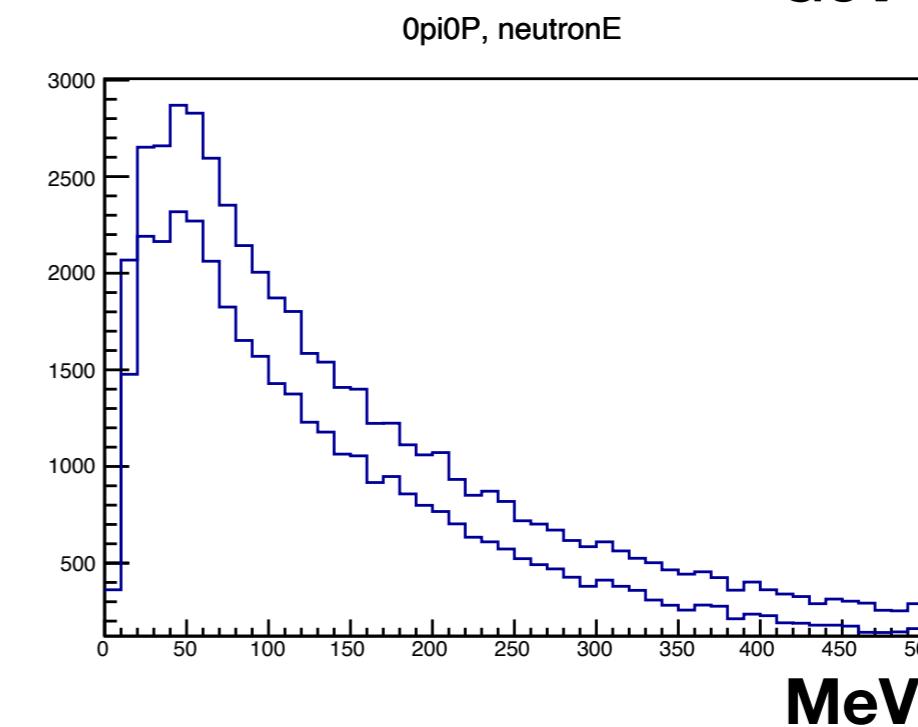
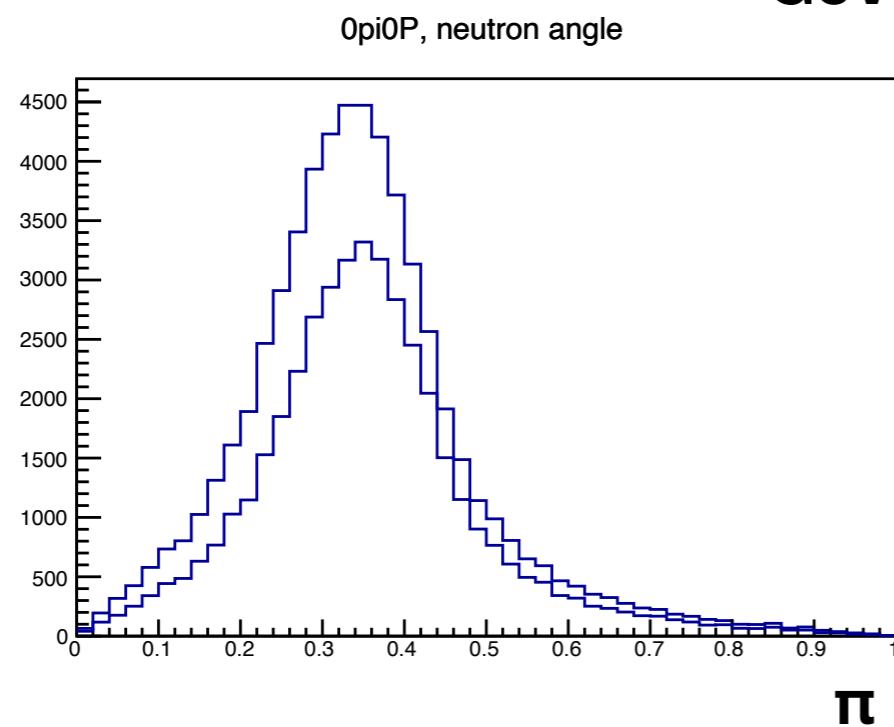
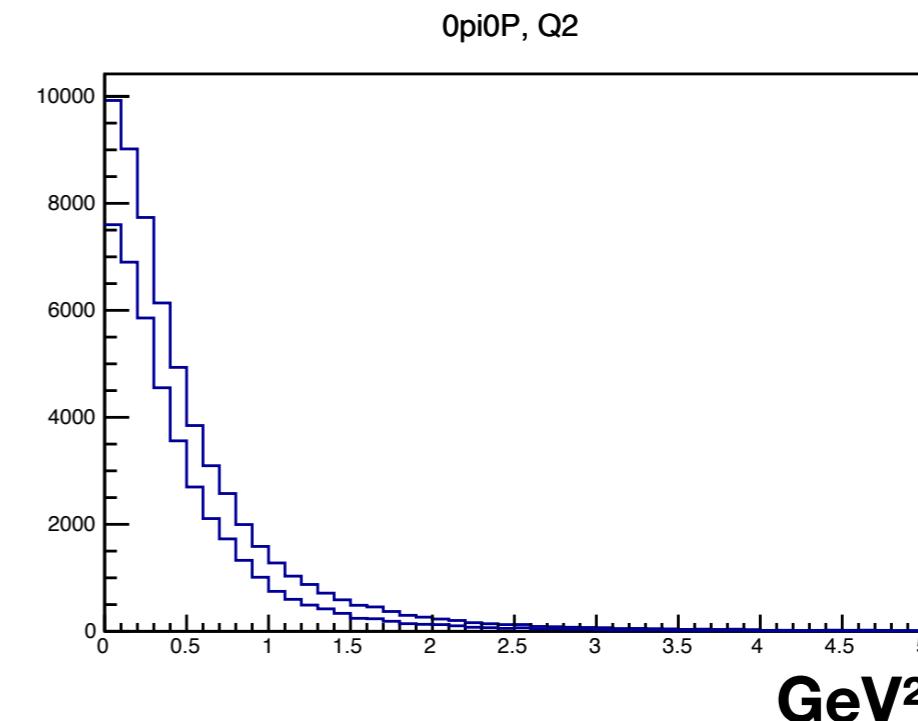
