

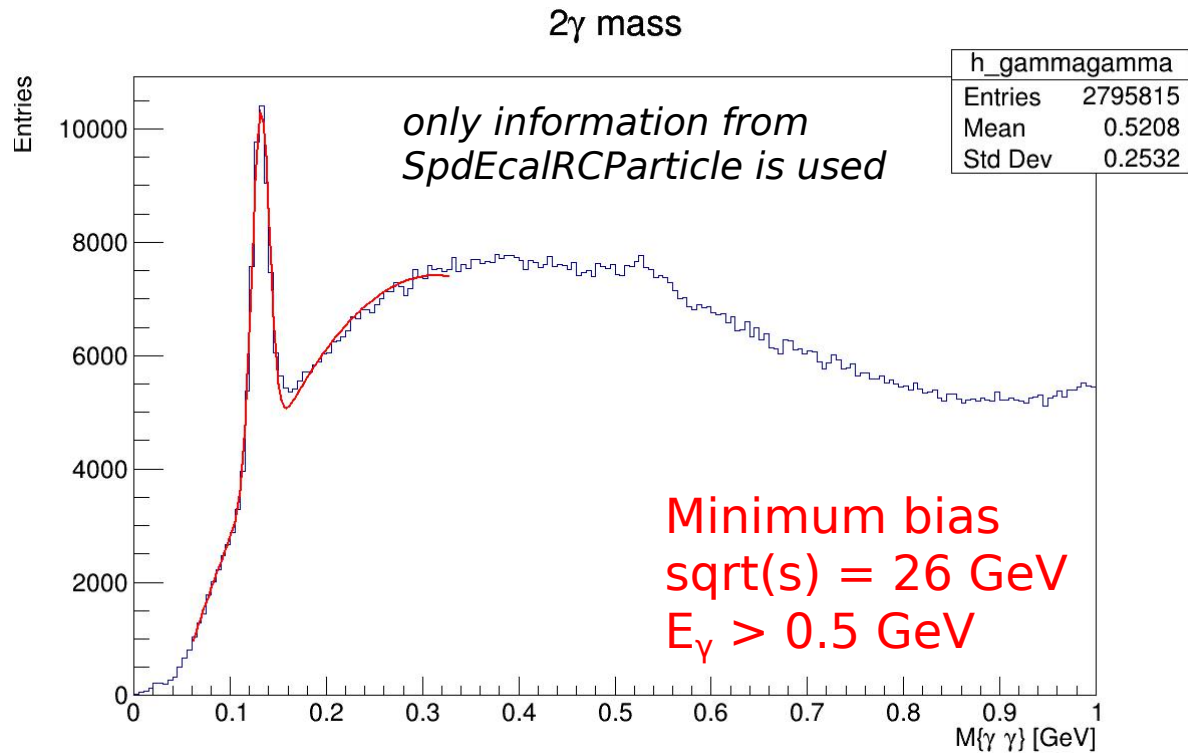
Simple charged track — ECAL cluster association in SPDROOT

