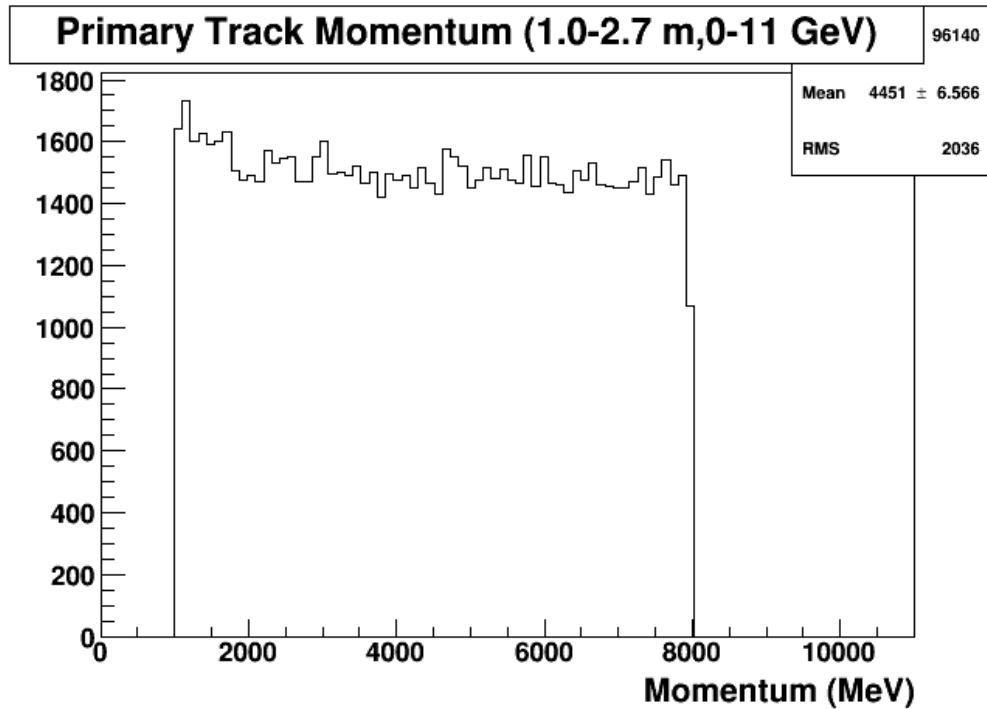


# ECAL Clustering Update - 2

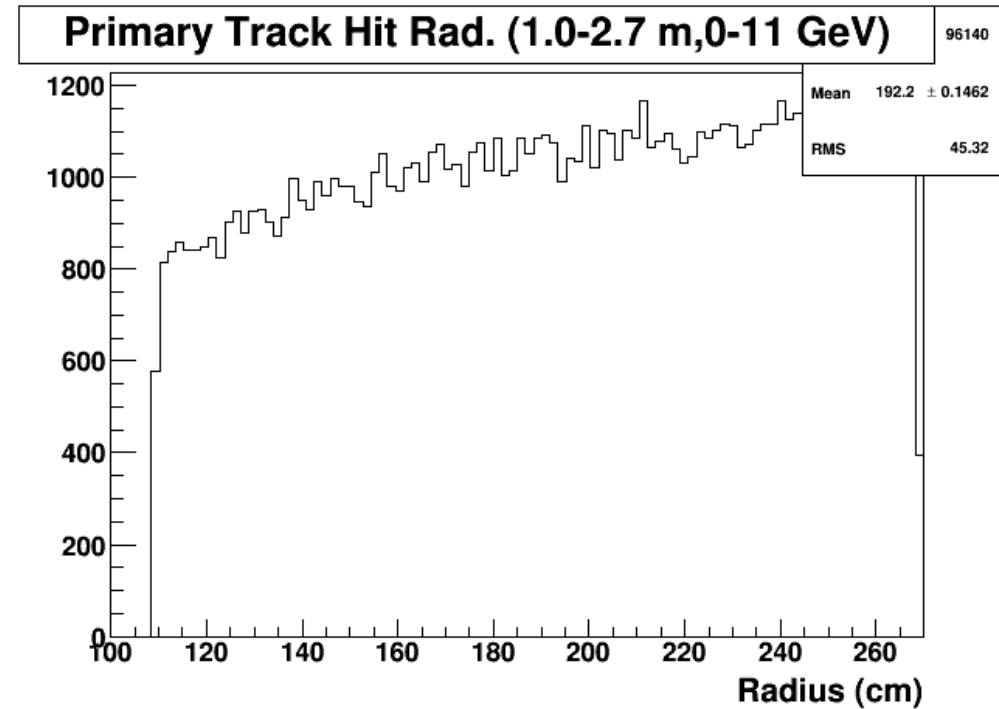
# ECAL Simulation Summary

- Input flat distribution : electrons
- No radiative effects in the target
- Setup only include ECAL and sensitive detector replacing last GEM in vacuum medium.
- Use ecal cluster energy and input momentum to get energy resolution for shower only and pre-shower + shower combination

# Input Flat Distribution



Input Momentum



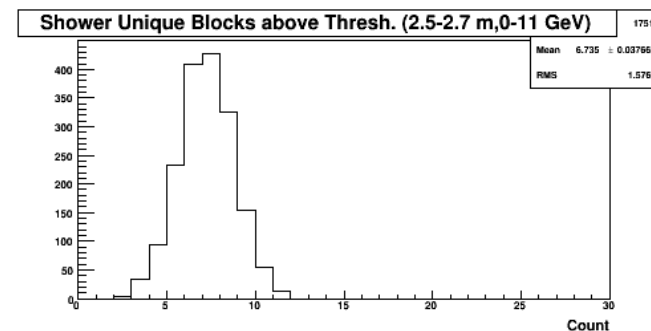
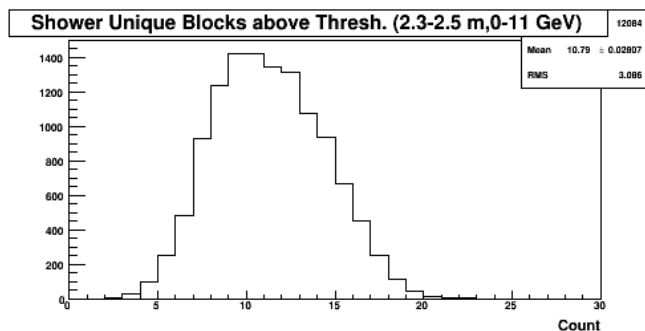
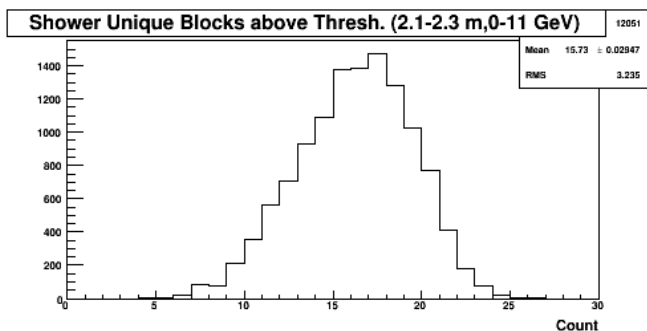
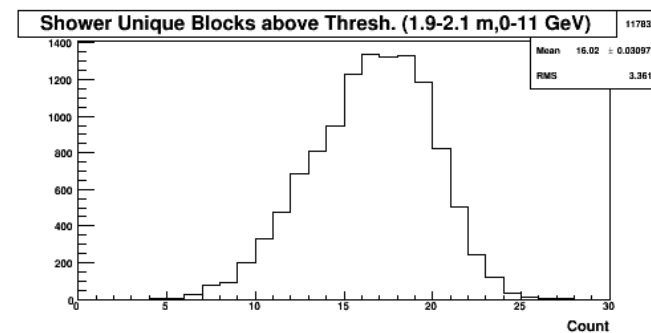
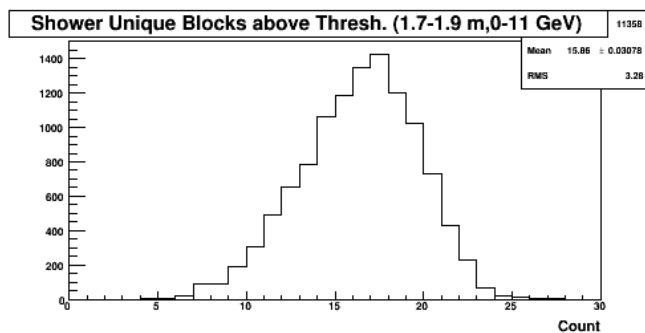
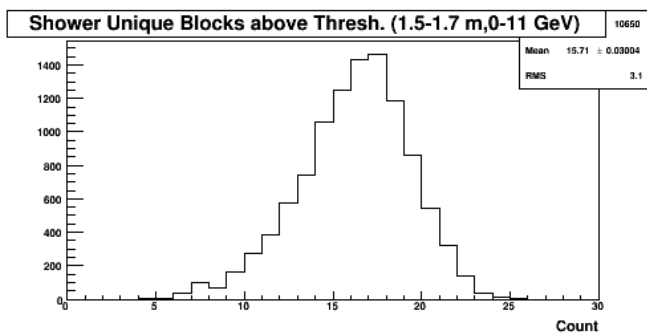
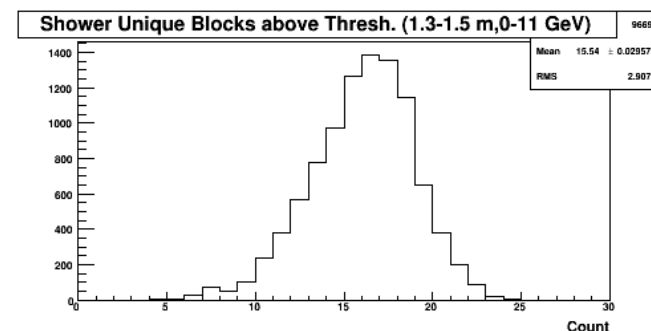
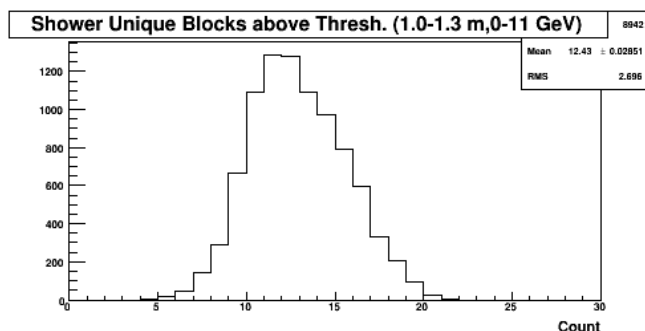
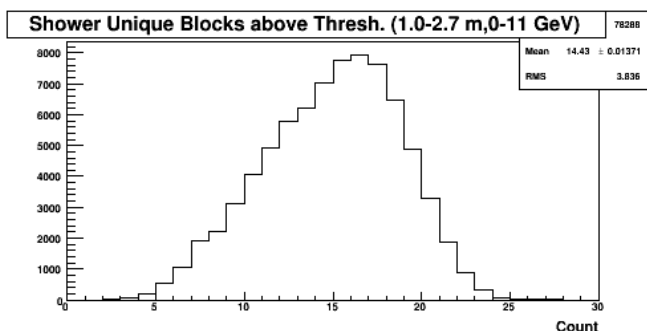
Input Radius

