

PVDIS Backgrounds Study Updates

11/07/2017

Beam on Target File for PVDIS

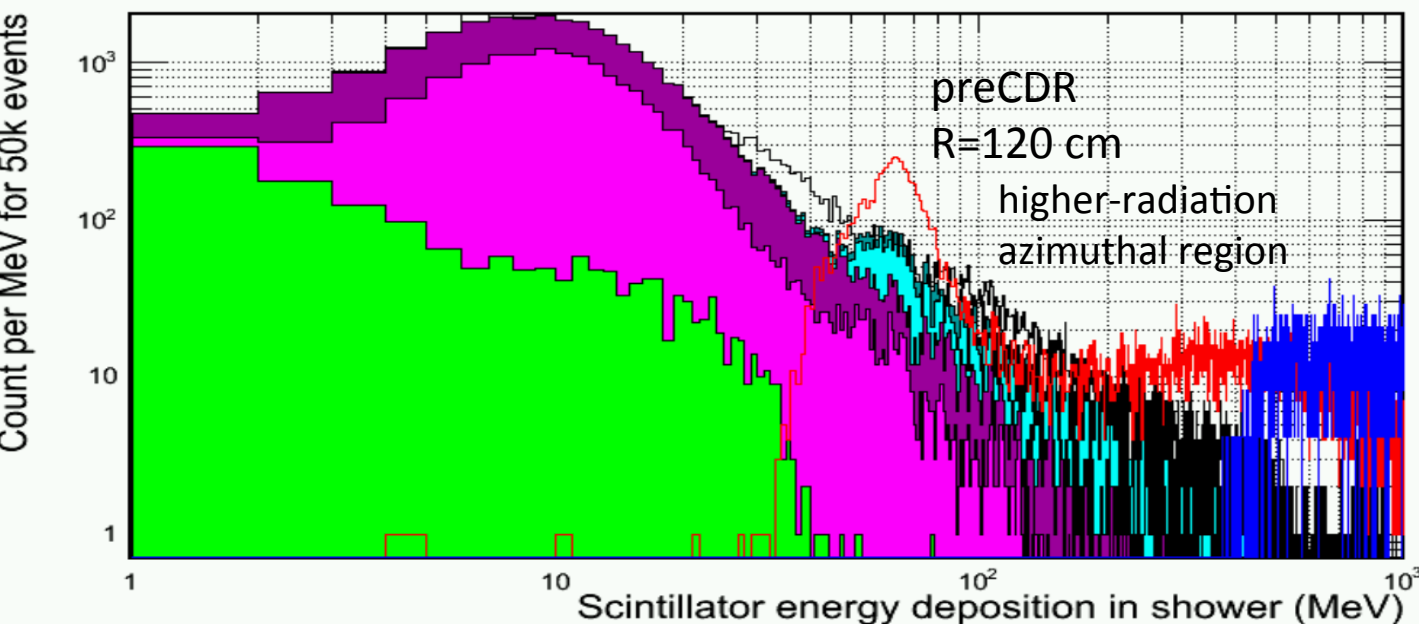
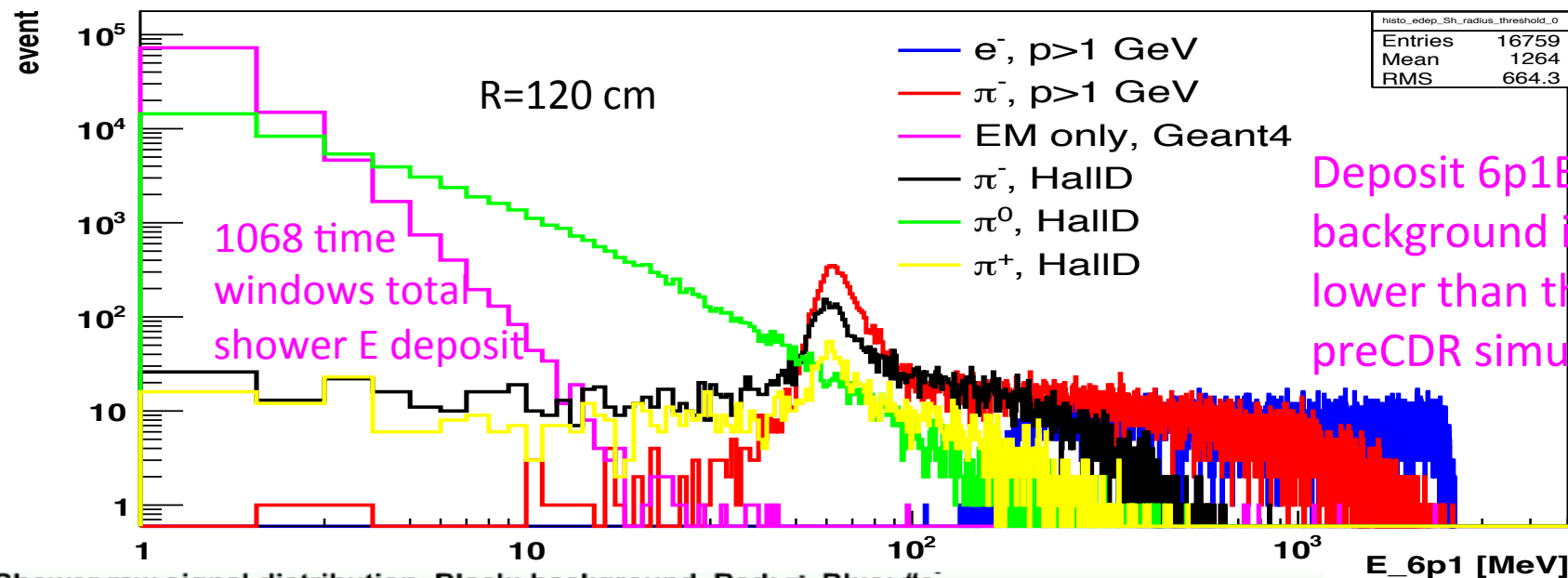
- 11 GeV e^- hit on deuterium target
- Geant4 physics: hadron, EM, and optical physics process.
- Mark event time window information (30 ns window) based on the Rates:

$$\text{Vertex Rate} = (\text{factor} * \text{event number}_{\text{vertex}}) \text{ Hz} = 1.629 \times 10^4 \text{ GHz}$$

total time windows: 1068

$$\text{Event weight factor} = (50e^{-6} / 1.6e^{-19} / \underline{\text{eventN}}) \text{ Hz}$$