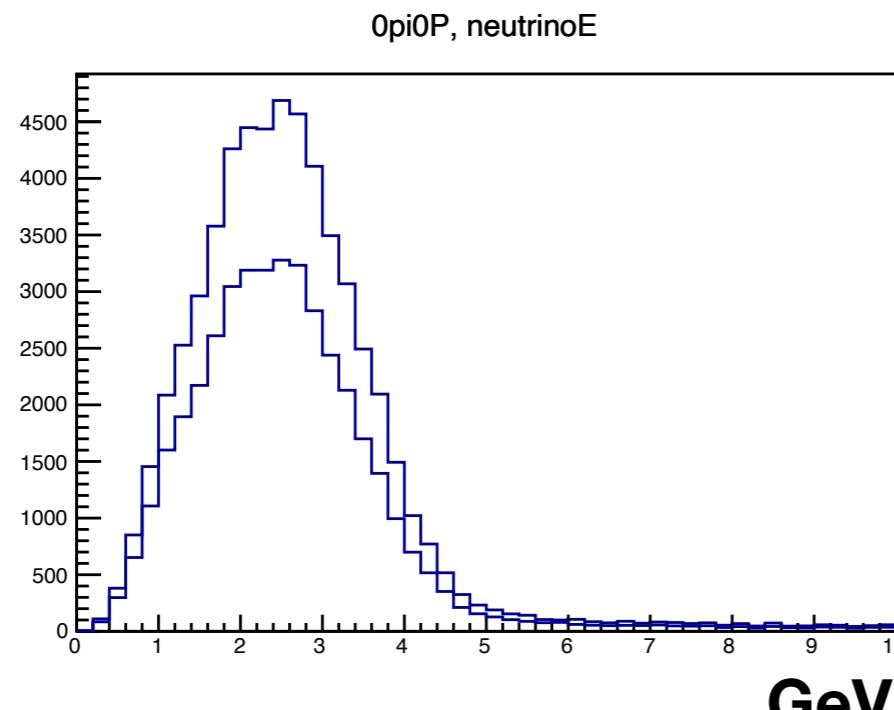
In each figure, upper one is before $BDT > 0.1$ cut, lower one is after the cut for 0pi1P channel signal.

