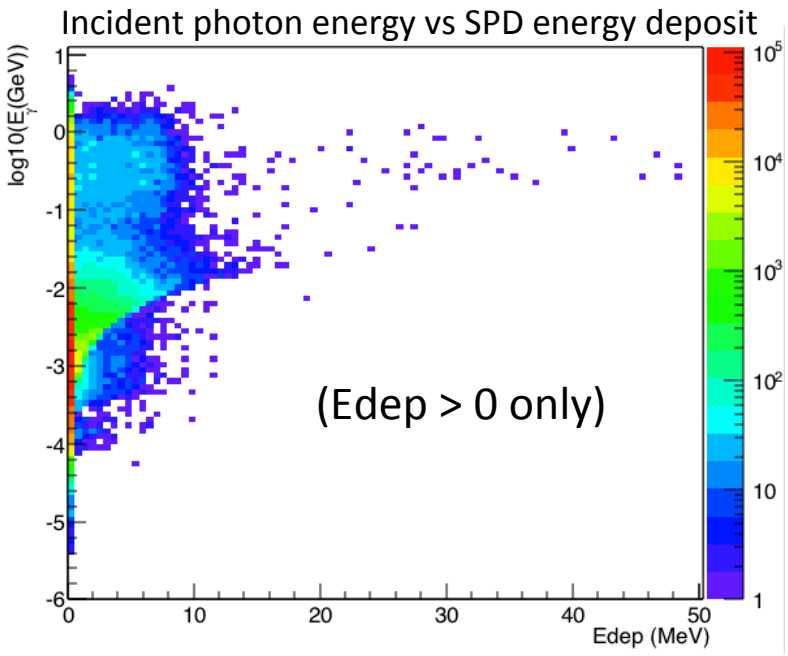
SPD update

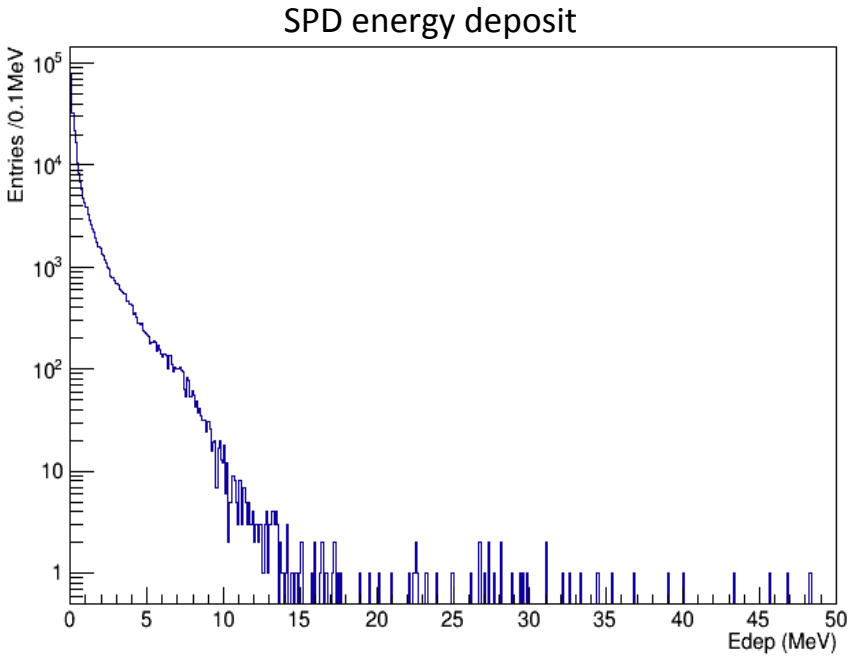
pi0 photon backward scattering

- Earlier studies suggested that backward scattering could be significant.
- Check pi0 decay photons and energy deposit. How much contribution comes from the backward scattering?
- Simple single photon simulation to study how high energy photons behave while traveling through the SPD and EC preshower.