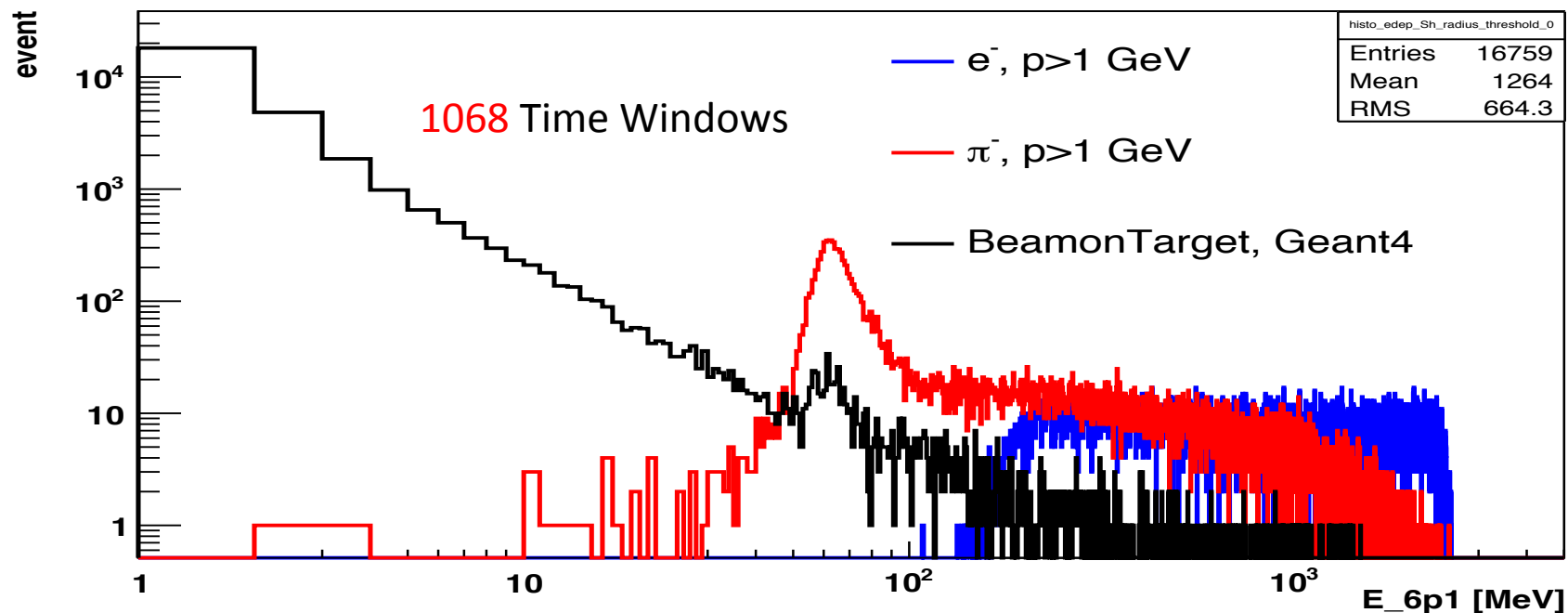
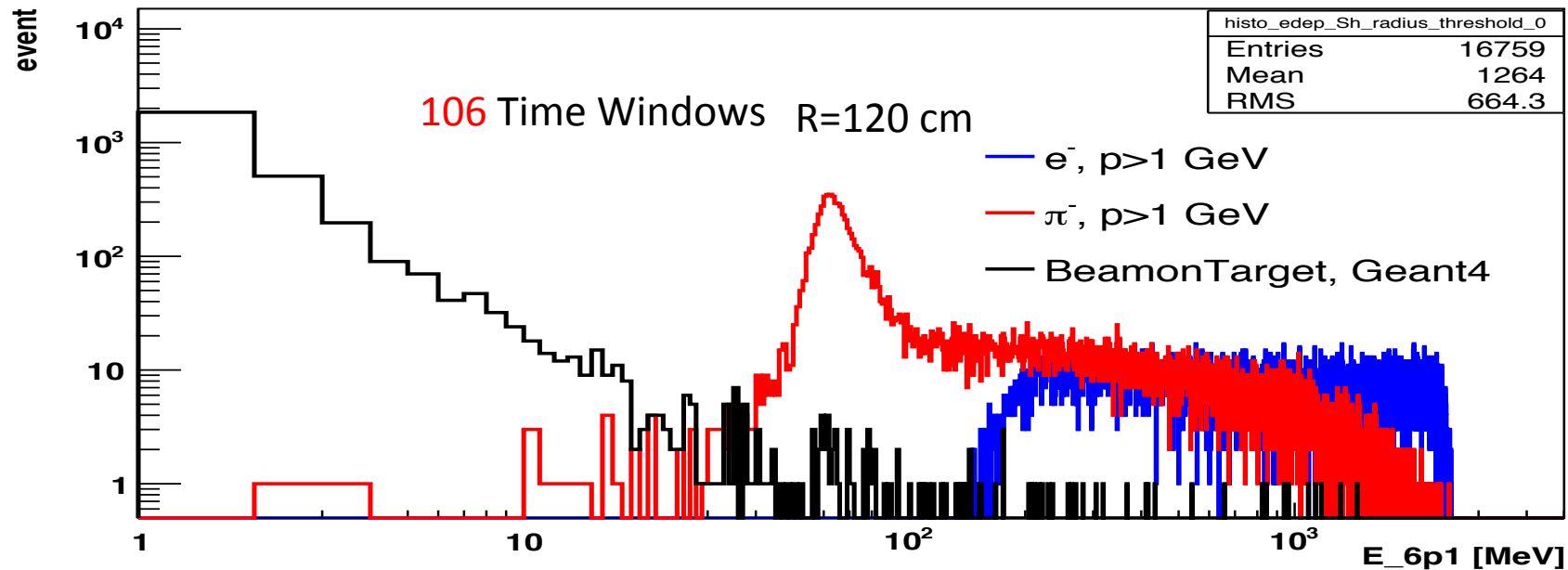
shower_6p1E_R0



π^- (light blue),
 π^+ (dark blue),
 protons (yellow),
 EM process-originated photons (magenta)
 π^0 -originated photons (dark magenta).
 high energy pion (red) and
 electrons (blue) are shown
 as non-filled curves.