Input Angle range is 20 to 36 deg

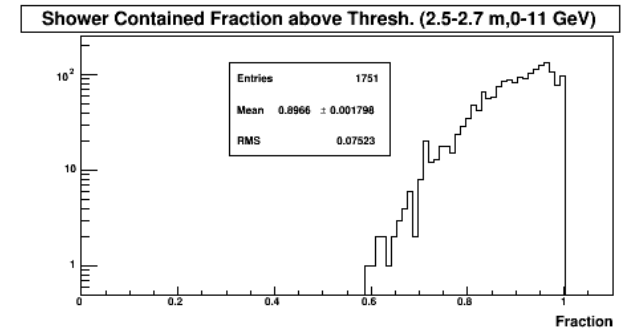
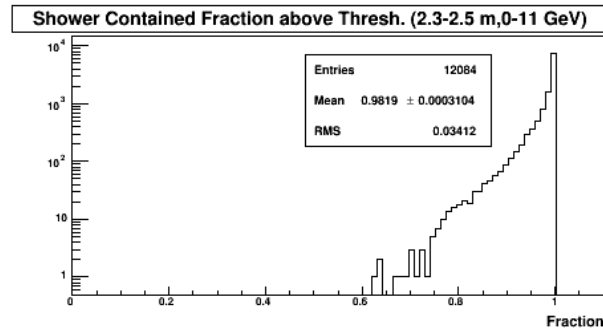
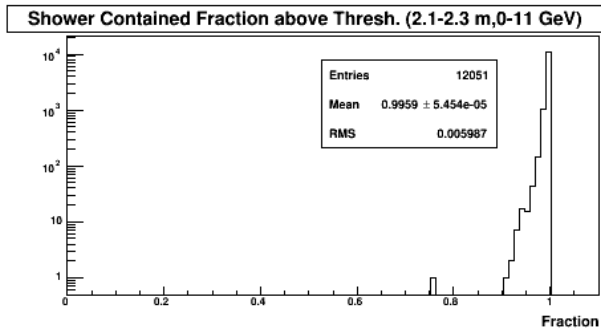
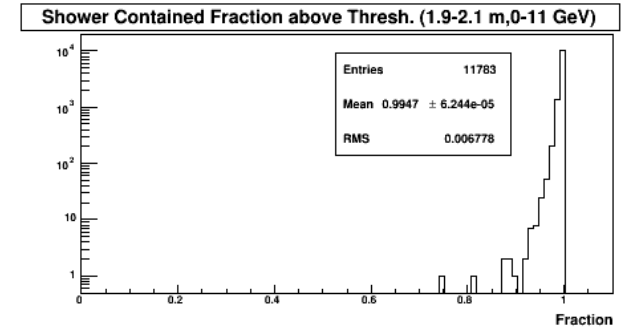
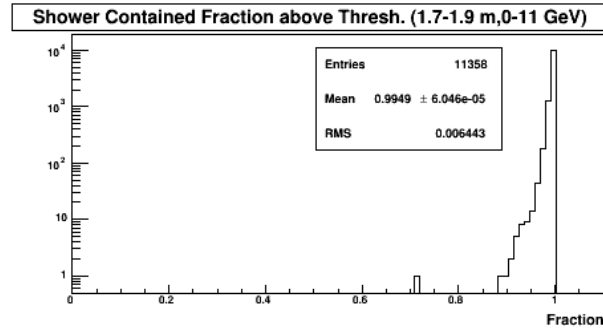
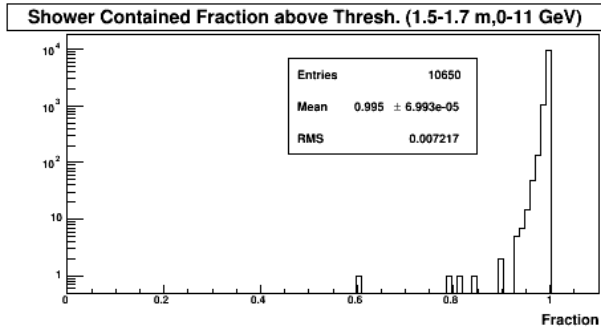
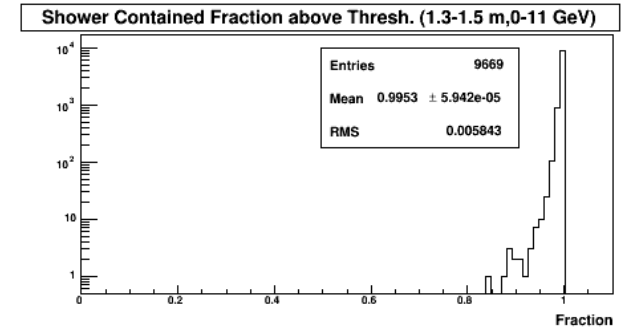
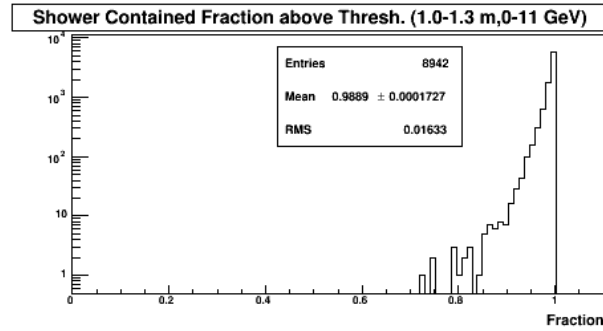
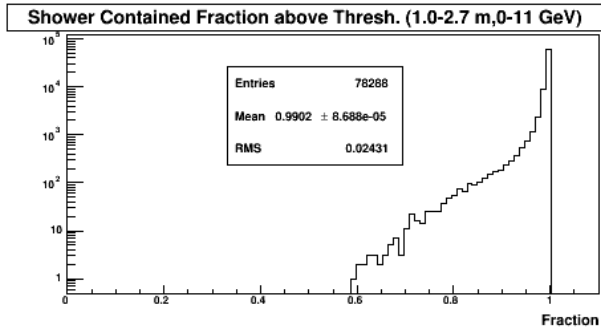
# Shower 6+1 Clustering for $e^-$

- Selecting all the 6+1 clusters above the threshold
- The threshold is based on DIS tracks energy deposit
  - R range (cm)
    - {110.0 ,130.0 ,150.0 ,170.0 ,190.0 ,210.0 ,230.0 ,250.0}
    - {130.0 ,150.0 ,170.0 ,190.0 ,210.0 ,230.0 ,250.0 ,270.0}
  - DIS Threshold cuts (edep in MeV)
    - {369.4 ,350.0 ,302.1 ,265.4 ,237.5 ,223.0 ,211.3 ,183.5}
- Count all the unique blocks in clusters above threshold cut
  - Select all the 6+1 clusters above DIS threshold
  - Count unique blocks in this subset

# Block Count for Shower 6+1 Clustering for $e^-$



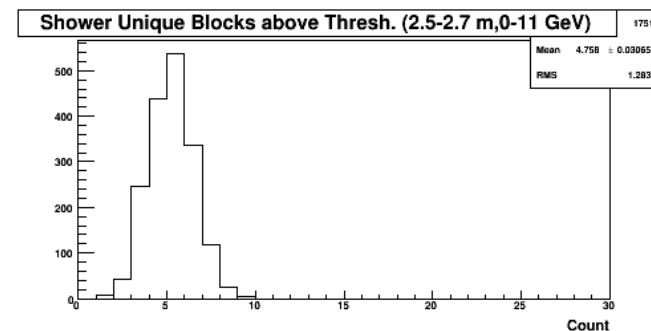
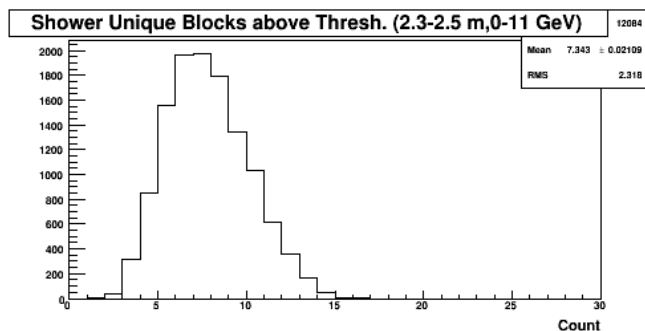
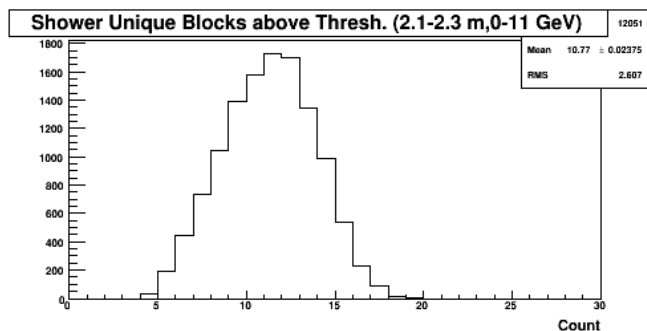
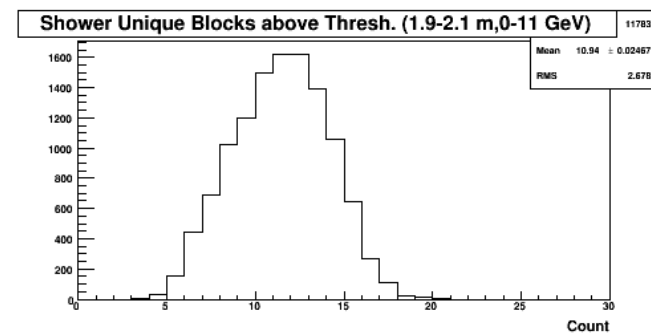
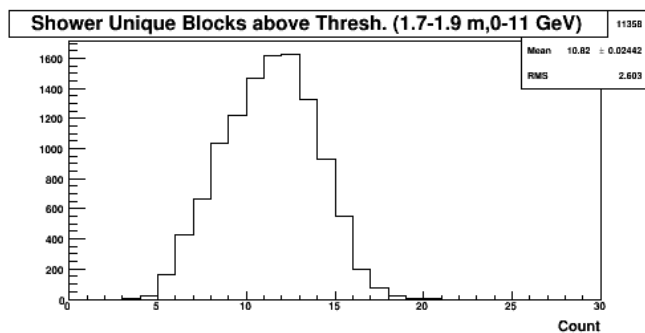
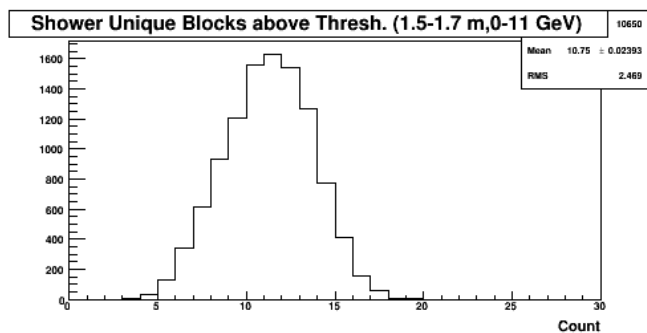
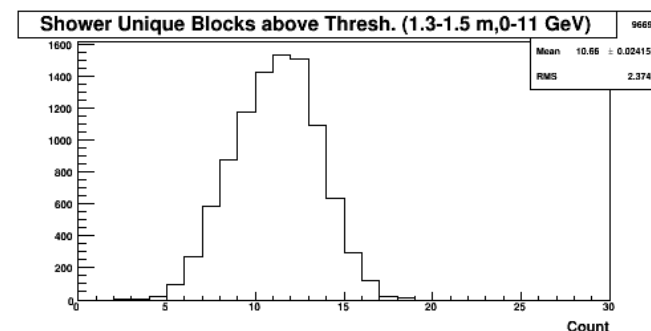
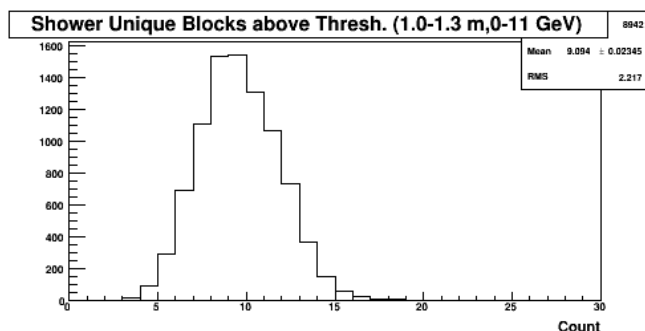
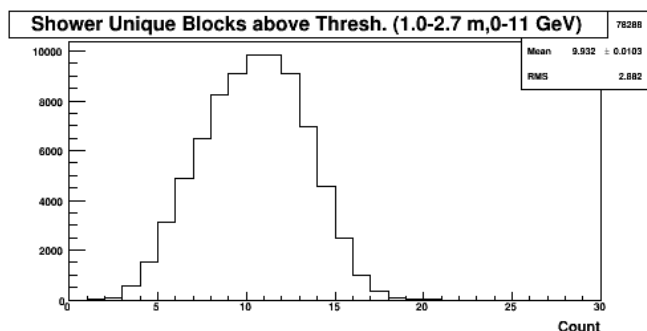
# Energy Fraction Contained in blocks above Threshold