LASPD

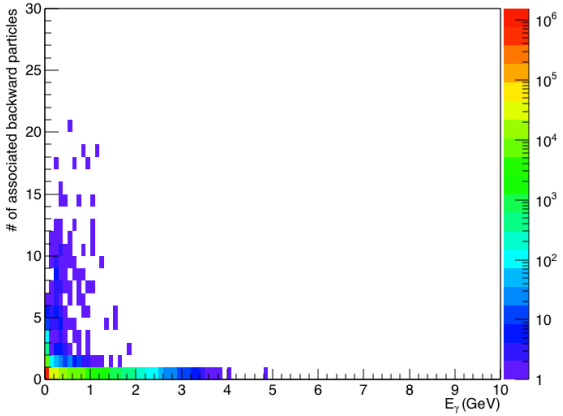
- LASPD is located in front of the LAEC
- pi0 simulation using the hallD generator (1M generated pi0)
- Identify all incident (forward) photons
- Energy deposit from the photons and secondary particles (96% of secondary are electrons).

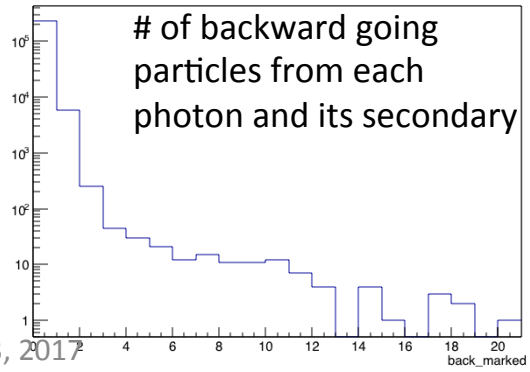


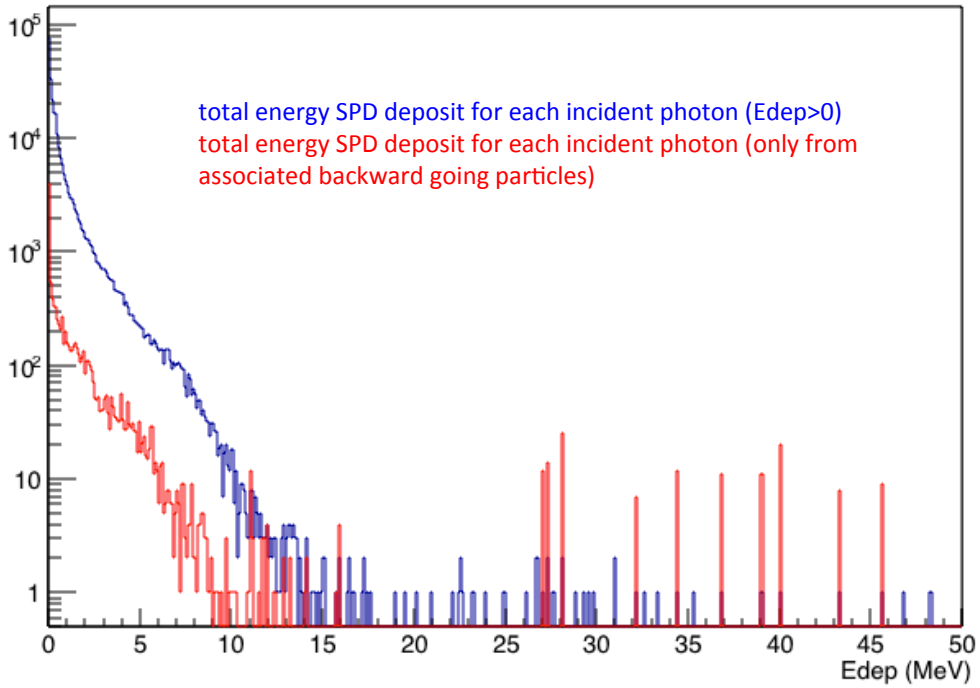


LASPD

- How much energy associated backward scattering particles deposit to the SPD for each photons?
- only few percent of associated particles are backward going particles
- Among the total backward going particles from the 1M events pi0 simulation, ~34% of backward going particles are e-, ~50% are photons.