0pi 0P channel



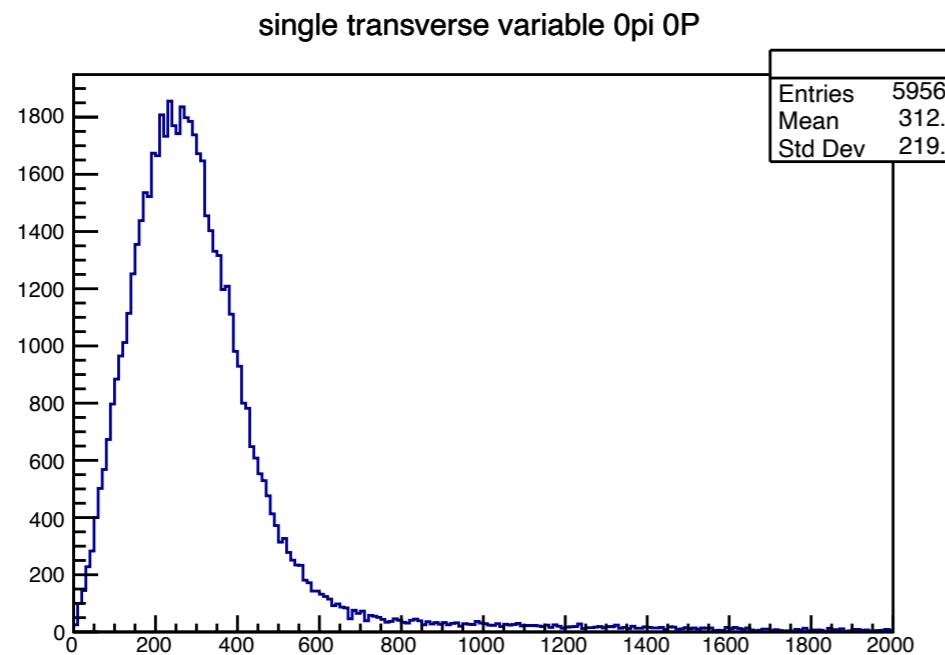
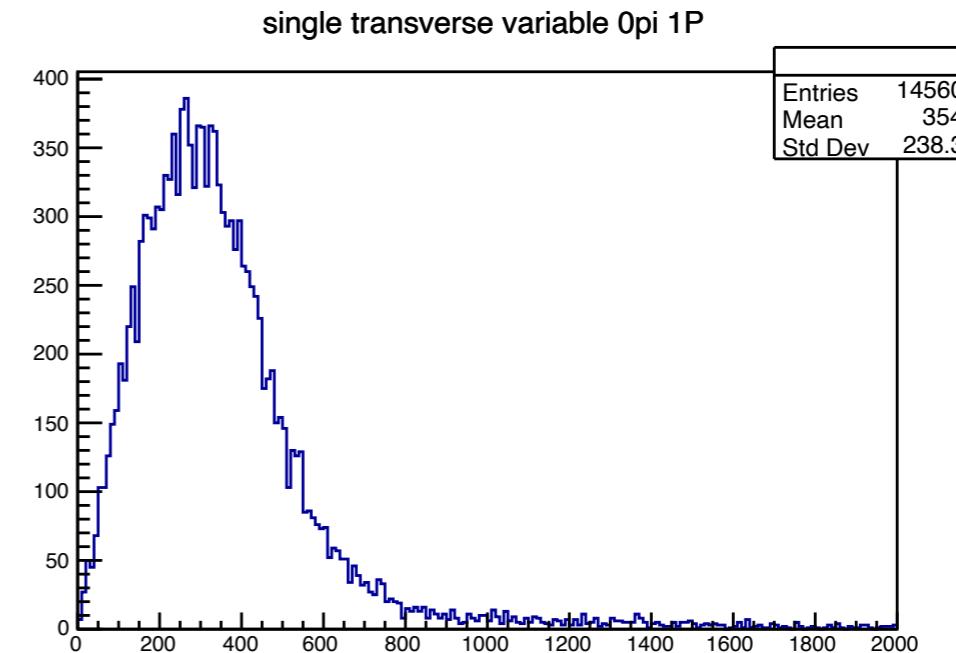
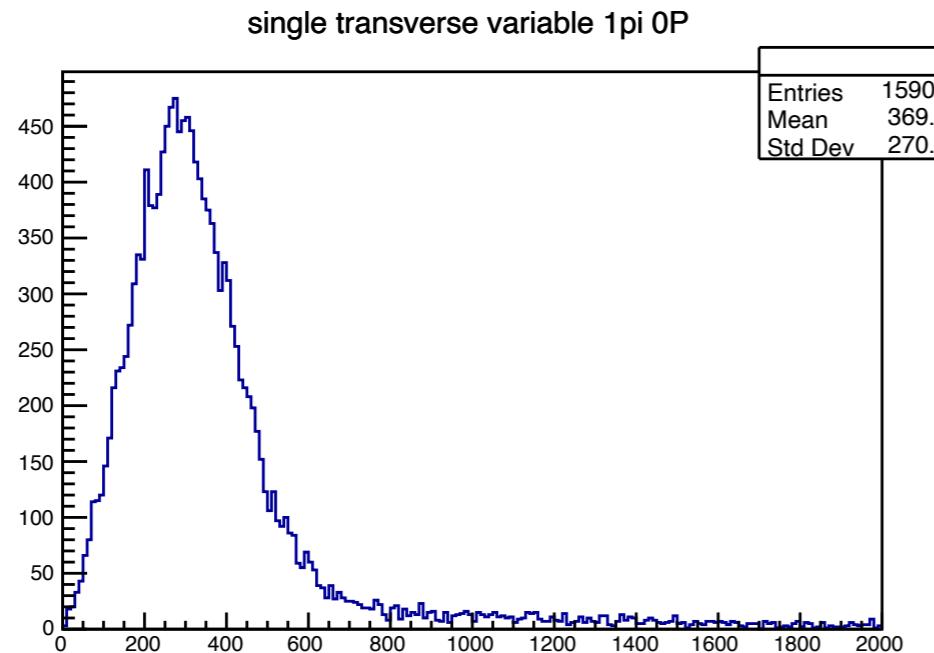
**For 0pi0P channel, signal efficiency(signal after cut/before cut) curve
after applying BDT > 0.1 cut.**

Opi 0P channel



In each figure, upper one is before $BDT > 0.1$ cut, lower one is after the cut for Opi0P channel signal.

single transverse variables



Single transverse variables (size of transverse momentum of all final state particles) for each channels.

Summary

- **For each channels, 1D distributions**
- **As a next step, we are trying to reconstruct neutrino energy with and without neutrons to see the effect.**