# Apply Min. Energy Threshold to Blocks

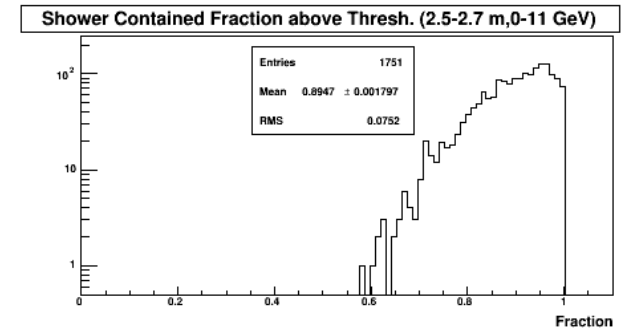
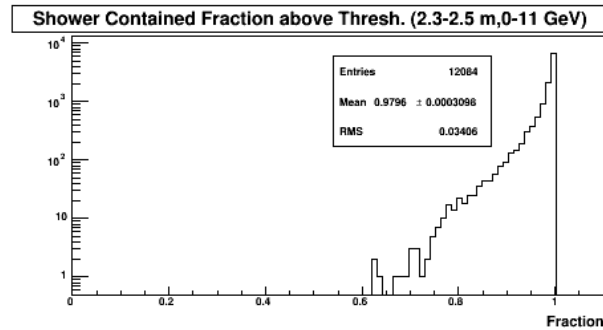
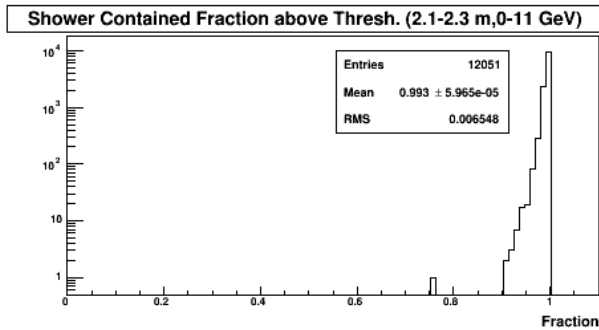
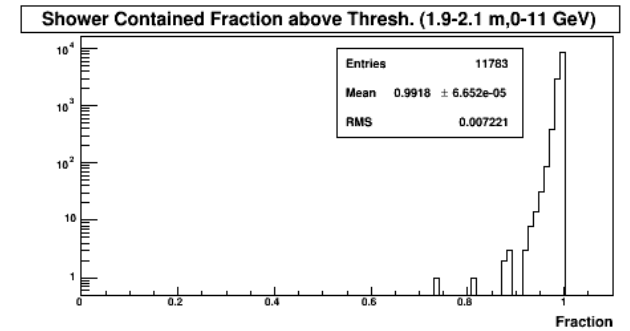
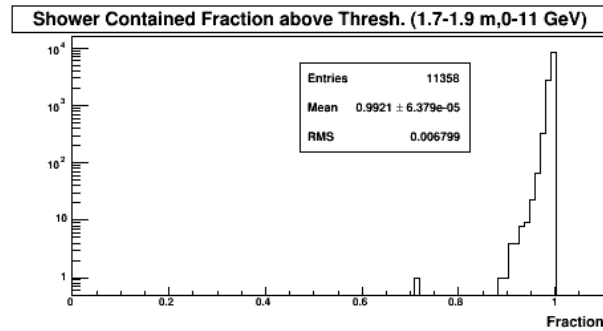
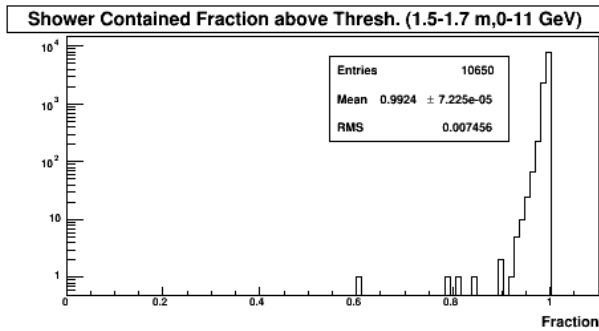
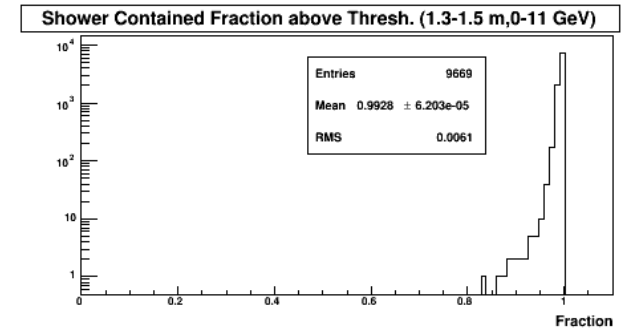
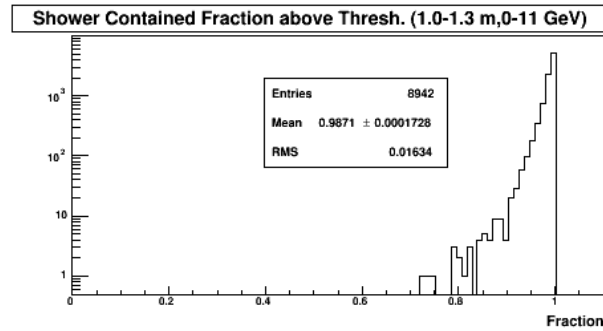
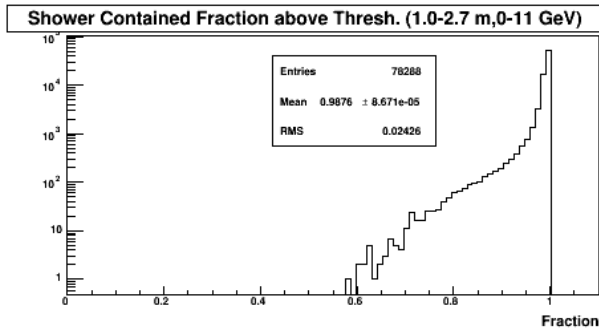
- The unique block count includes blocks with minuscule energy deposits
- Applied a 1 MeV cut to get unique block count
  - Select all the 6+1 clusters above DIS threshold
  - Select unique blocks in this subset
  - Count only blocks with  $\text{edep} > 1 \text{ MeV}$

# Block Count for Shower 6+1 Clustering for $e^-$ with 1 MeV Cut

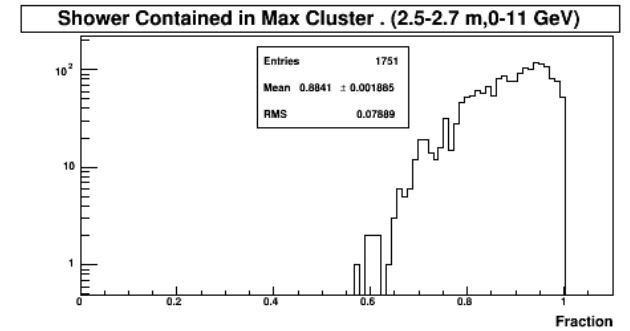
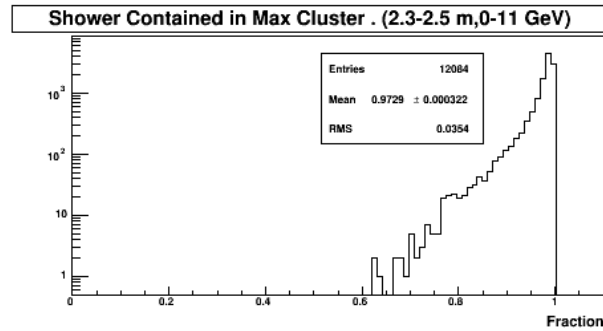
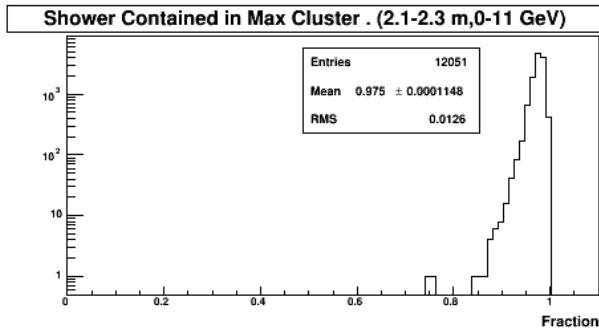
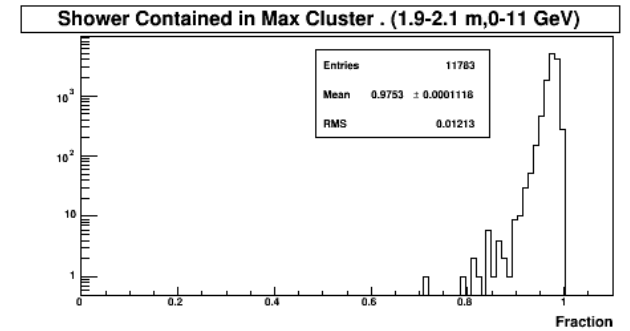
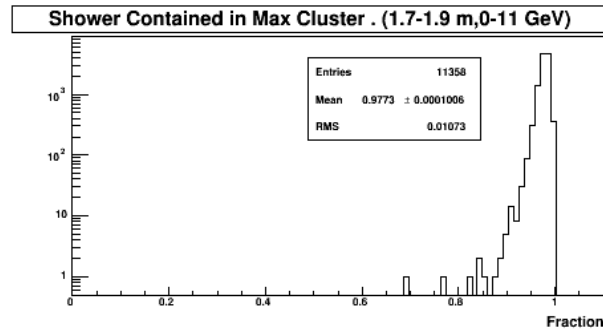
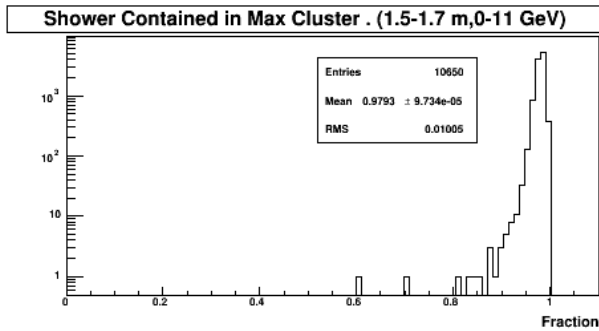
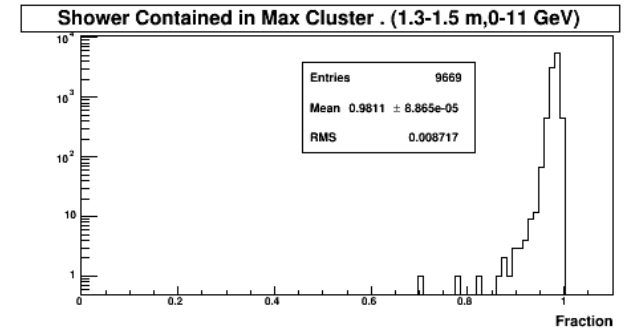
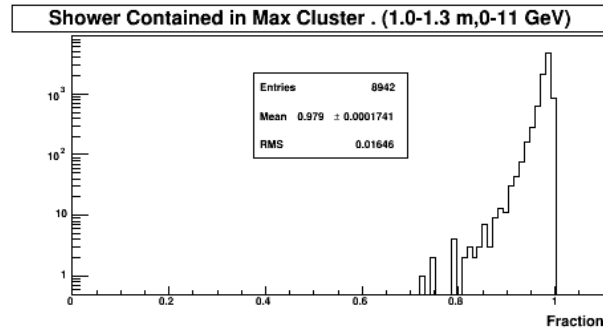
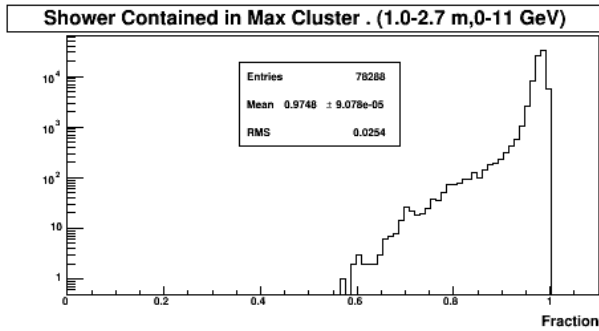