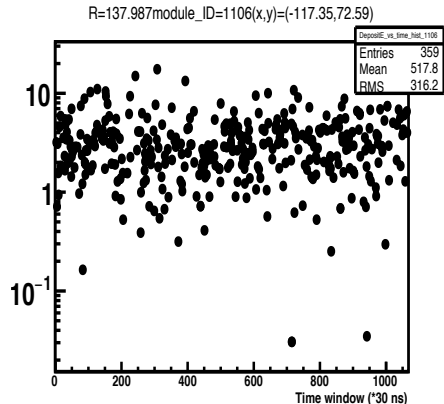
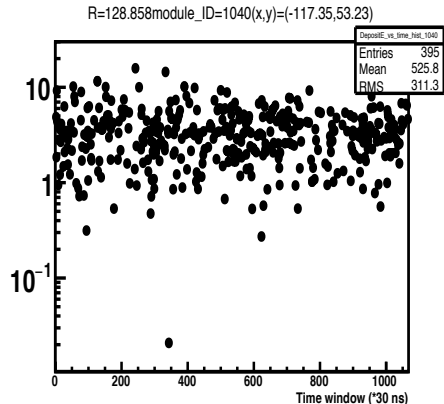
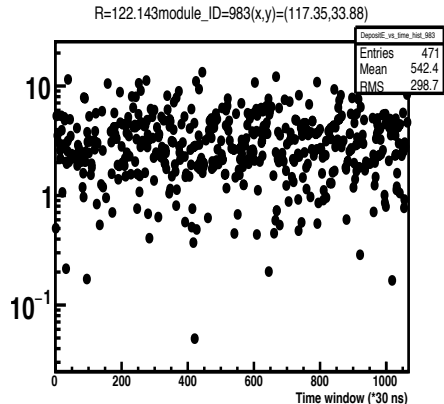
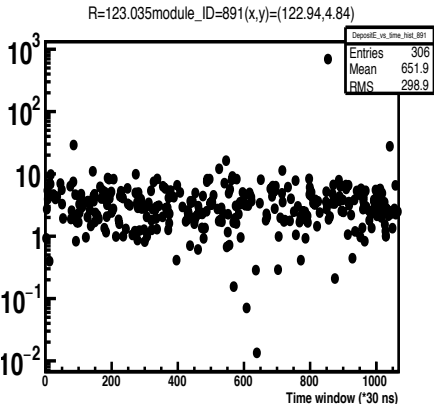
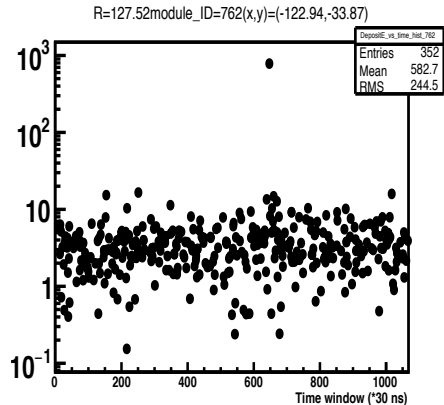
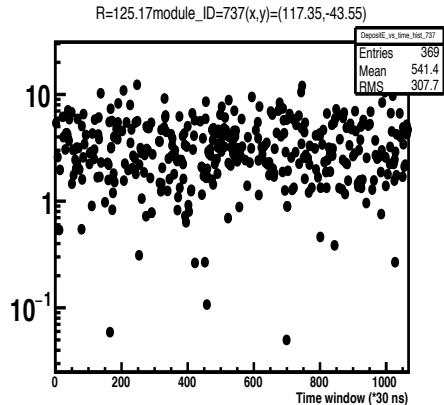
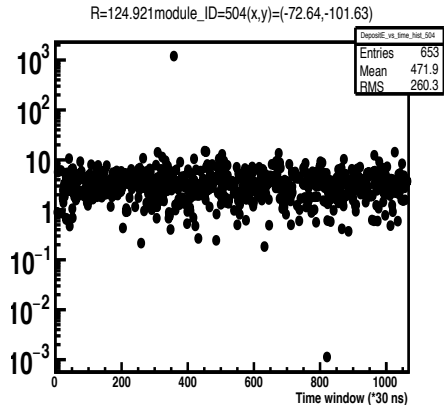
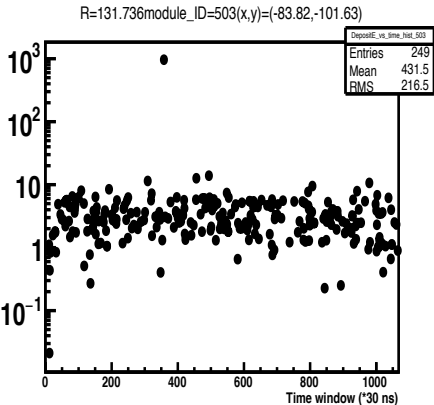
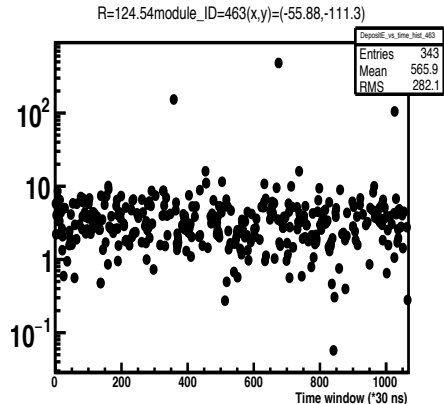
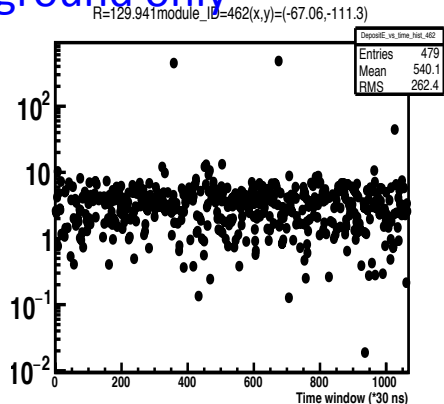
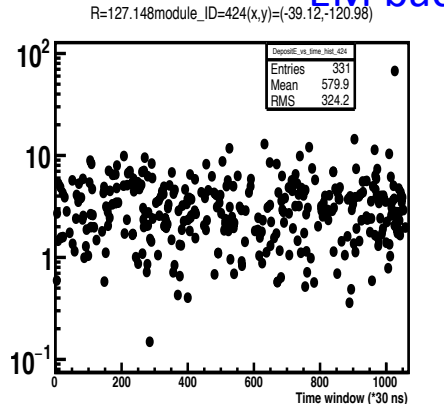
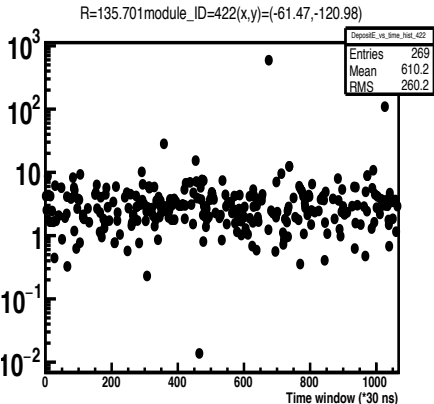
Stacked probability (count per 50k events) vs. Shower scintillator energy deposition for incoming background electrons (green)

