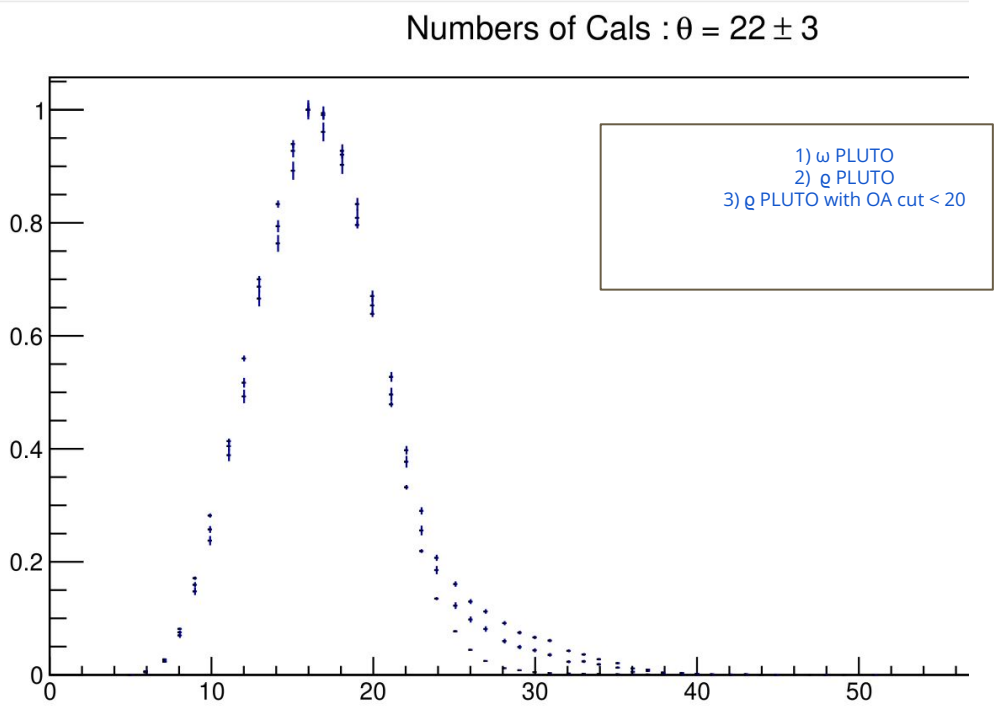
Meeting 14/01/25

NCALS distribution comparison

Way of Handling PLUTO simulation

- Loop to remove non primary leptons using kine objects
    - 2 possibilities : within acceptance or with no cut
- Loop using cand objects to use PID cuts
    - (Optional) Inside this loop : double loop to remove low opening angle kine objects

Double loop using cand objects to create unlike sign pairs

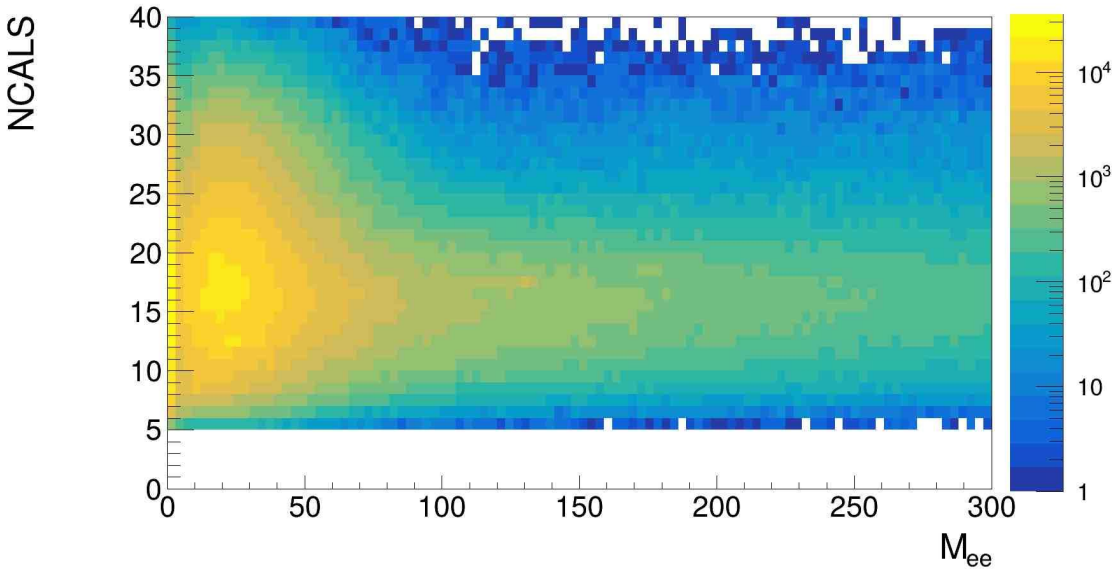


Normalized lepton pure only NCALS distribution

From top to bottom at high NCALS > 25 :