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SPD SW&C Meeting

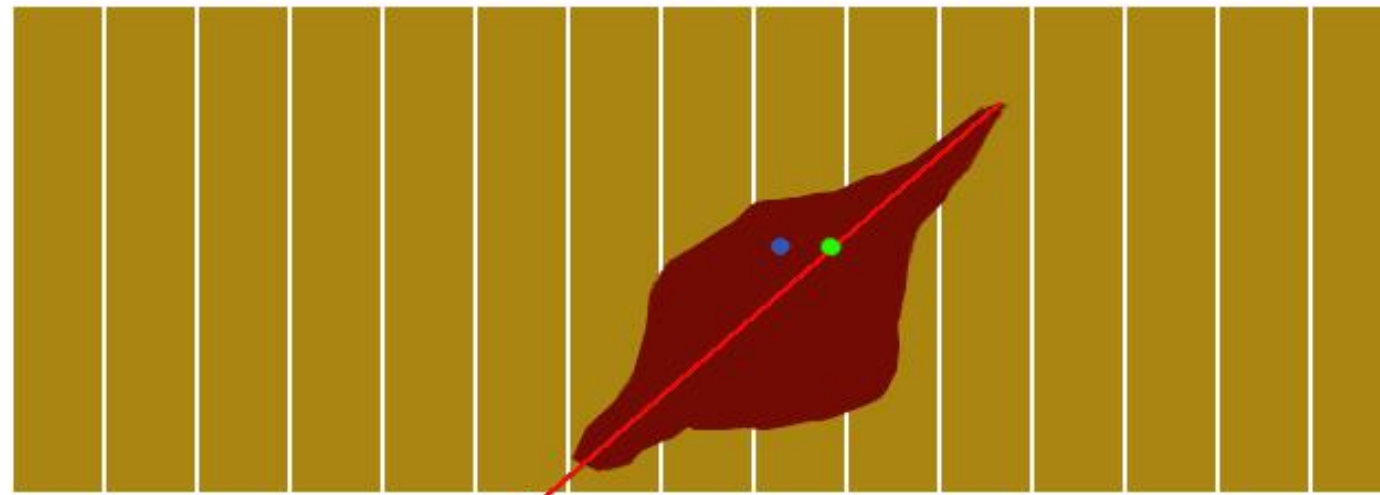
25.01.2021

Motivation



- Large background under π^0 peak
- Could we improve it by rejecting ECAL clusters that are close to trajectories of charged particles?

Idea



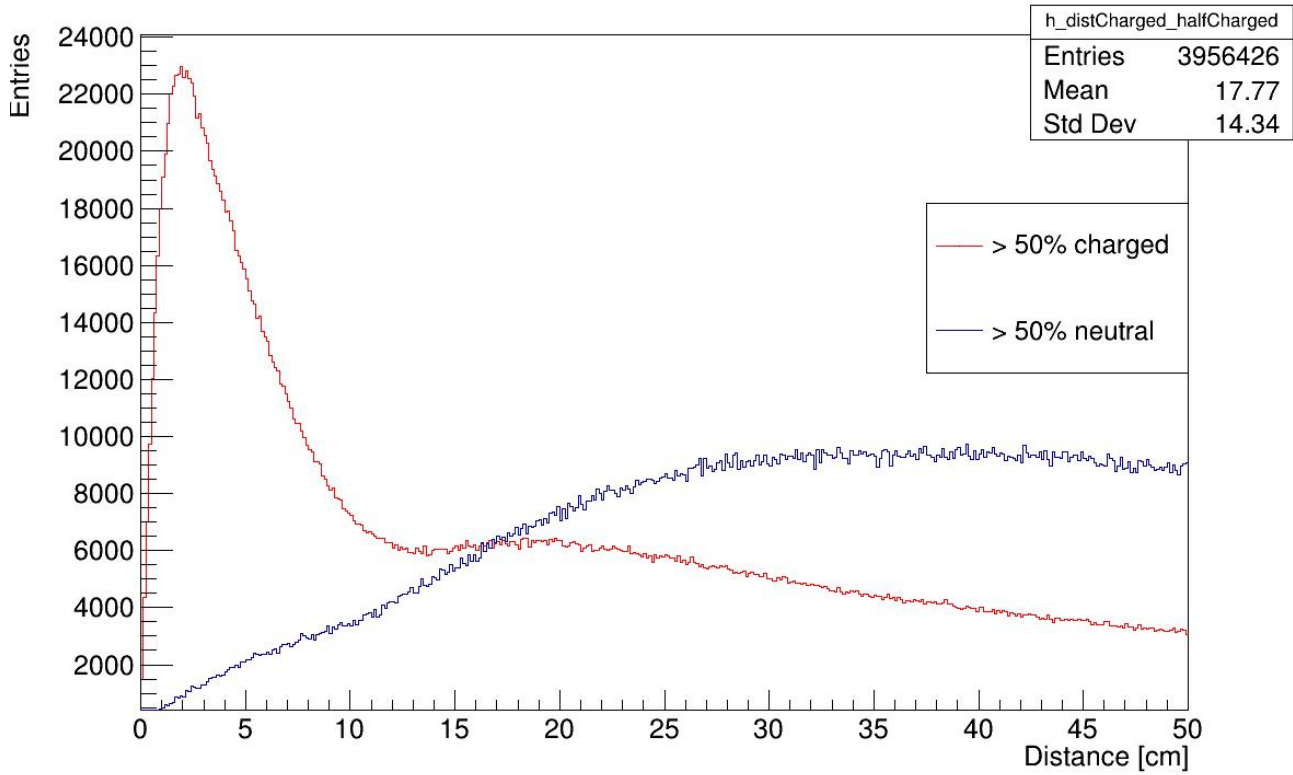
Mean weighted position @ cell center (in Z)
Reconstructed corrected position of photon