Shower Scintillator Deposit 6p1 Energy



6p1 Deposit E vs Time Windows for Individual Module

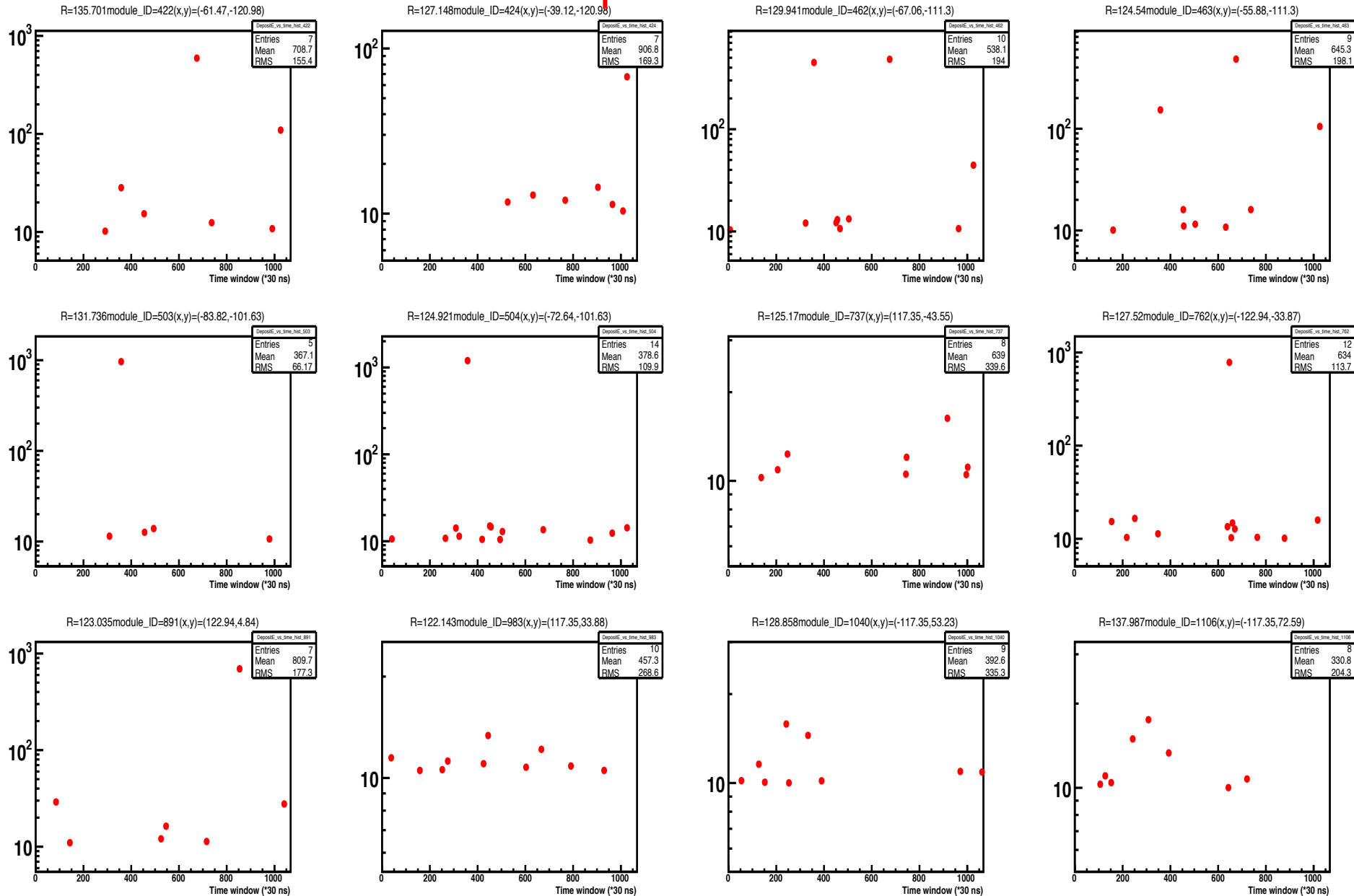
EM background only



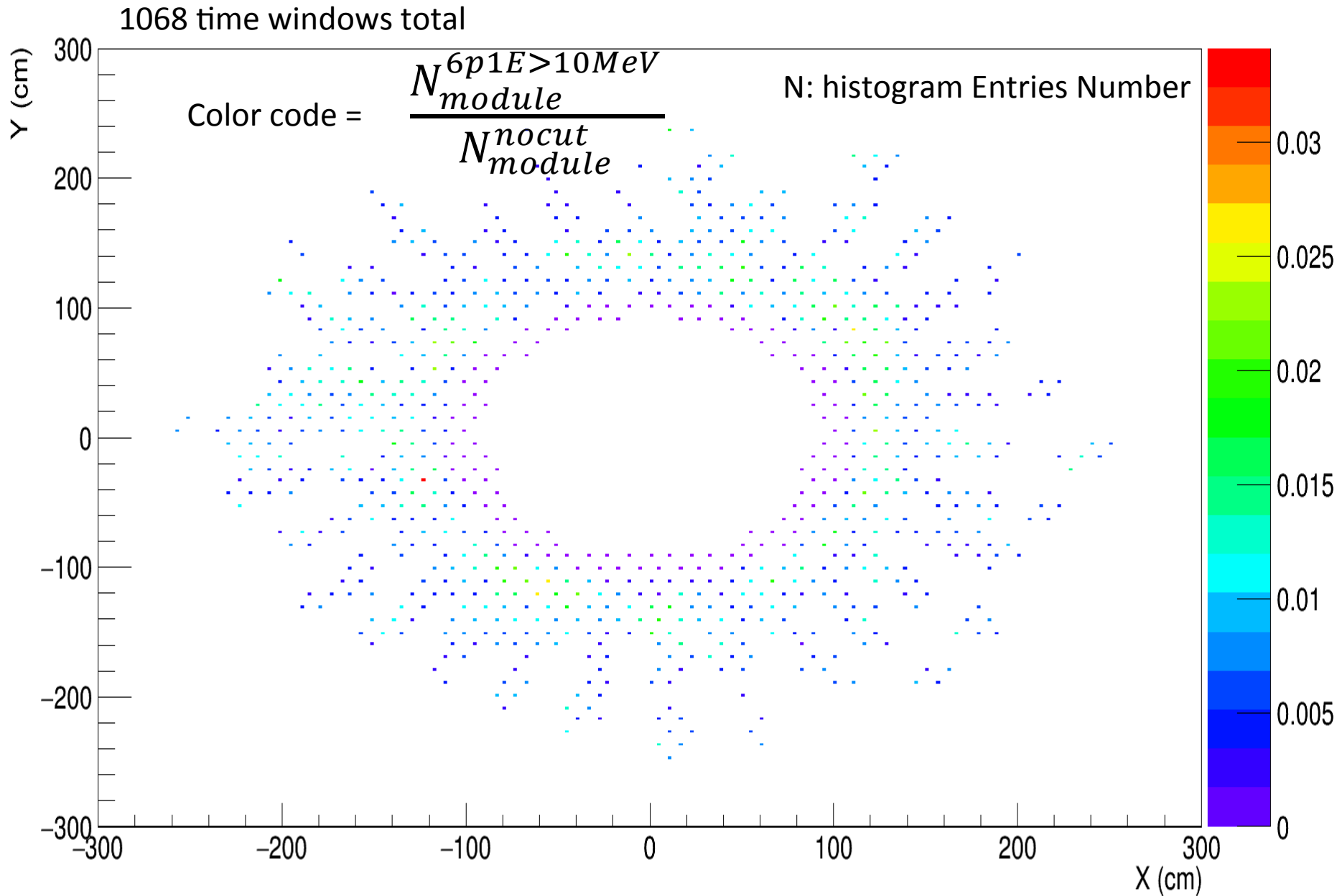
6p1 Deposit E vs Time Windows for Individual Module