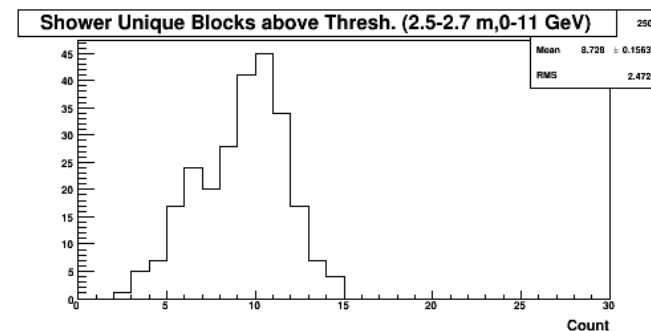
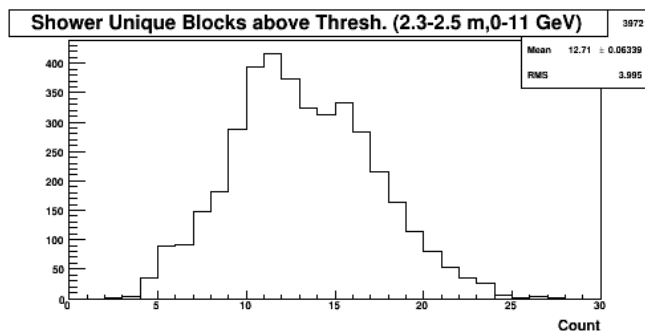
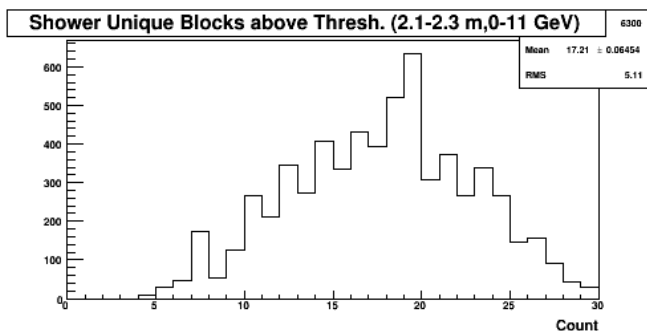
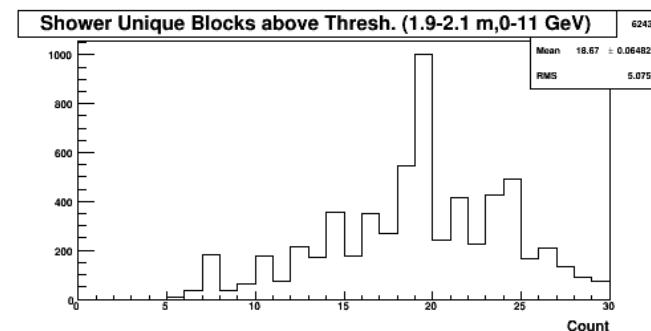
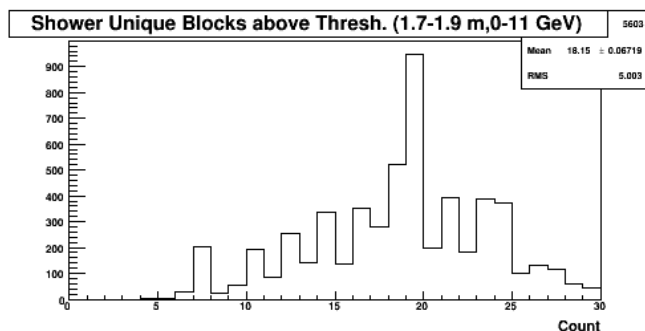
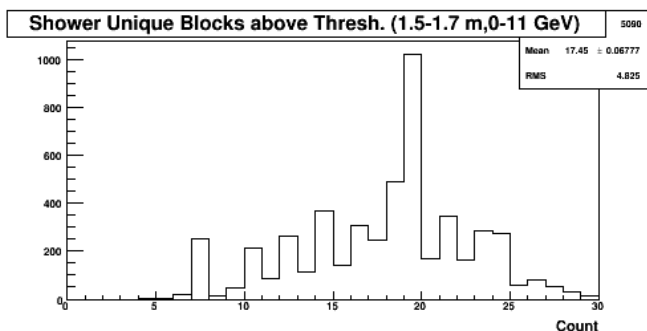
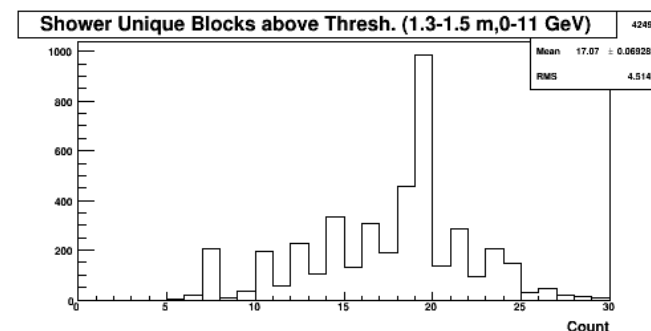
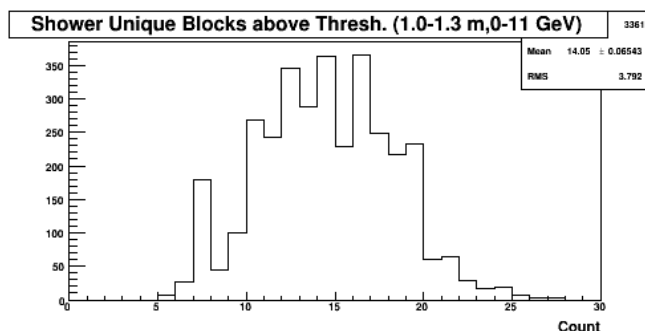
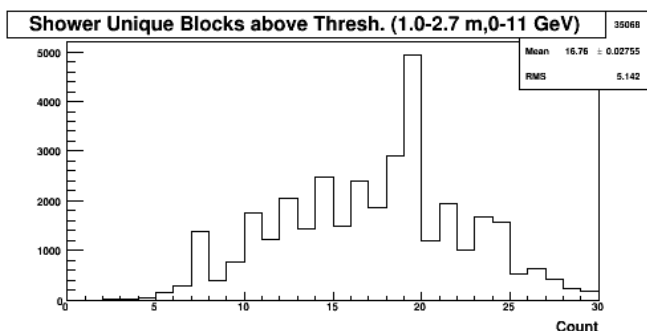
# Energy Fraction Contained in blocks above Threshold with 1 MeV Cut