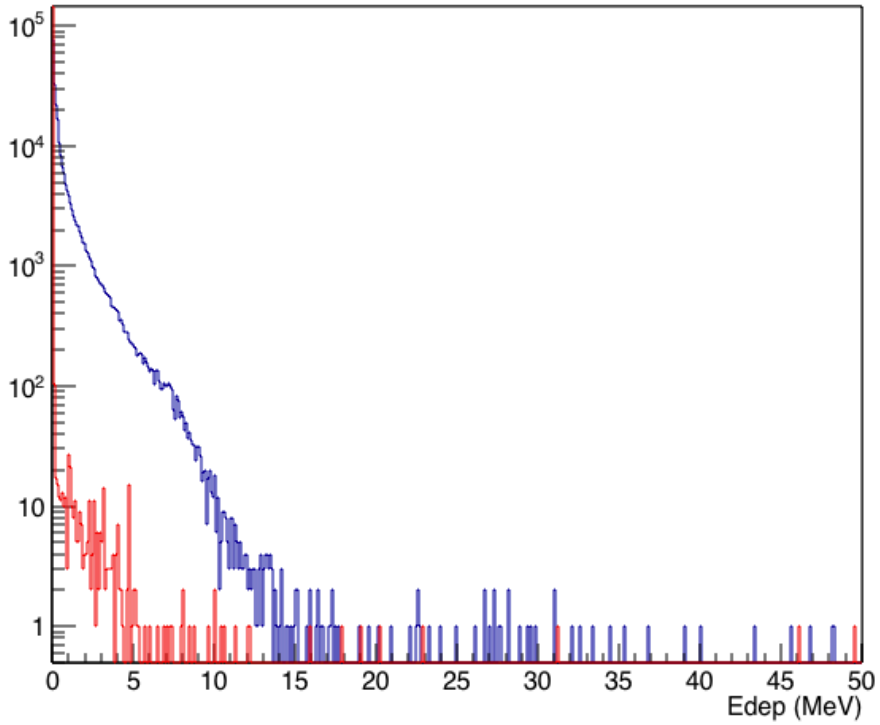


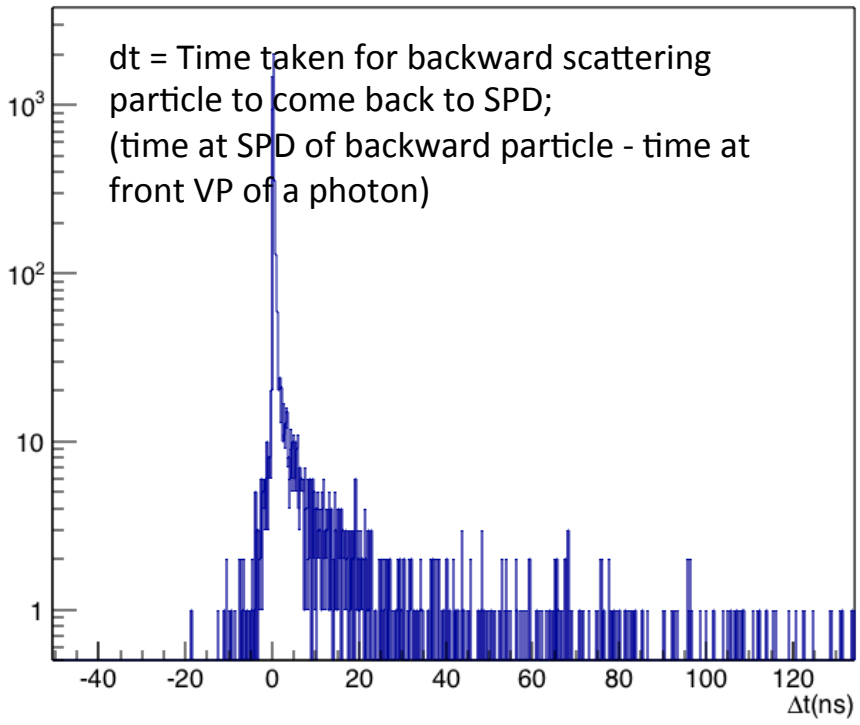




Unassociated backward scattering

- Backward scattering unassociated with a given incident photon
- dt = Time taken for backward scattering particle to come back to SPD. ~80% of them took <1ns