EM background only

6p1 E > 10 MeV

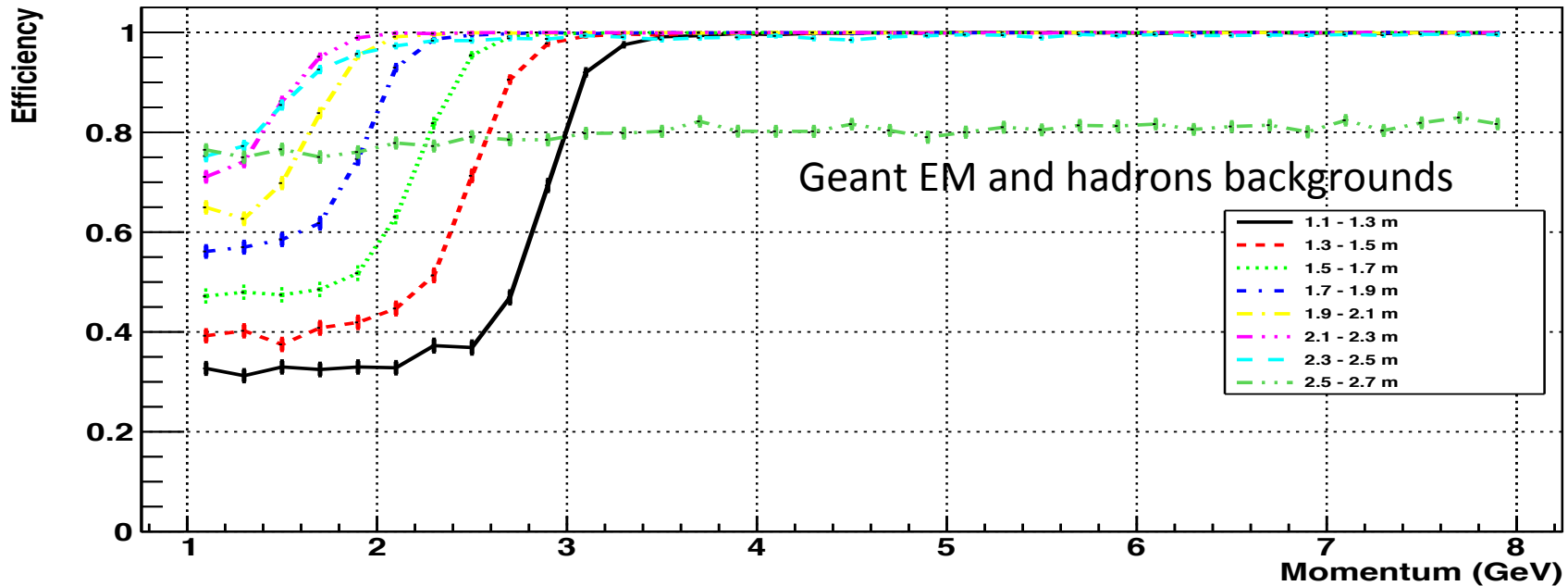
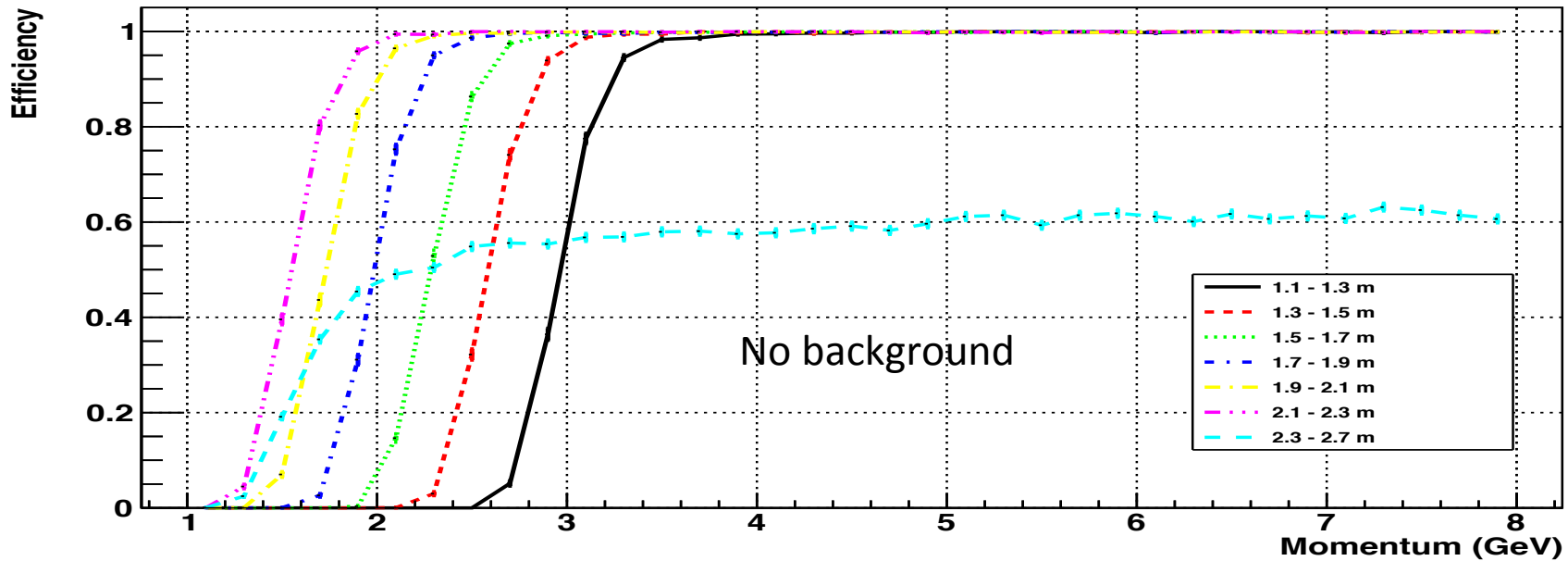


EM only Backgrounds



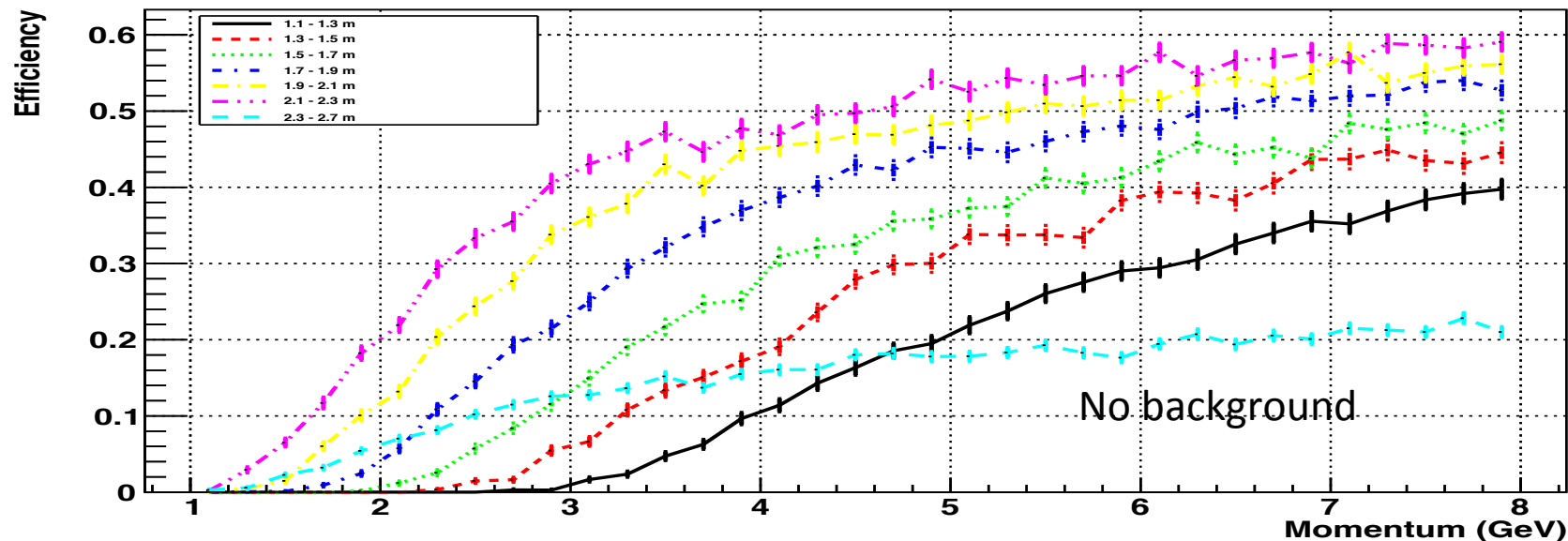
ECAL Trigger Response Curves for PVDIS configuration