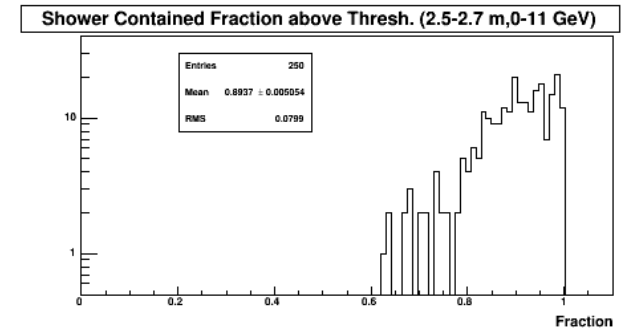
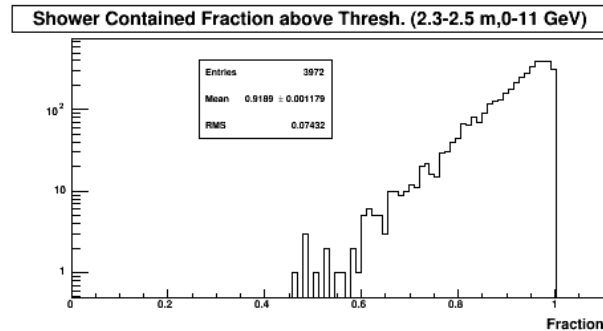
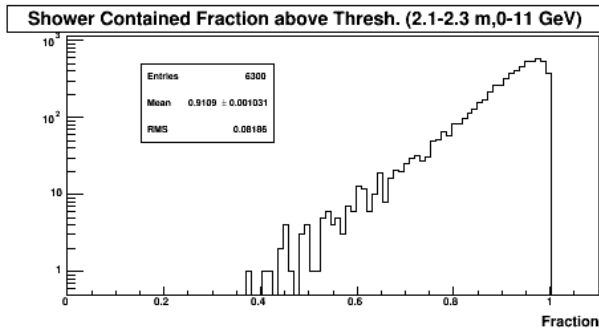
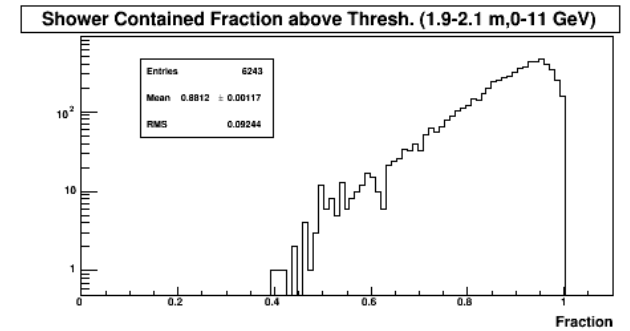
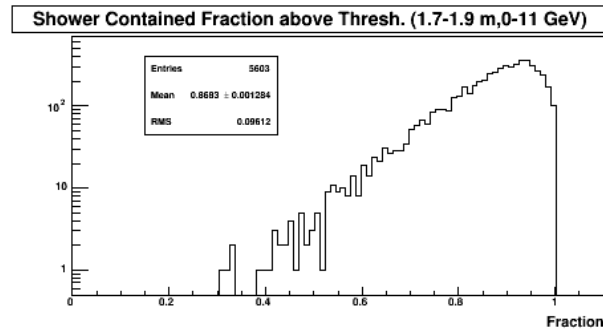
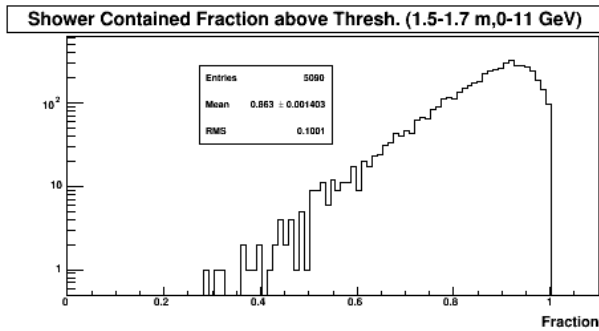
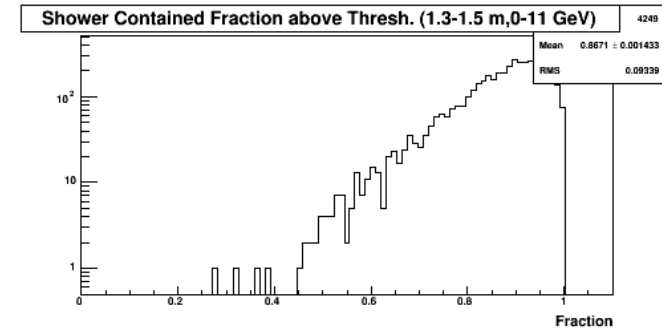
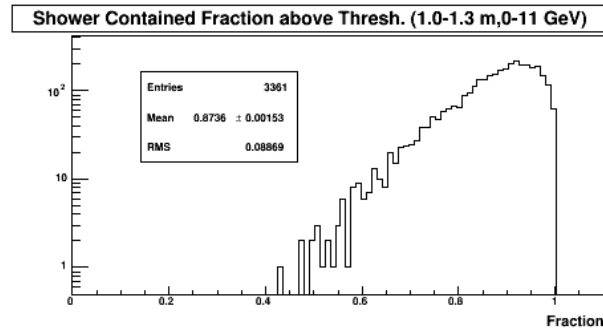
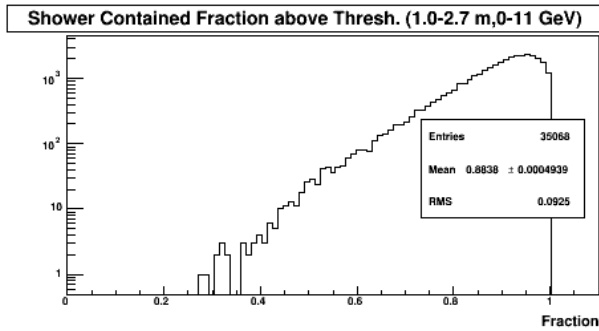
# Energy Fraction Contained in Max 6+1 Cluster



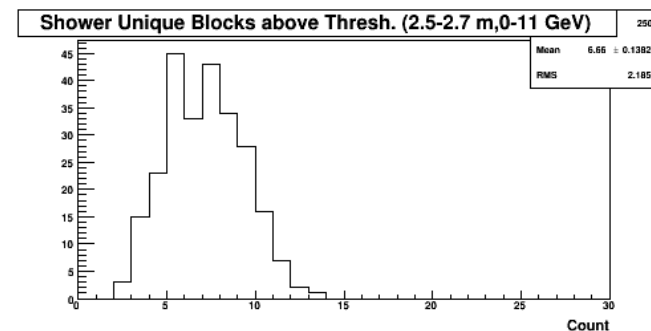
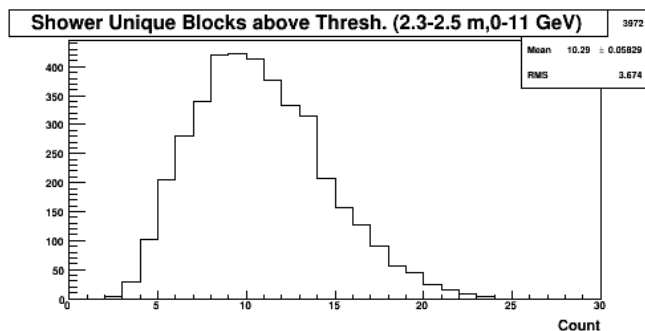
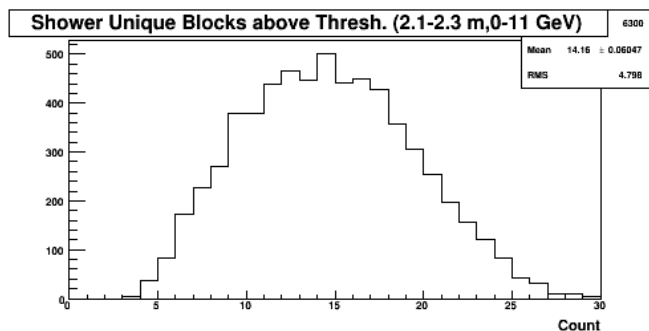
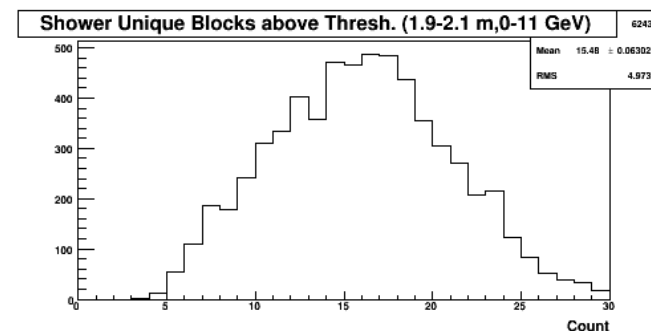
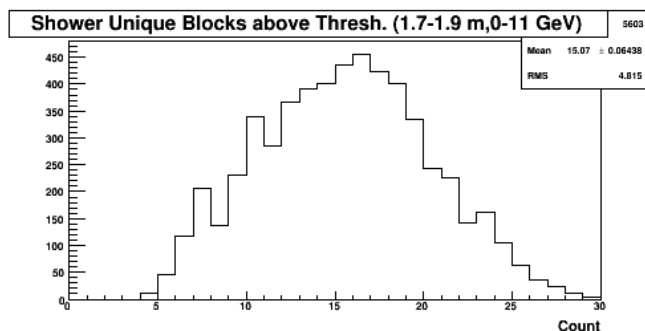
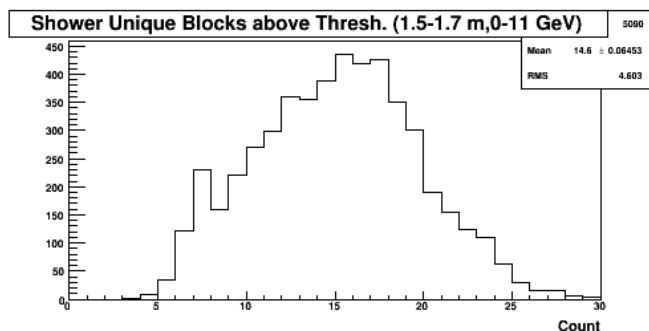
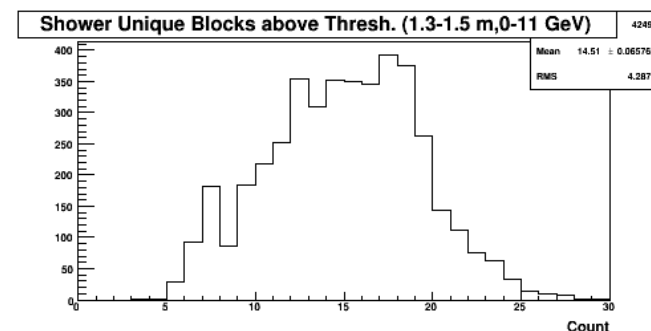
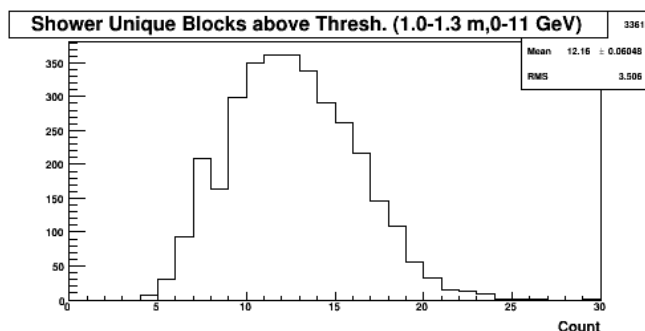
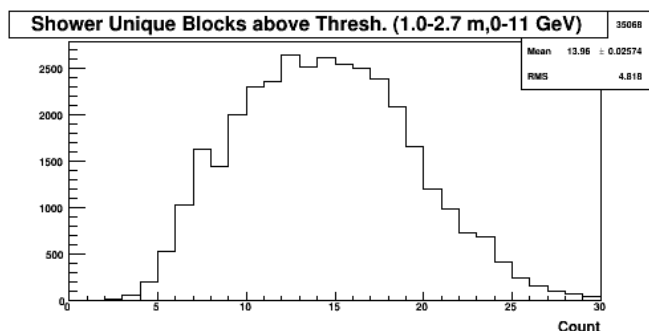
# Block Count for Shower 6+1 Clustering for $\pi^-$