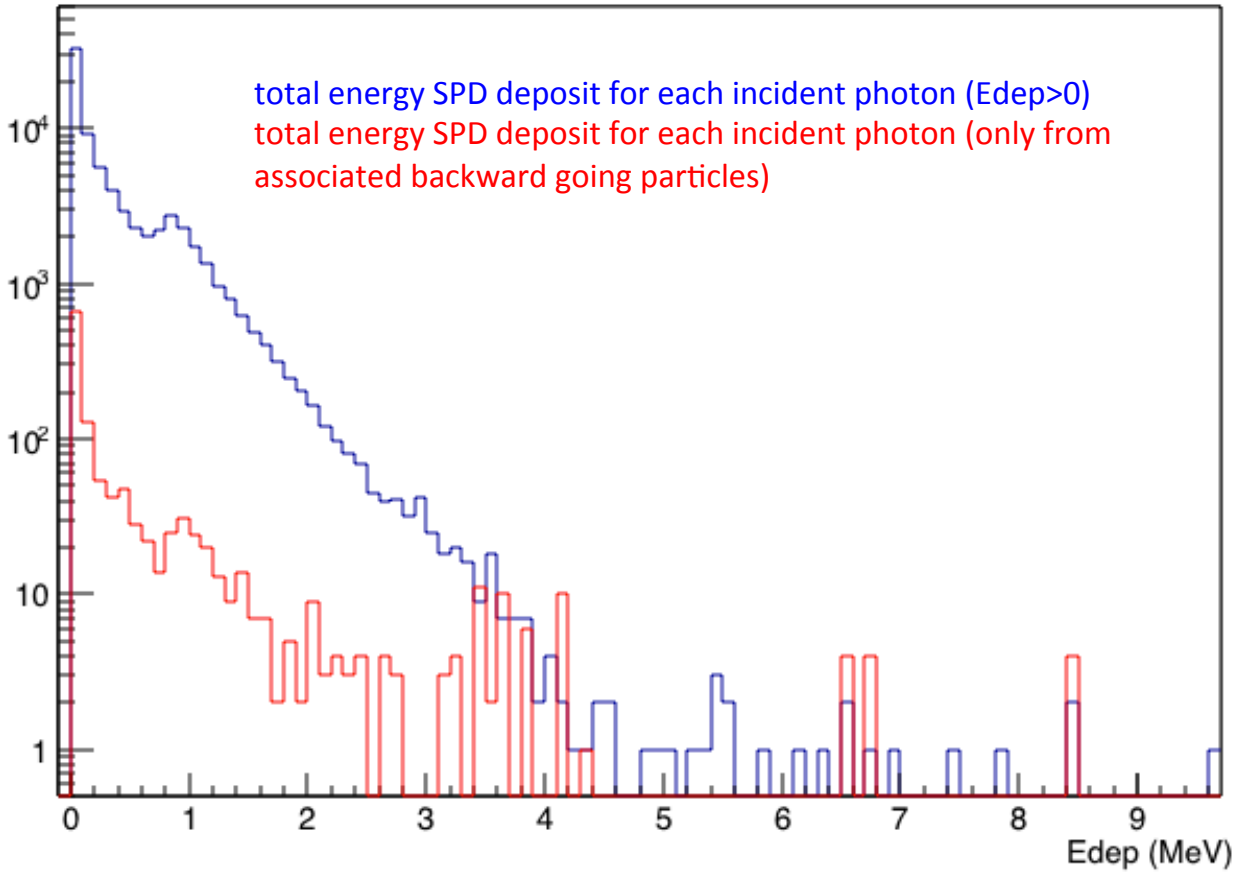


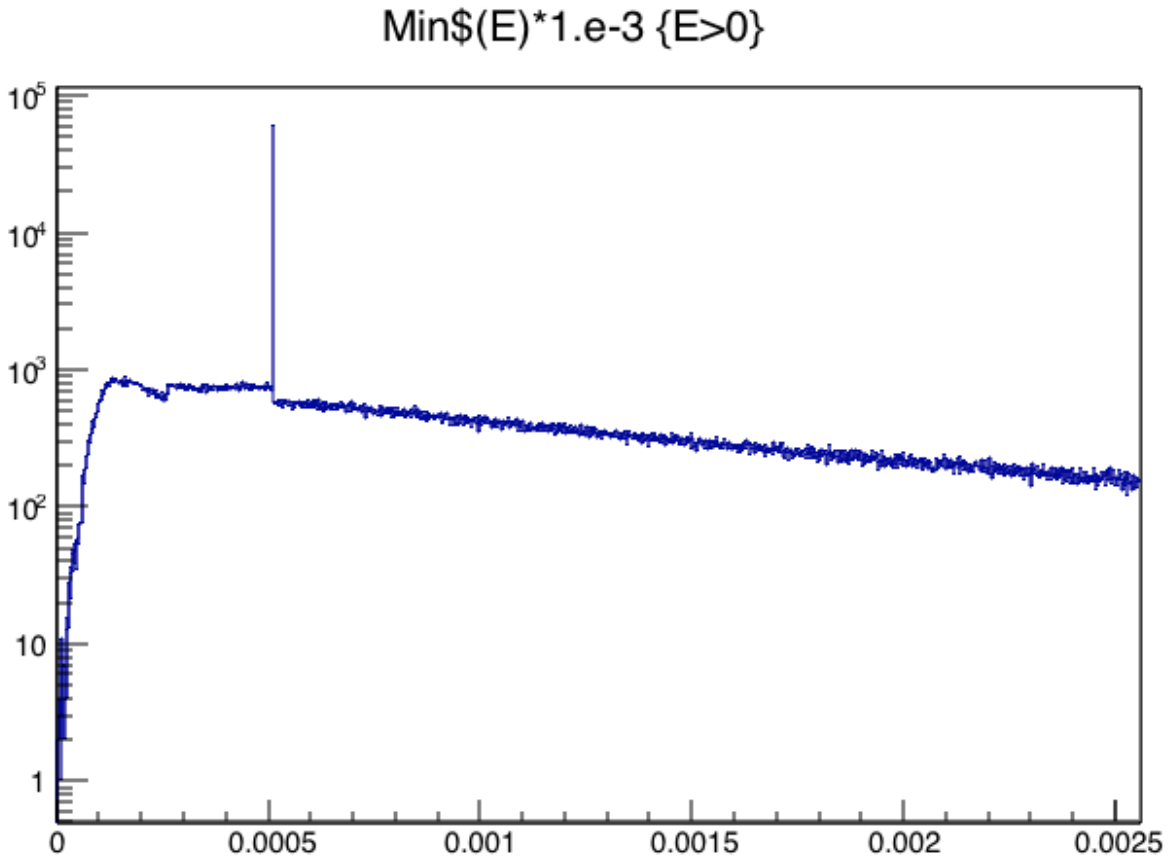
Summary and more

- Associated and unassociated backward scattering contribution to the SPD checked.
- More concise track matching with EC shower? - in progress
- Any suggestions?
- New strategy for the SPD photon rejection study? (radial dependence). Thoughts..
  - a single module edep profile: Edep for a single module (or radially segmented)
  - Use radial dependent background rates for a timing window.

Backup

FASPD


total energy SPD deposit for each incident photon (Edep>0)
total energy SPD deposit for each incident photon (only from associated backward going particles)
10^4
10^3
10^2
10
1
0
1
2
3
4
5
6
7
8
9
Edep (MeV)


Min$(E)*1.e-3 {E>0}
10^5
10^4
10^3
10^2
10
1
0
0.0005
0.001
0.0015
0.002
0.0025