Electron Efficiency

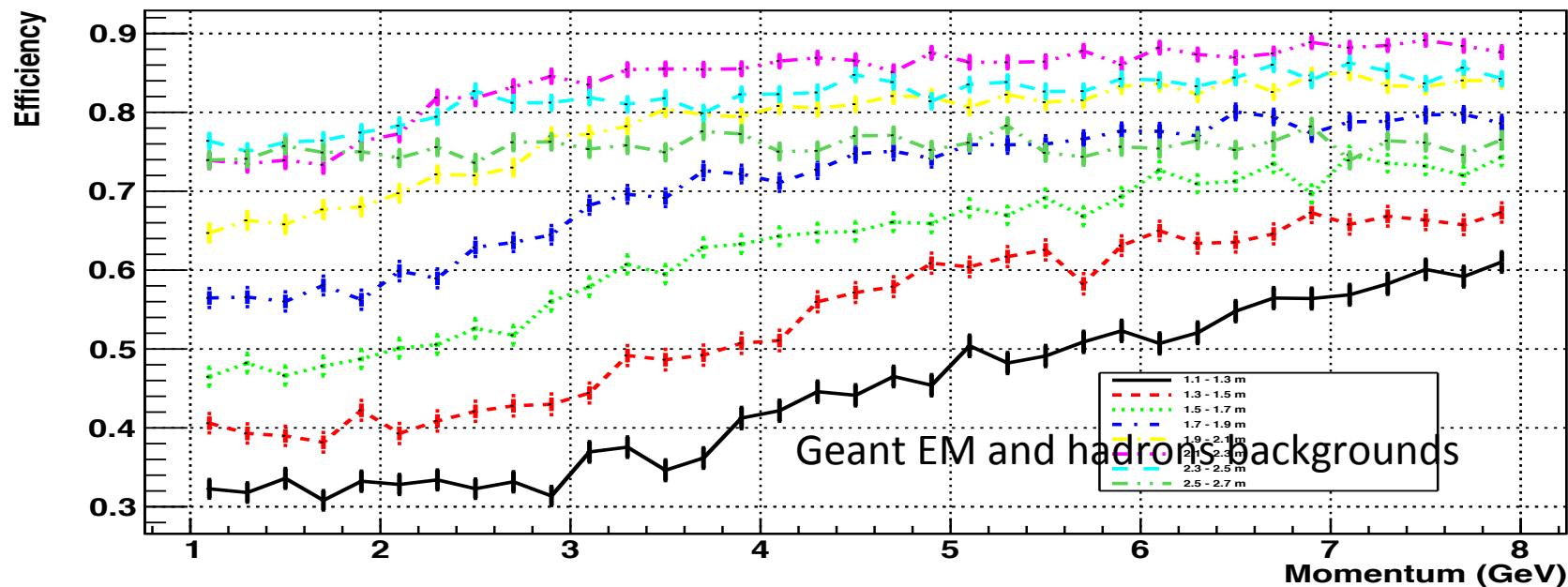


ECAL Trigger Response Curves for PVDIS configuration

Pion Efficiency



Pion Efficiency



Summary and Outlook

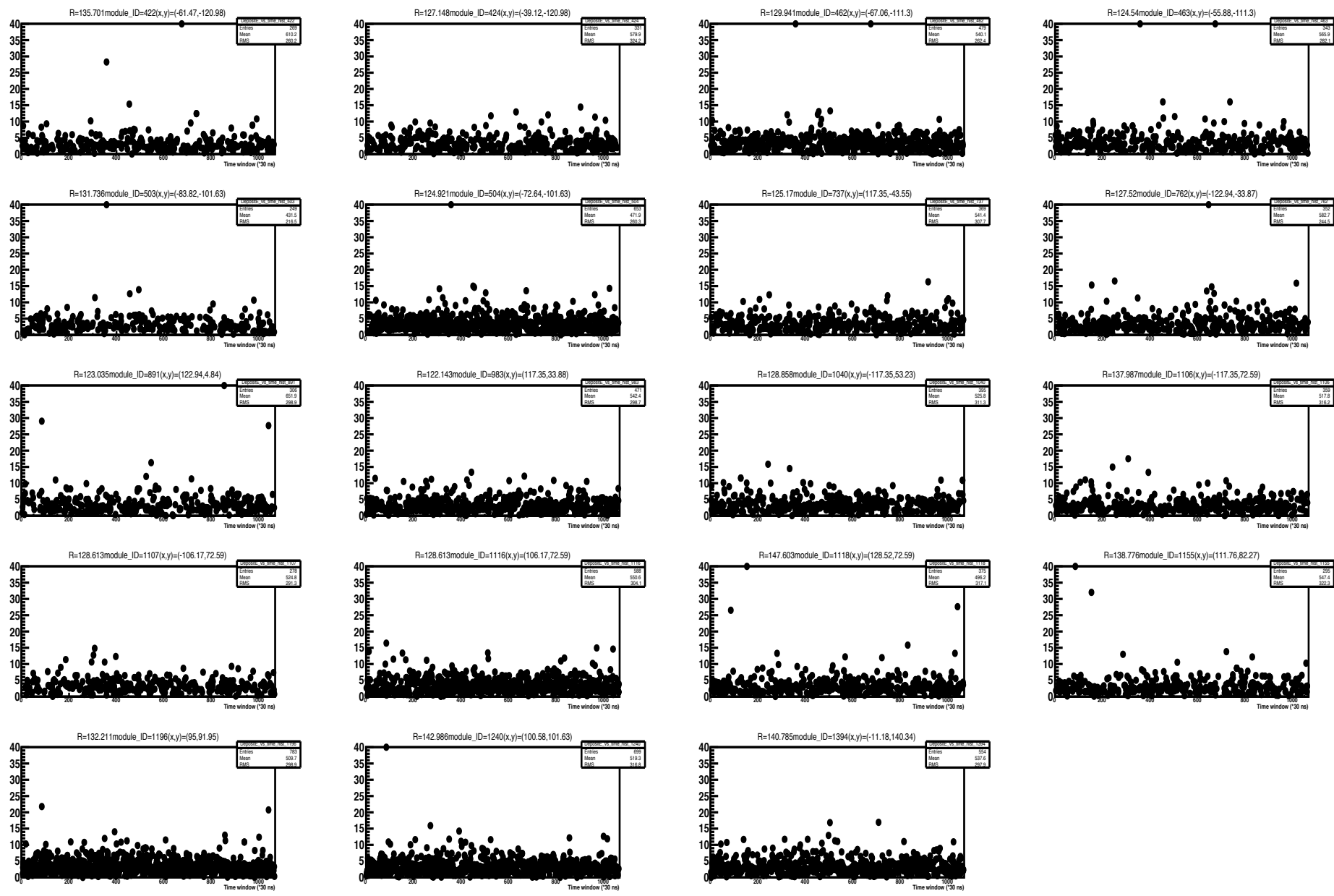
- Based on the current simulation setup, the EM background deposit energy from GEMC is negligible, which is much lower than the preCDR results. Need to understand the difference.
- For the beam on target backgrounds, the new simulated 1068 time windows data show that the contribution from hadron backgrounds is large. Are 1068 time windows enough for this study?
- Next step, study the angle dependence of deposit 6p1 E for individual ECAL module.

