

# Michel Electron: Truth Study

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# Samples

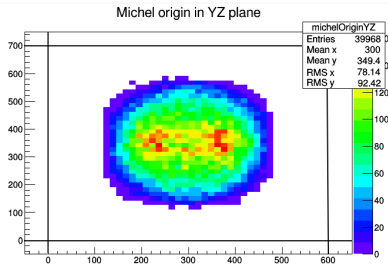
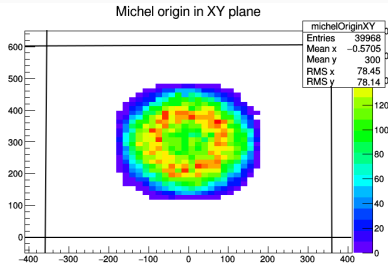
Dorota generated two samples with EM shower daughters retained

## Stopping Muons

- 40k 400MeV PG  $\mu^+$
- From above the TPC with angular spread

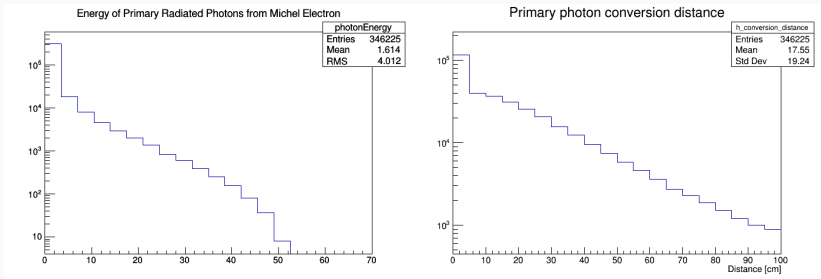
## Cosmics

- Produced but not analysed
- Significantly larger files
- Efficiency improvement required

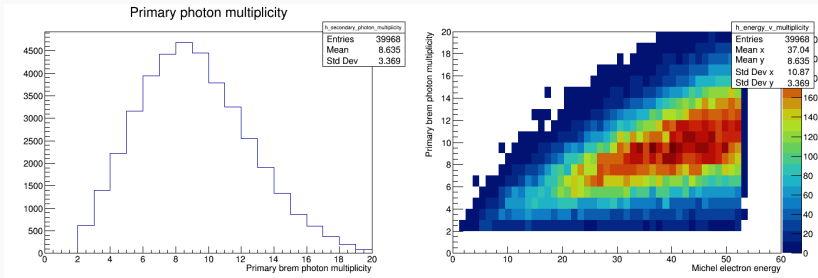


# Radiated Photons

- Radiated energy important for reconstructing Michel energy
- We need to associate radiated energy deposits back to Michel electron track
- Looked at energy and conversion distance for photons with Michel electron as their Parent



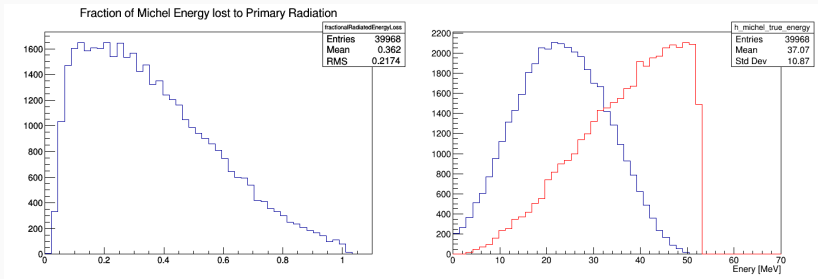
# Radiated Multiplicity



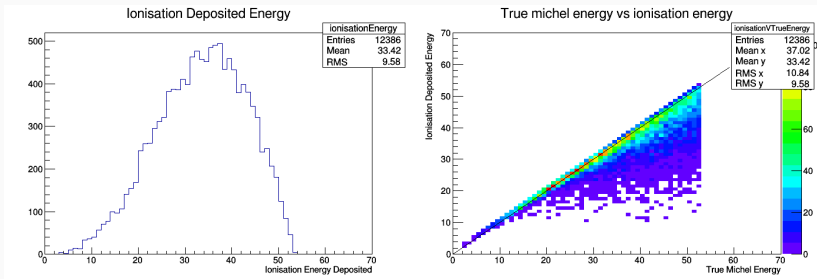
- Looked at the multiplicity of primary photons from Michel electrons and compared it to the energy
- Need to recover an average of 8-9 ionisation deposits from radiated photons
- Higher energy Michels have a higher radiated photon multiplicity
- The relationship is slightly none linear

# Radiated Energy Spectrum

- Fractional energy loss to primary photons, peaks at 0.2 but has a tail up to 1
- Energy spectrum is broadened and lowered if we are unable to retrieve any of the radiated energy
- We should hope to be able to achieve somewhere in between the two histograms in terms of total energy recovered



# Ionisation Energy Deposition



- Represents the maximum amount of energy we can expect to collect via ionisation
- Requires collecting all ionisation deposits from radiated photons
- Currently reading out the ionisation energy deposited from `sim::IDE`'s for all planes and dividing by 3, I will also look at the 'best plane'