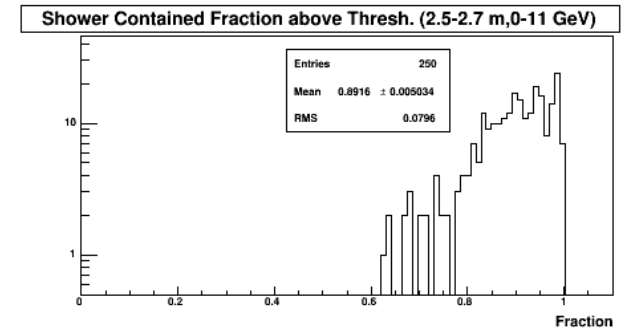
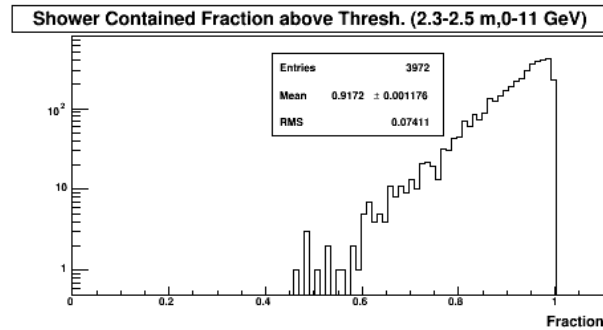
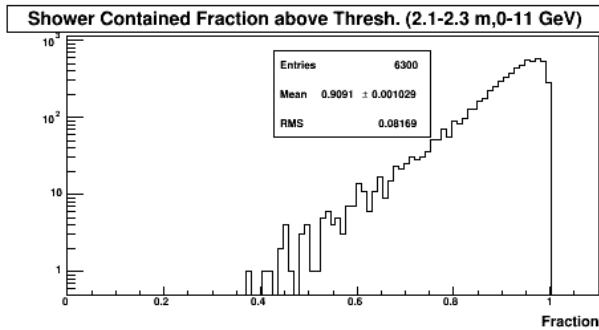
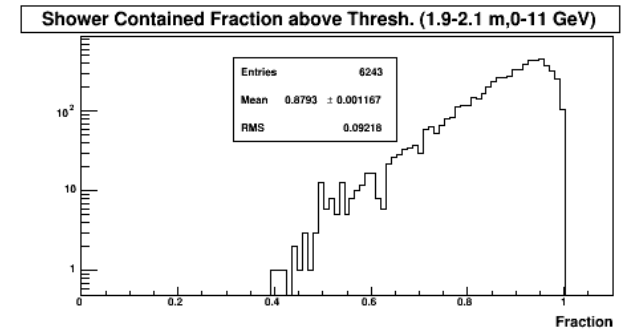
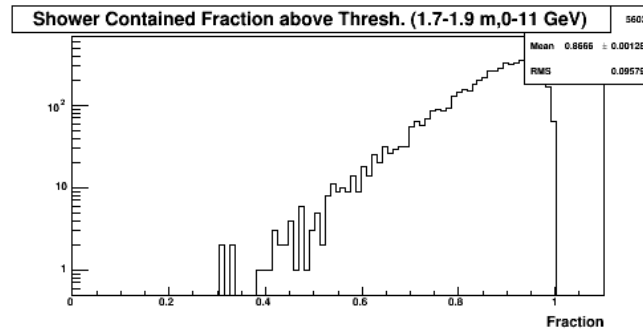
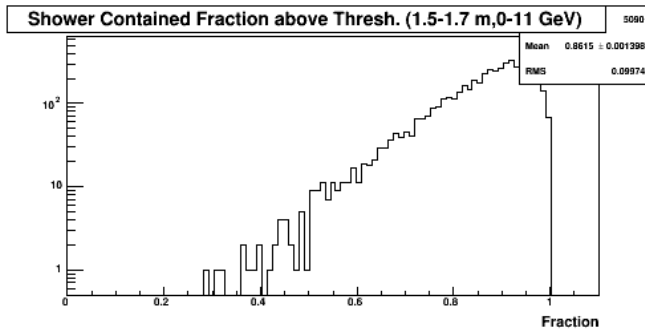
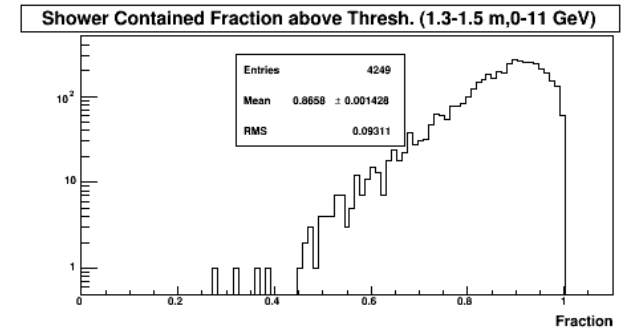
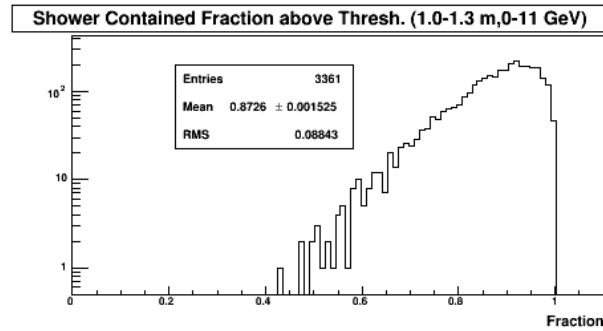
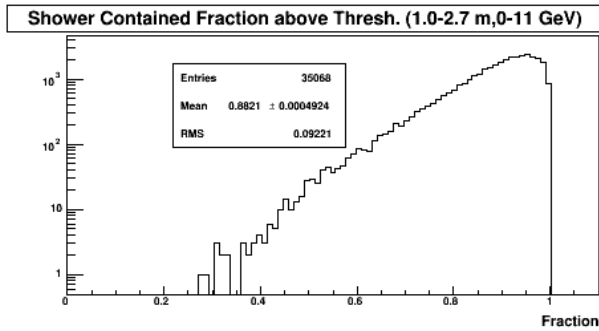
# Energy Fraction Contained in blocks above Threshold for $\pi^-$



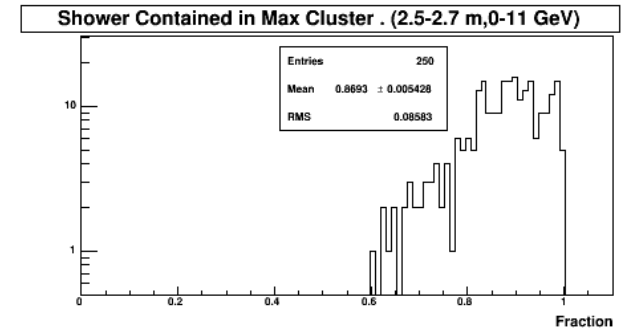
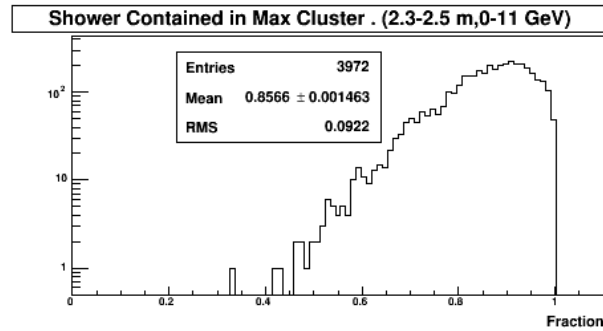
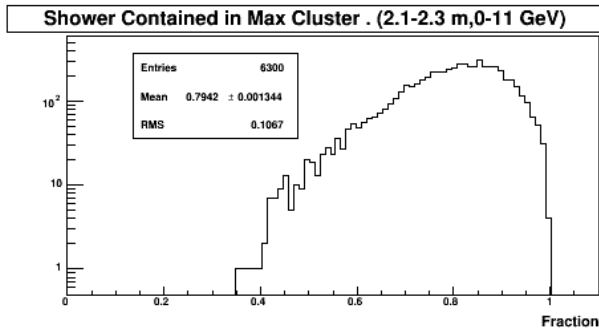
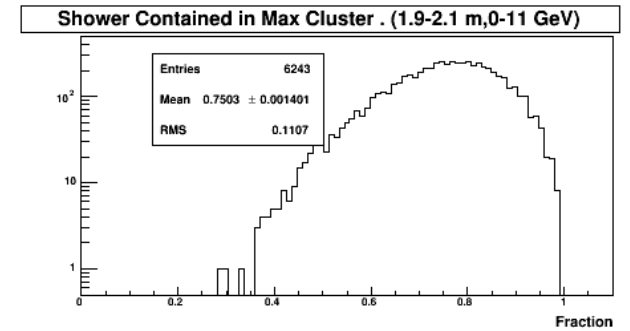
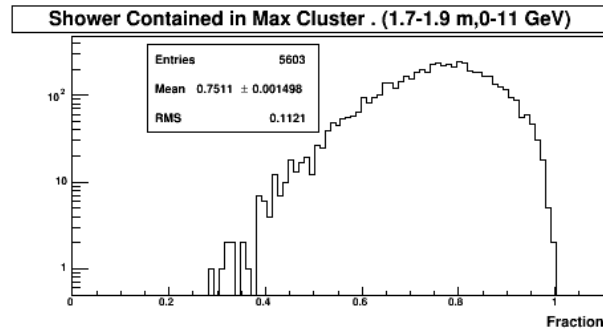
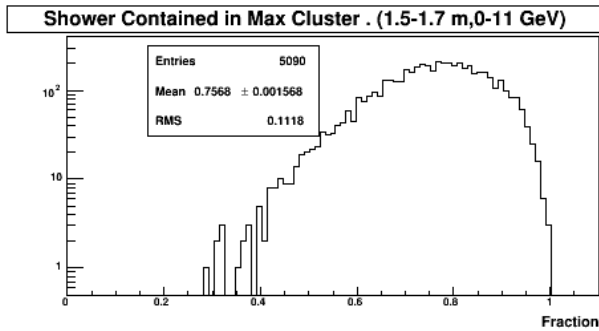
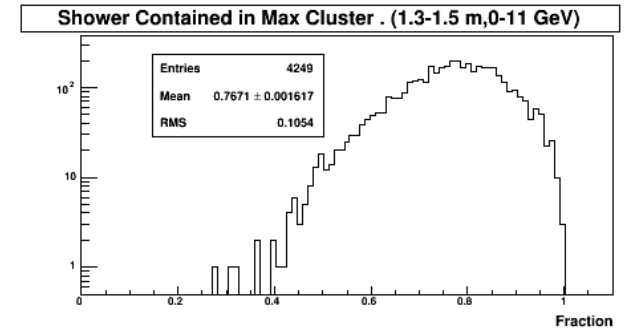
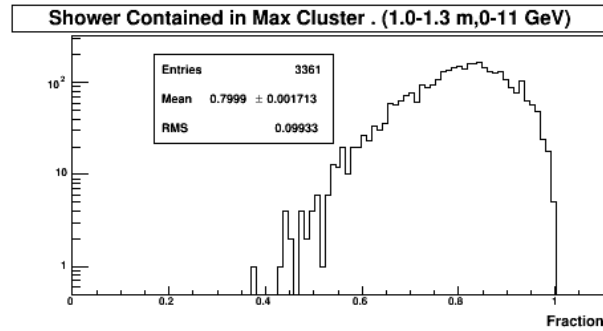
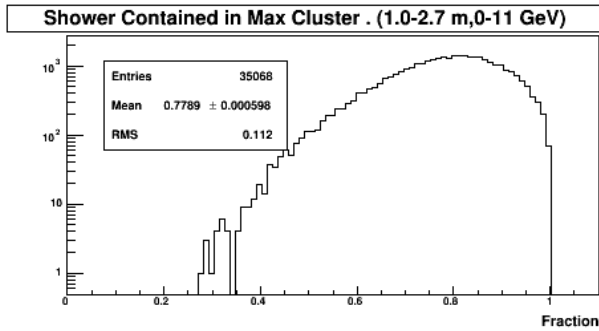
# Block Count for Shower 6+1 Clustering for $\pi^-$ with 1 MeV Cut