Any comments and suggestions ?

Back up

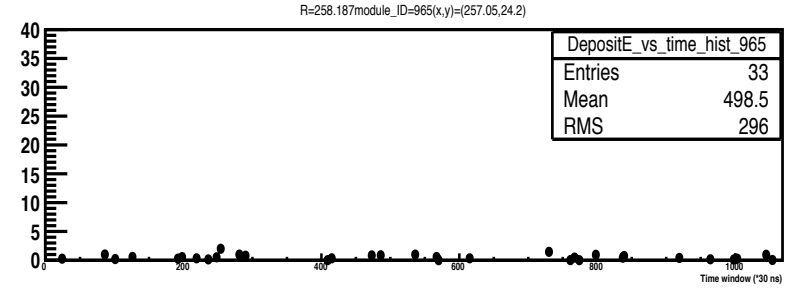
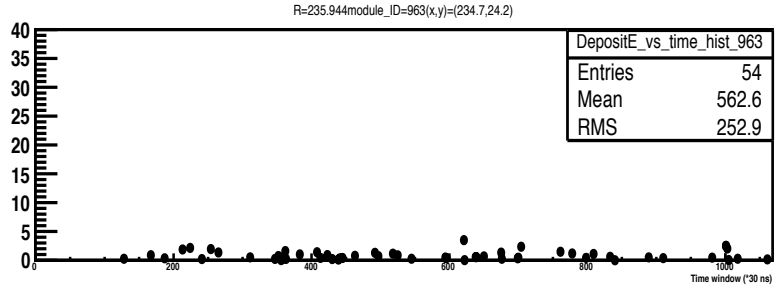
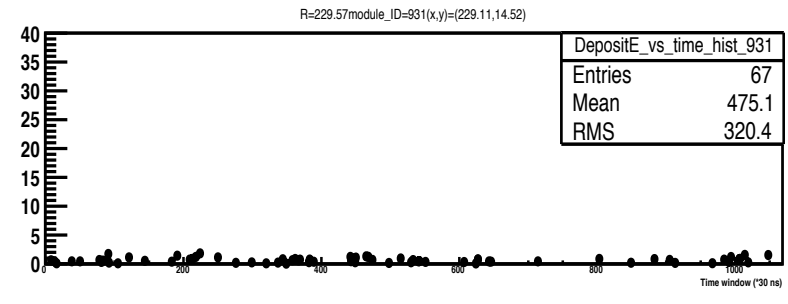
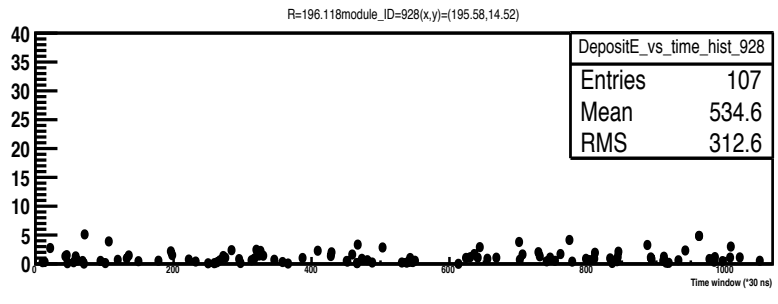
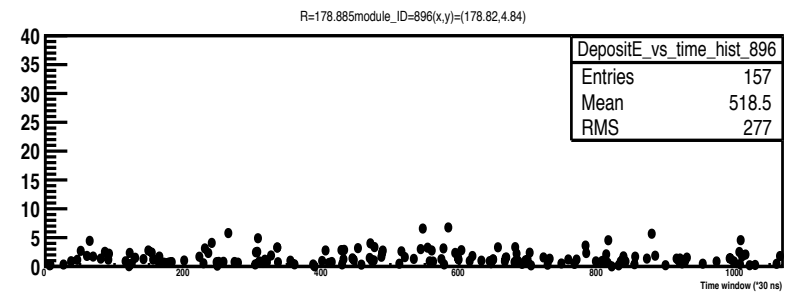
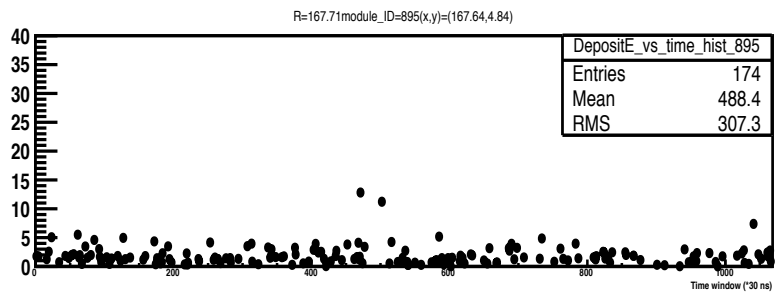
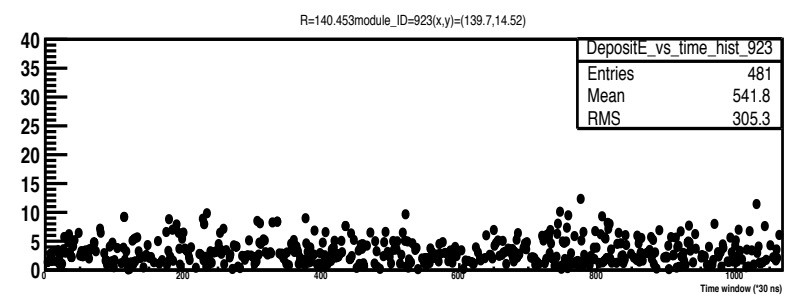
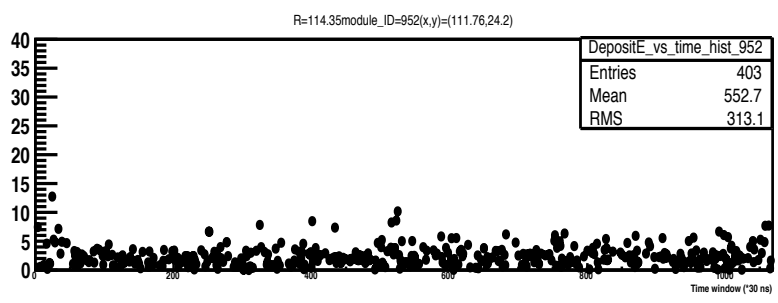
6p1 Deposit E vs Time Windows for Individual Module