How “Distance between cluster and charged track” is calculated at the moment:

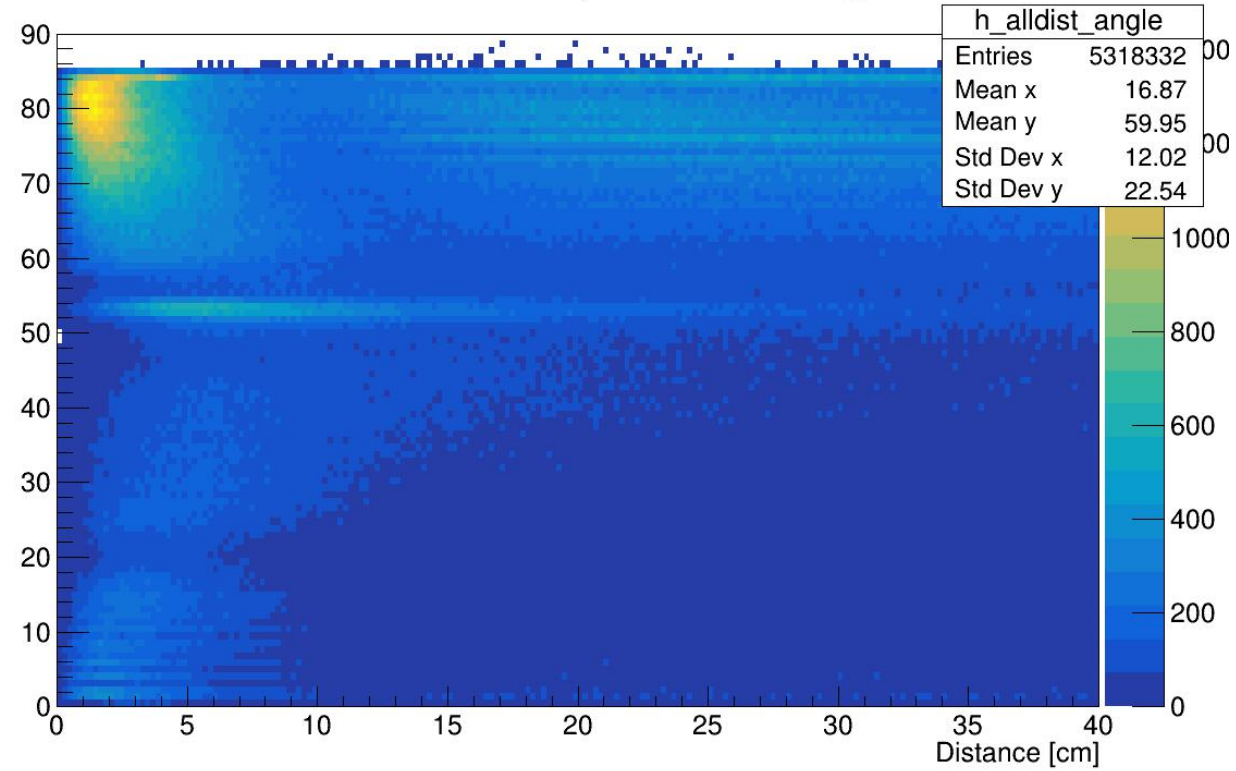
- cluster position: photon trajectory @ cell middle (in radial dimension)
- for example: log.weighing: weighted mean of cell center positions, accounted for shower depth (in case of large angles) using empirical correction
- distance is calculated using `SpdTrackPropagatorGF::ExtrpolateToPoint`, where the propagator is initialized using information on `SpdTrackRC` (reco tracks)
- if no info on `SpdTrackRC`: try to use `SpdTrackMC` (not yet implemented in the current version)
- closest distance is written to `SpdEcalRCParticle` for the user to apply cuts in analysis macros

Tests

distance to charged track if more than half of energy was contributed by charged particles