. ϱ PLUTO
. ϱ PLUTO with OA cut
. ω PLUTO

Couldn’t explain this tail which is source dependent



NCALS over Invariant Mass (MeV) for η PLUTO

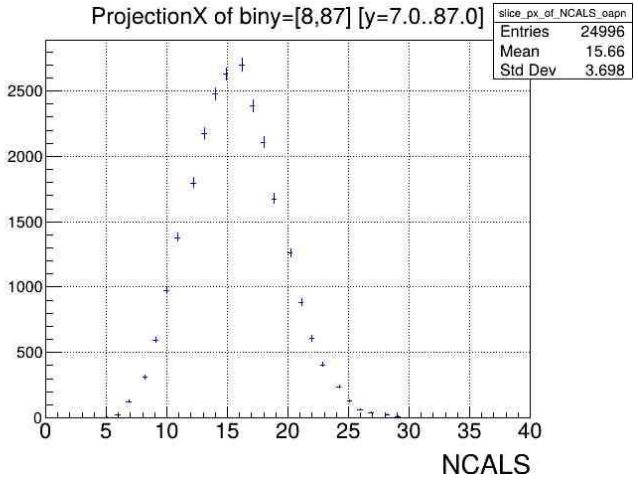
Correlation between high NCALS values and low invariant mass

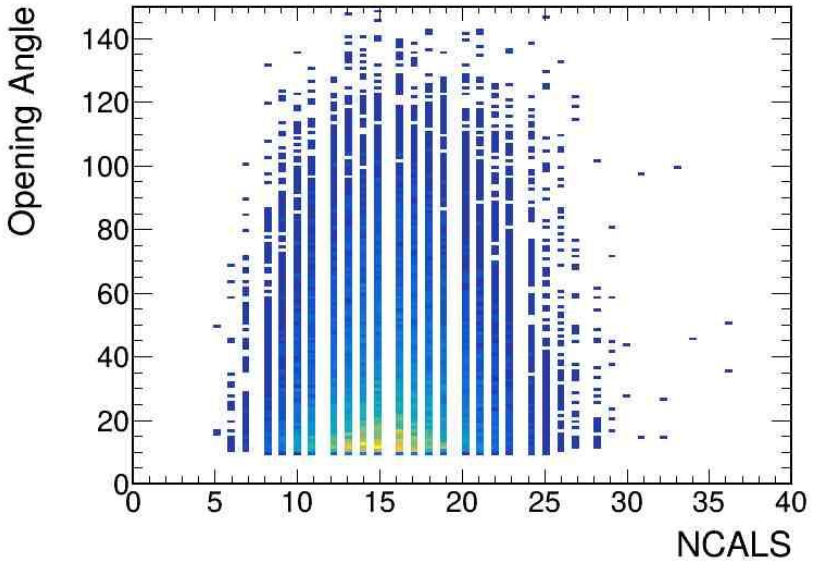
Low invariant mass is correlated to low opening angle

Main difference between ω and the other sources

Correlation between lepton originating from gamma dalitz and main lepton is ruled out

Instead of looking for cand properties filling quality flags : Look for +/- pairs





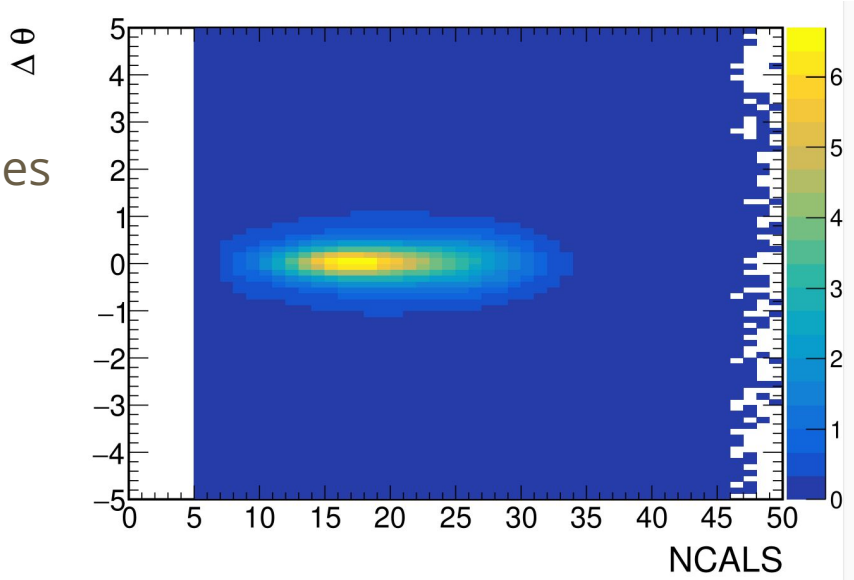
Tail disappears in this case meaning high NCALS are correlated to single tracks