# Energy Fraction Contained in blocks above Threshold for $\pi^-$ with 1 MeV Cut



# Energy Fraction Contained in Max 6+1 Cluster



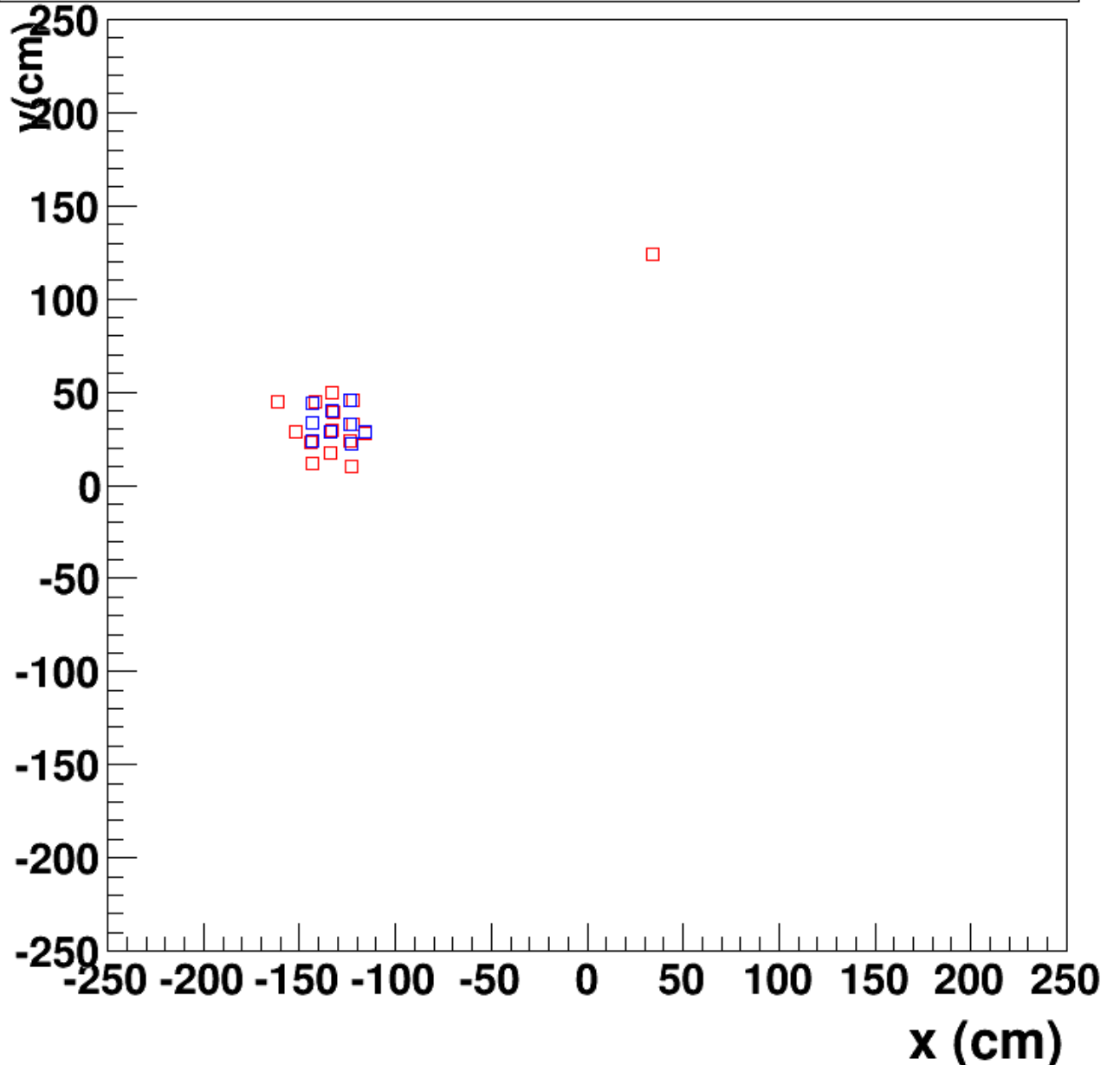
# Single Events ECAL Block Distribution



# Single $e^-$ Hit on ECAL

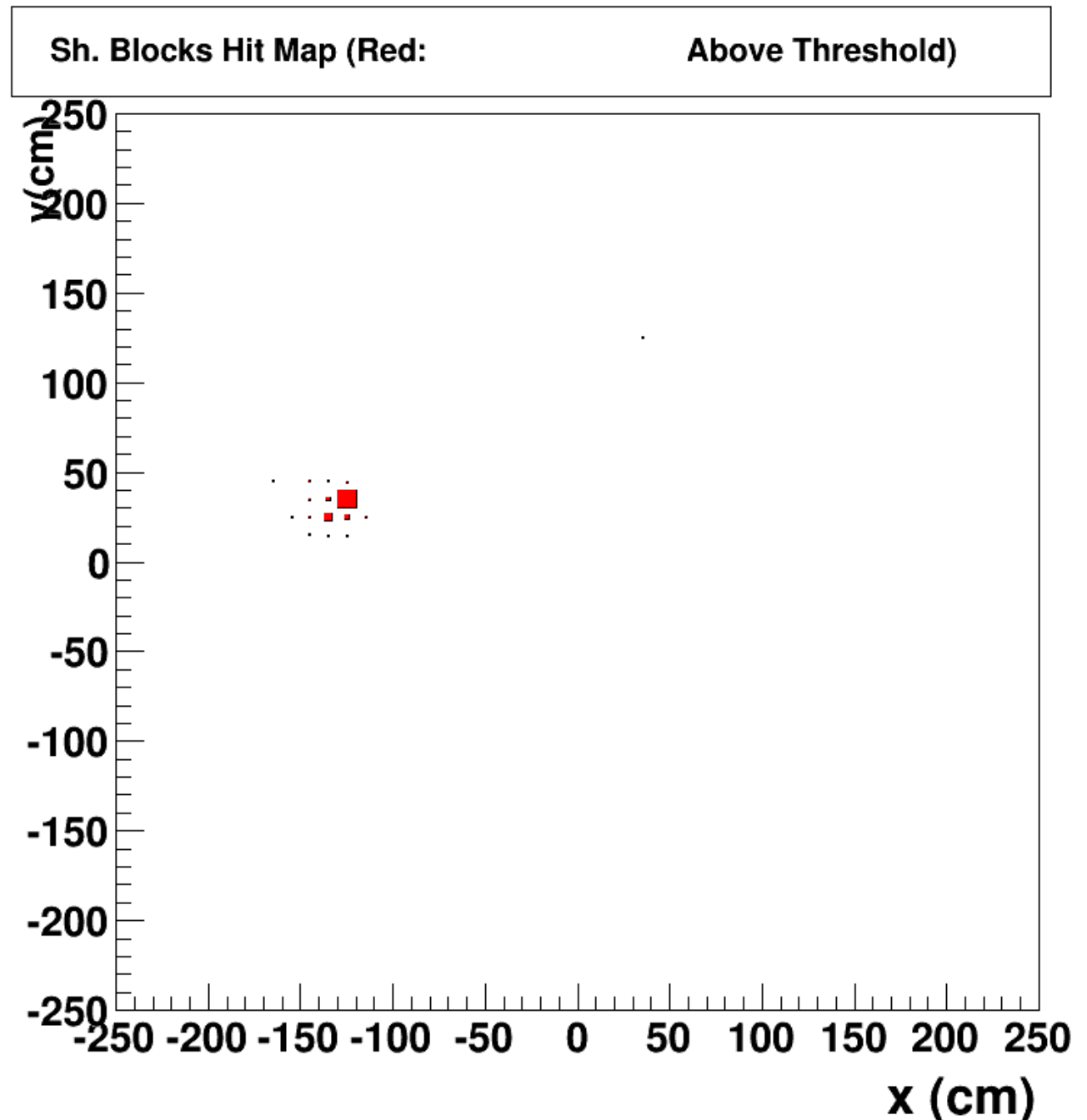
### Sh. Blocks Hit Map (Red: All Blocks, Blue Above Threshold)