Closest distance between particle and charged track



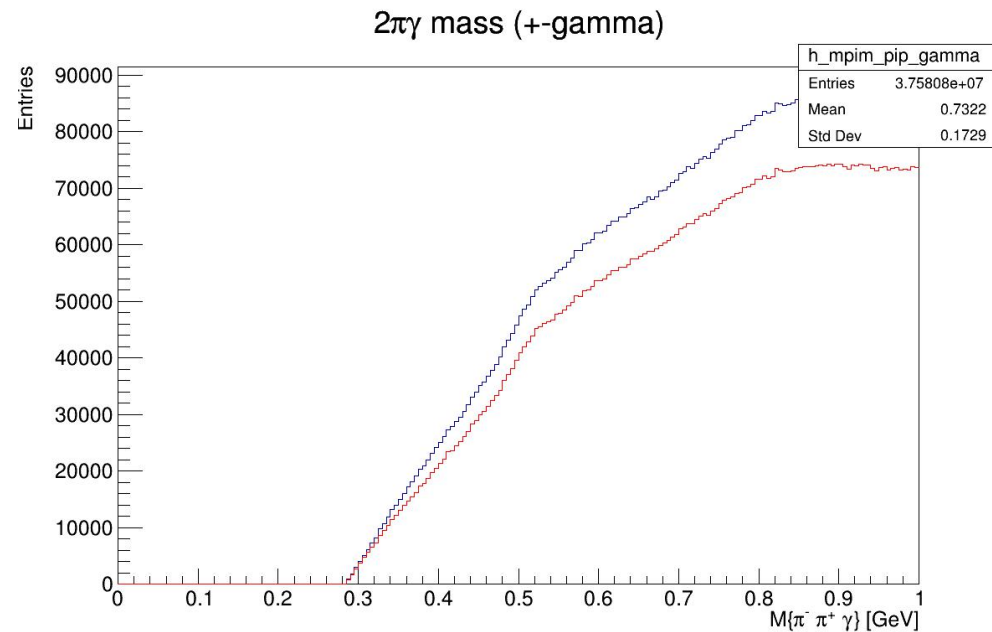
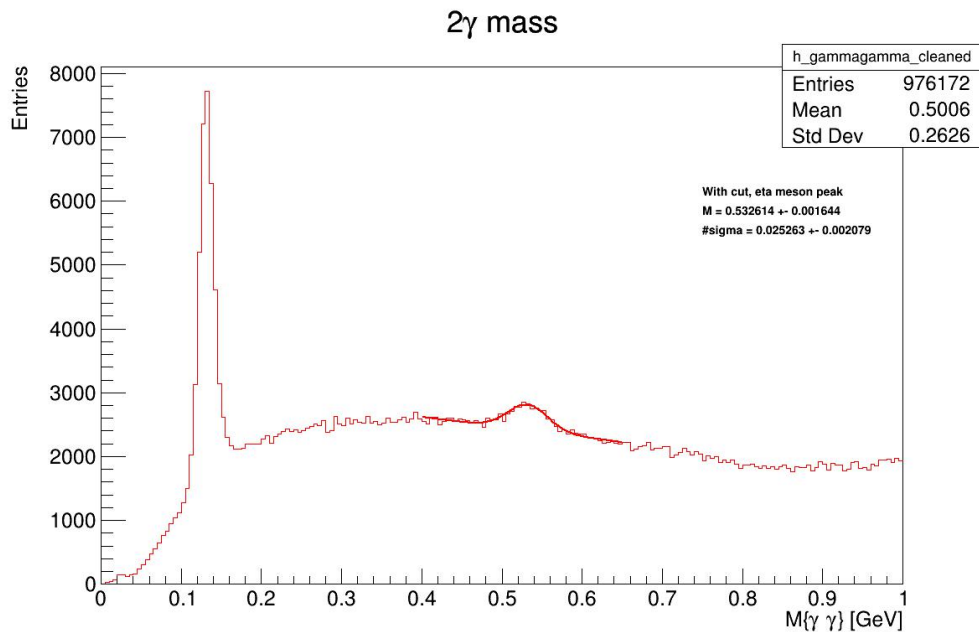
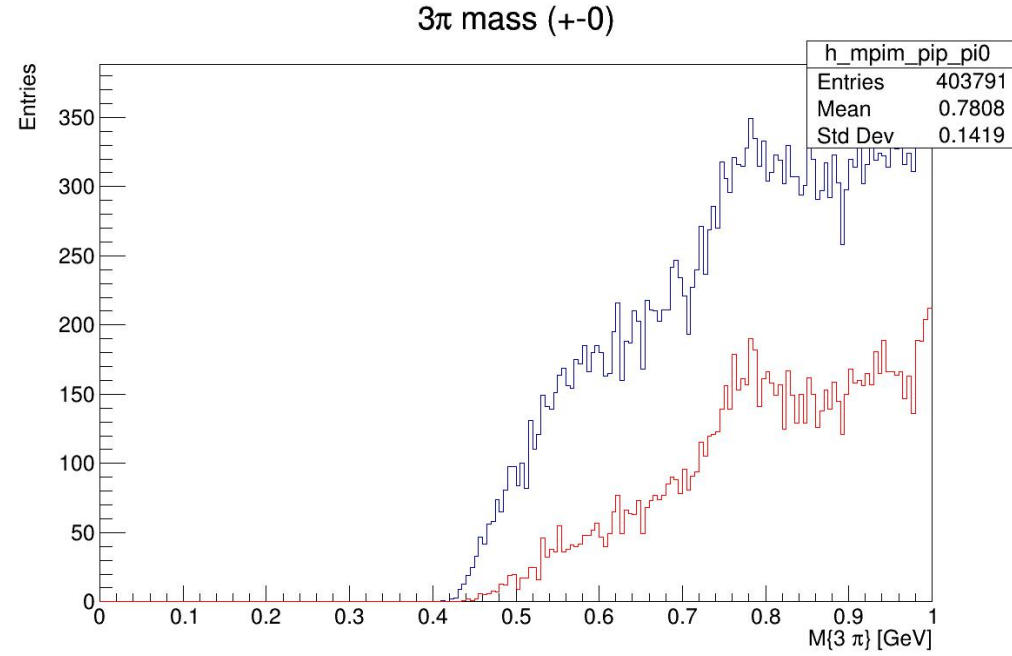
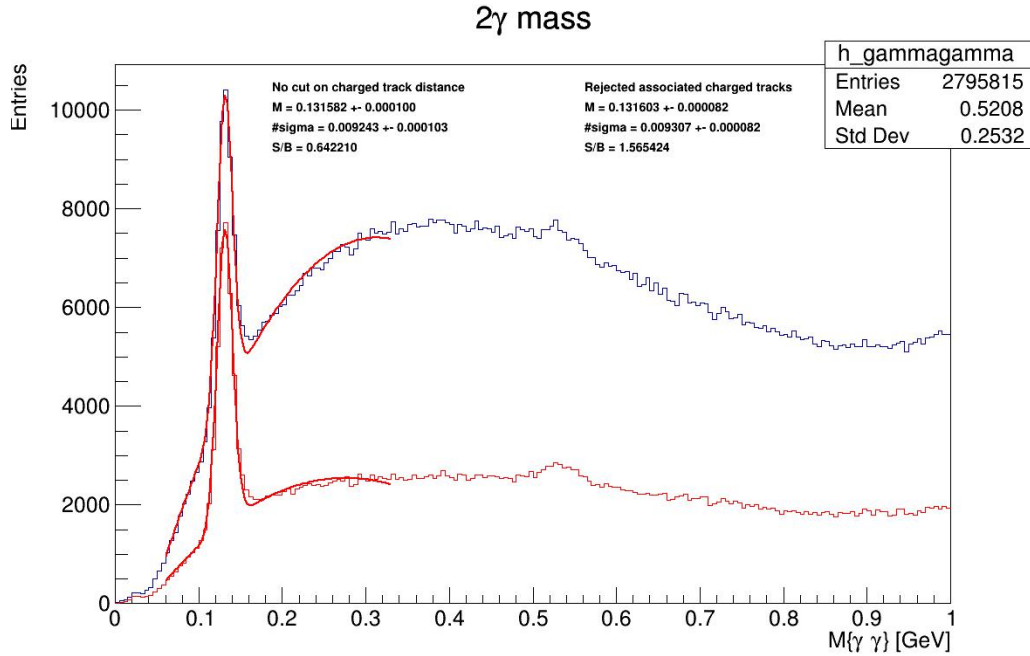
Examples

No cut on charged track distance

With cut: distance > 10 cm

$M_{\pi^0,PDG} = 134.98 \text{ MeV}$

$M_{\pi\eta,PDG} = 547.86 \text{ MeV}$



Timeline: next major SPDR00T release(?)

Any suggestions/comments?

Backup