—-> Low OA leads to poorly reconstructed tracks in the inner MDC

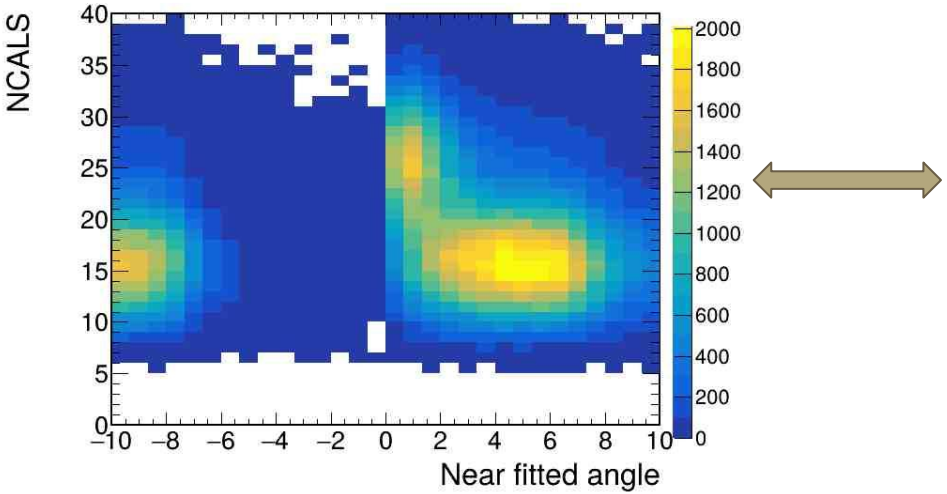
Low OA tracks have overlapping rings : only 1 track is in the end associated to this ring

The deformed ring has a less well defined center which impact RMQ values and explain the observed correlation some times ago between ΔΘ and NCALS

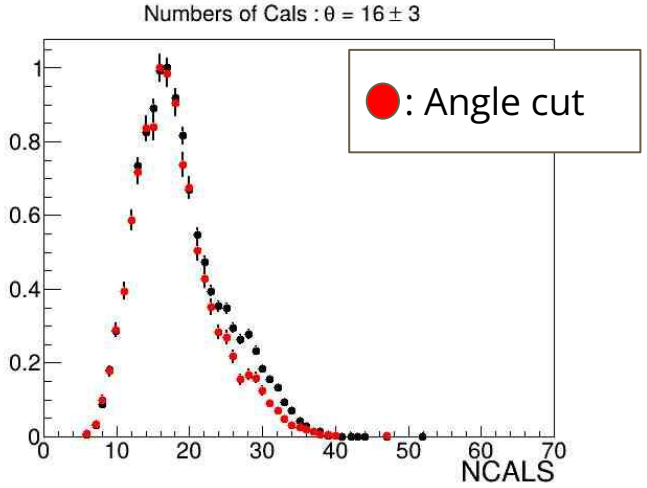
This can also explain why ΔΘ values are systematically larger than white lepton values



A way to assess it ?



Cut on near fitted track with an angle below 2°



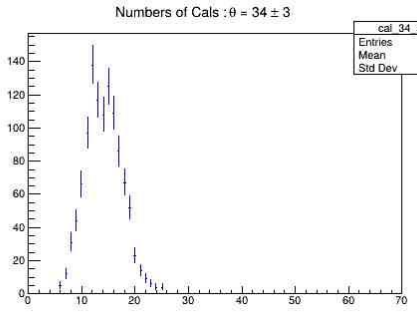
Part of close pair noise is removed by this

Mistake with how I was handling simulation :

- Using In Acceptance filtering : removing kine objects which didn't hit enough wires or were being bend out
- Not possible to remove them after when looking at cand objects which were not created (inside kine double loop)
- Found out that 2 tracks can share the same ring -> Impact NCALS distribution

All of this led to inconsistencies when analysing close pairs

By doing pair selection from kine before looking at cand objects one obtainw the same NCALS distribution as ω PLUTO and white leptons for the other sources



What does it change ?

- Explain approximatively behavior of pair correction factor at low invariant mass
- Single lepton efficiency is better reproduced with a PLUTO cocktail

Next Step —> Create PLUTO cocktail weighted by multiplicities to define new single lepton matrices

Still to do :

- Apply new Smearing matrices and self consistency check between PLUTO and White leptons
- Display systematics from PID