EM background only for more noise modules

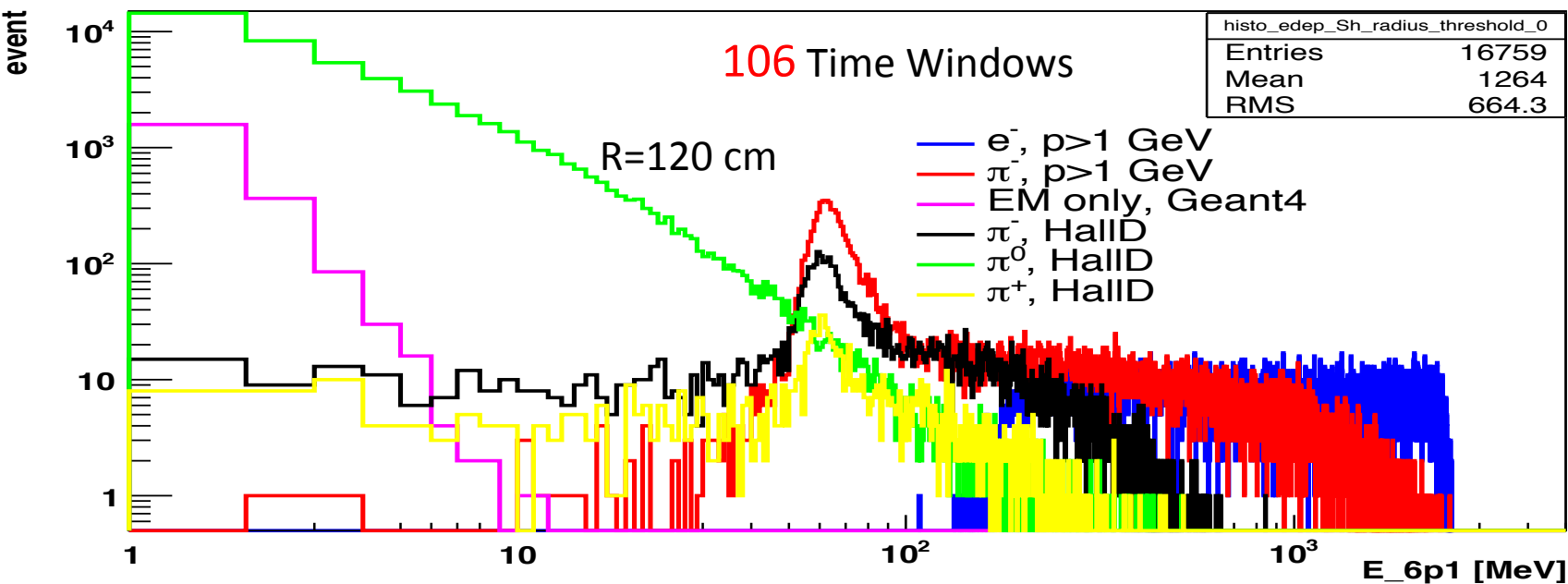


6p1 Deposit E vs Time Windows for Individual Module

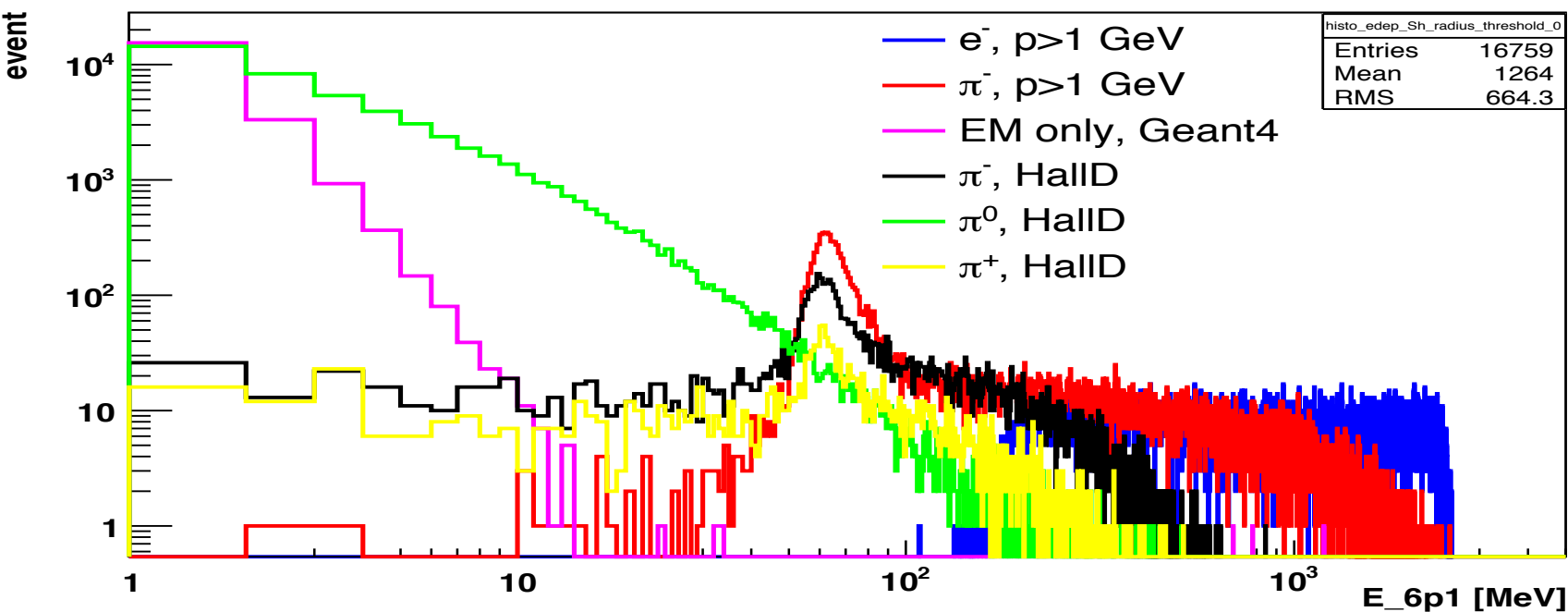
EM background only for more noise modules



shower_6p1E_R0



shower_6p1E_R0



Ecal module X vs Y for radius color code