Incident Mom. 4 GeV  
Incident R 124 cm



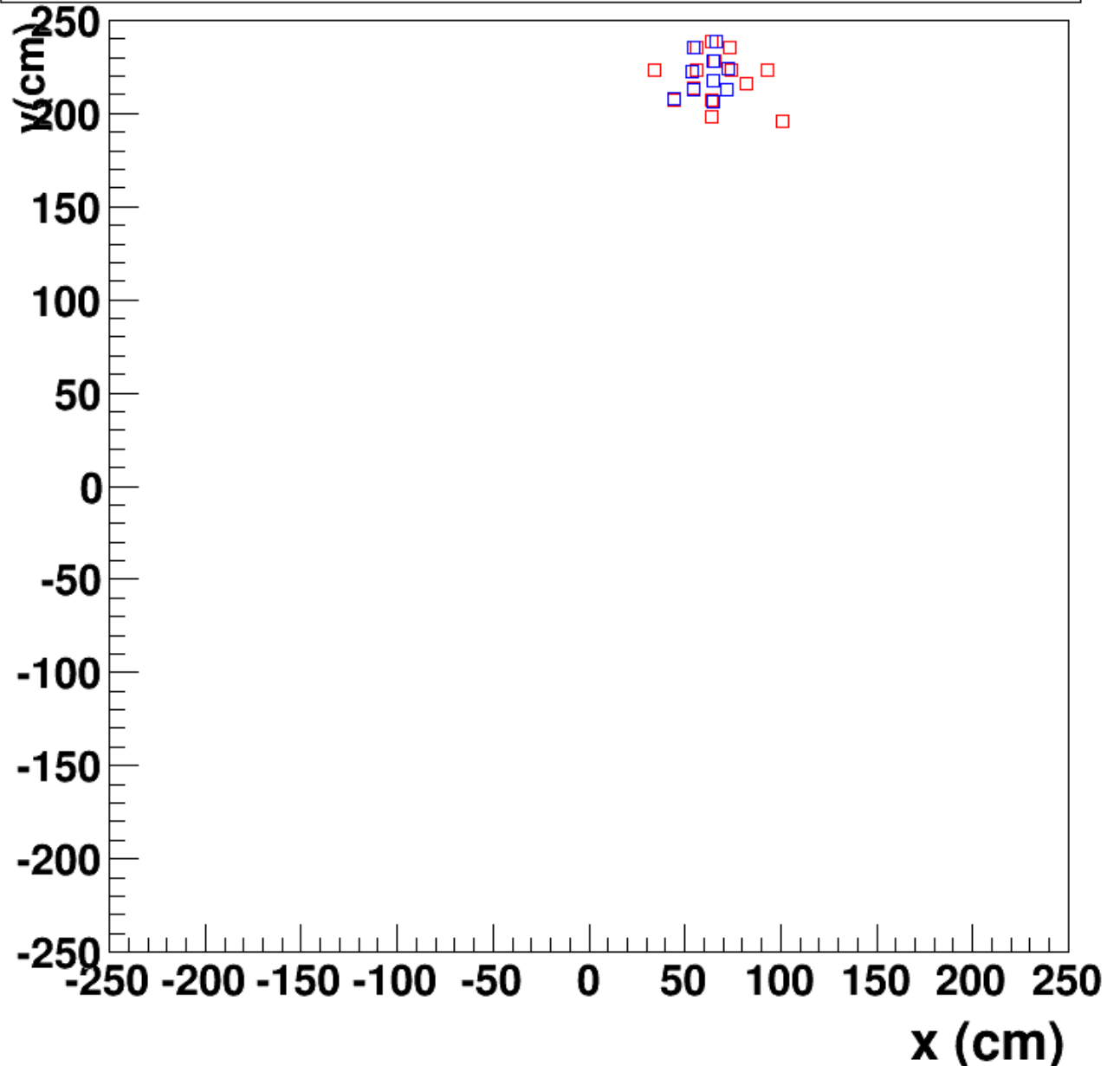
# Single $e^-$ Hit on ECAL

Incident Mom. 4 GeV  
Incident R 124 cm  
Energy weighted



# Single $e^-$ Hit on ECAL

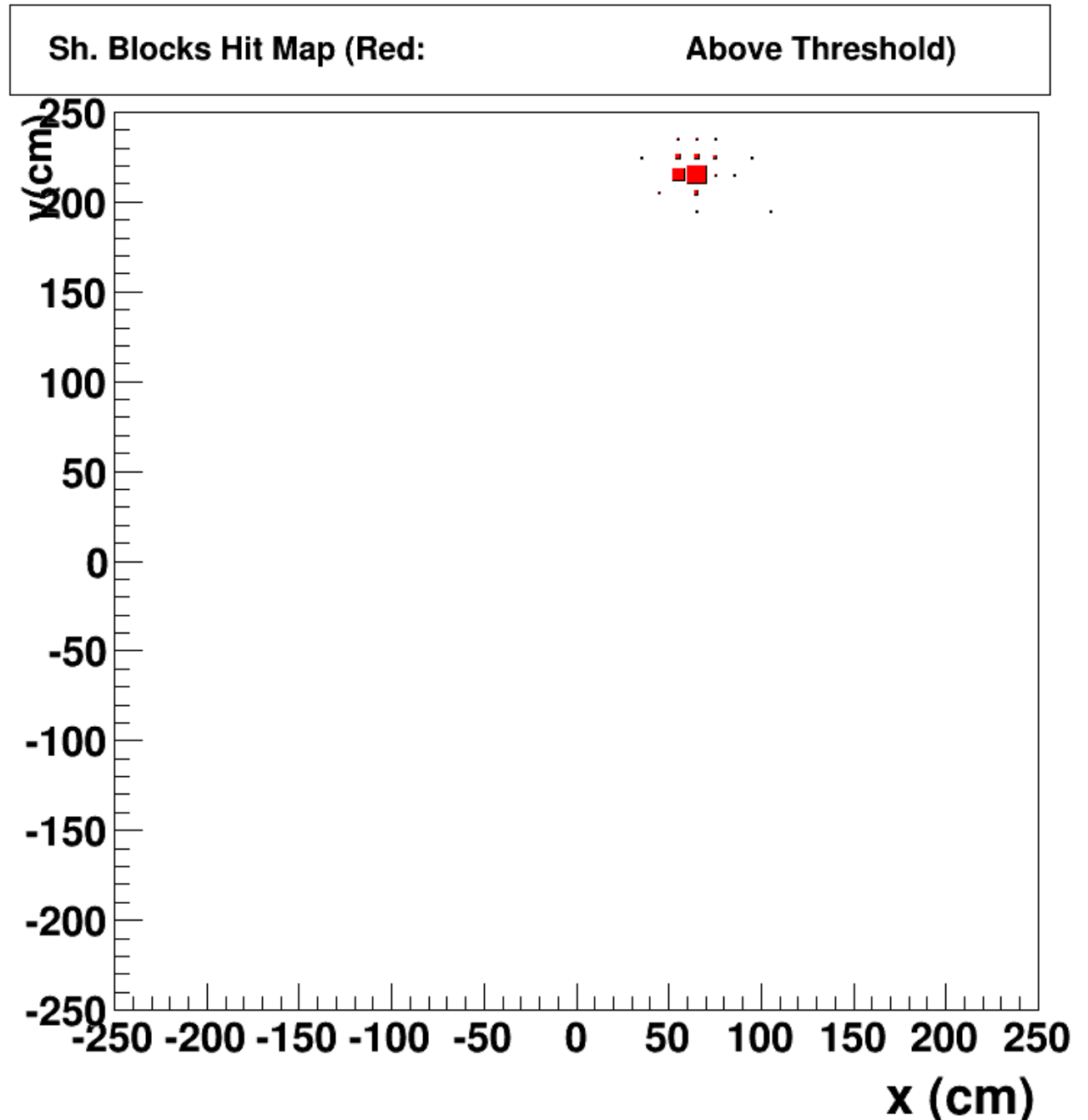
Sh. Blocks Hit Map (Red: All Blocks, Blue Above Threshold)



Incident Mom. 3 GeV  
Incident R 216 cm

# Single $e^-$ Hit on ECAL

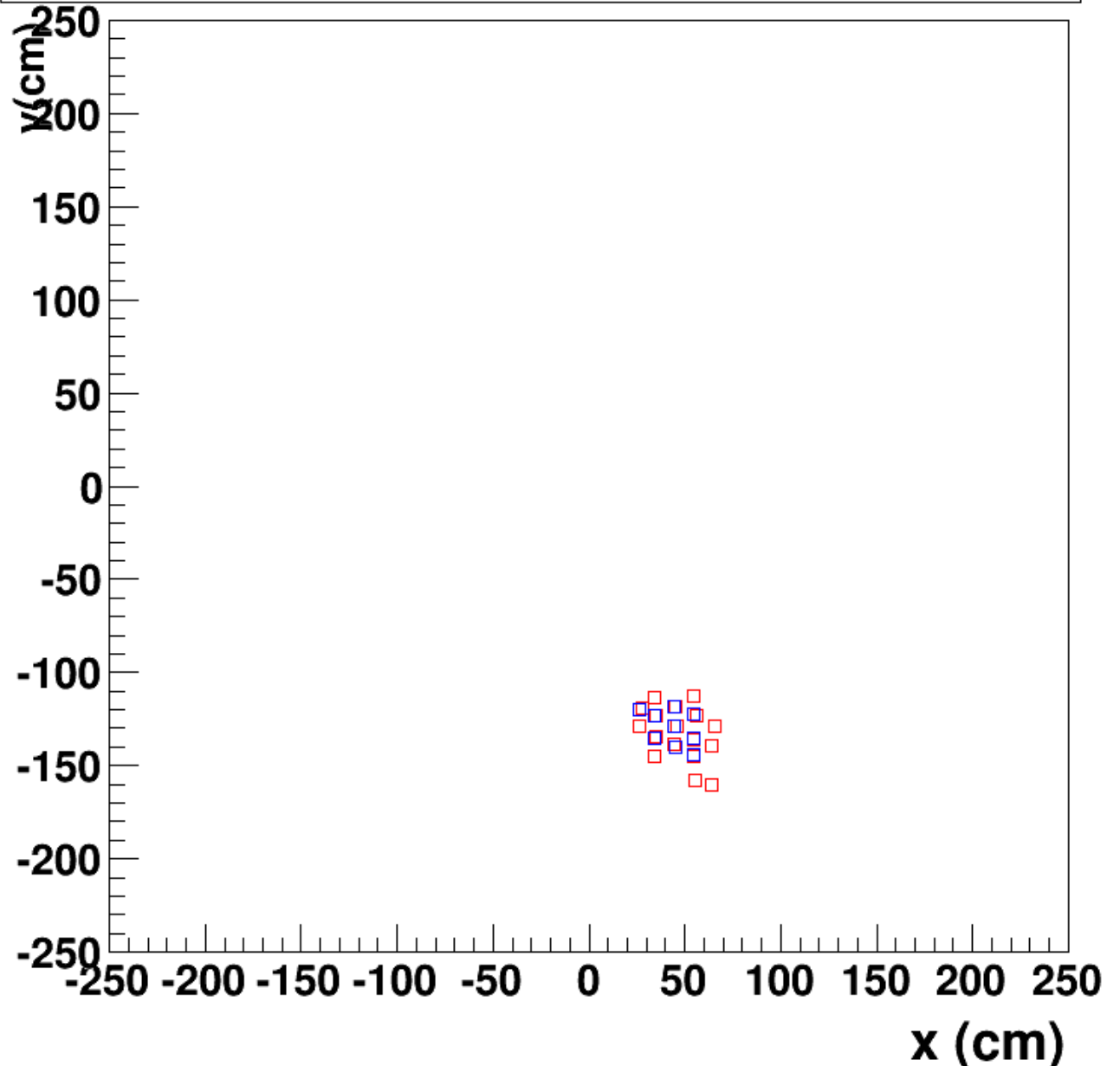
Incident Mom. 3 GeV  
Incident R 216 cm  
Energy weighted



# Single $e^-$ Hit on ECAL

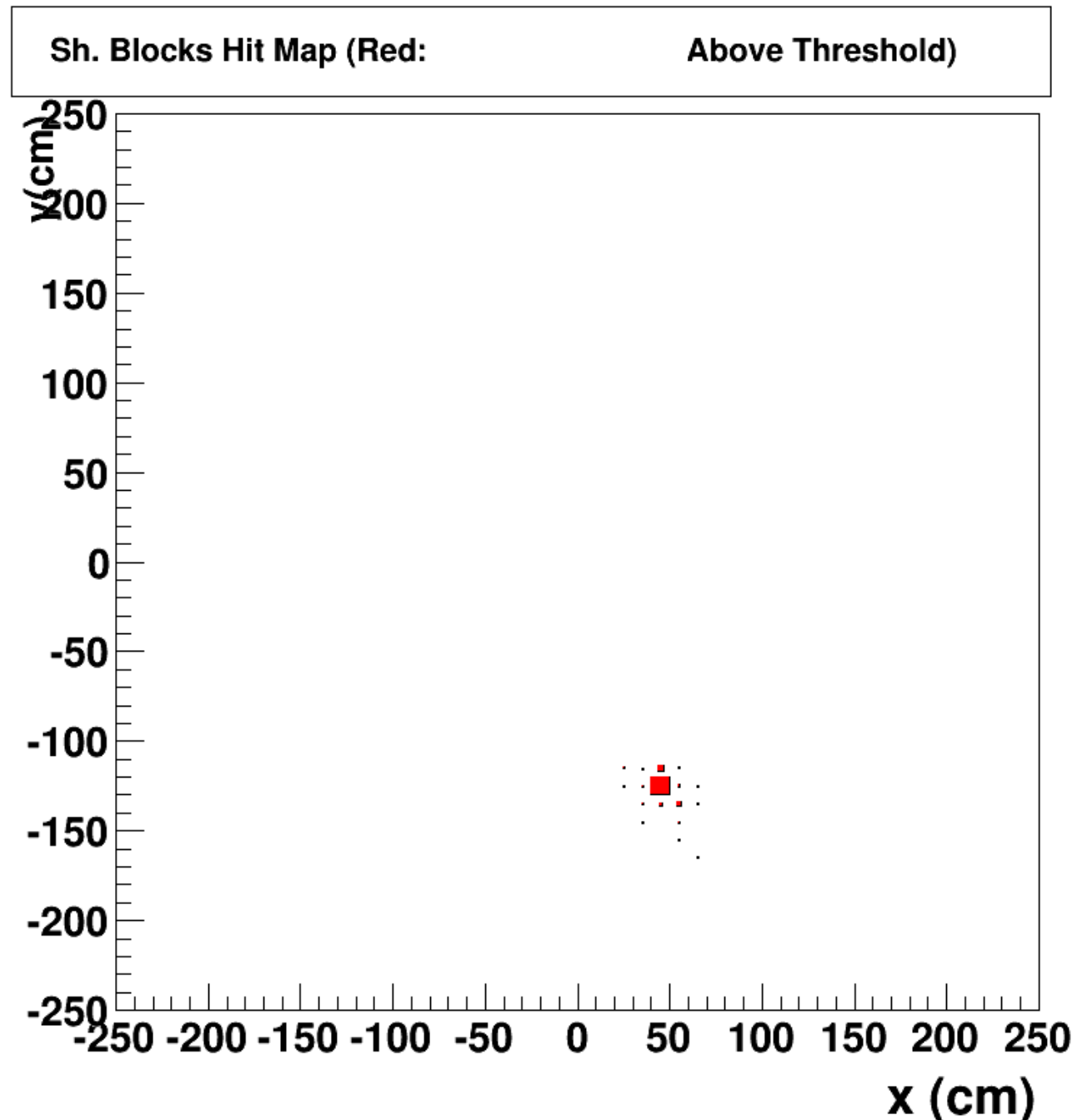
Sh. Blocks Hit Map (Red: All Blocks, Blue Above Threshold)

Incident Mom. 4 GeV  
Incident R 130 cm



# Single $e^-$ Hit on ECAL

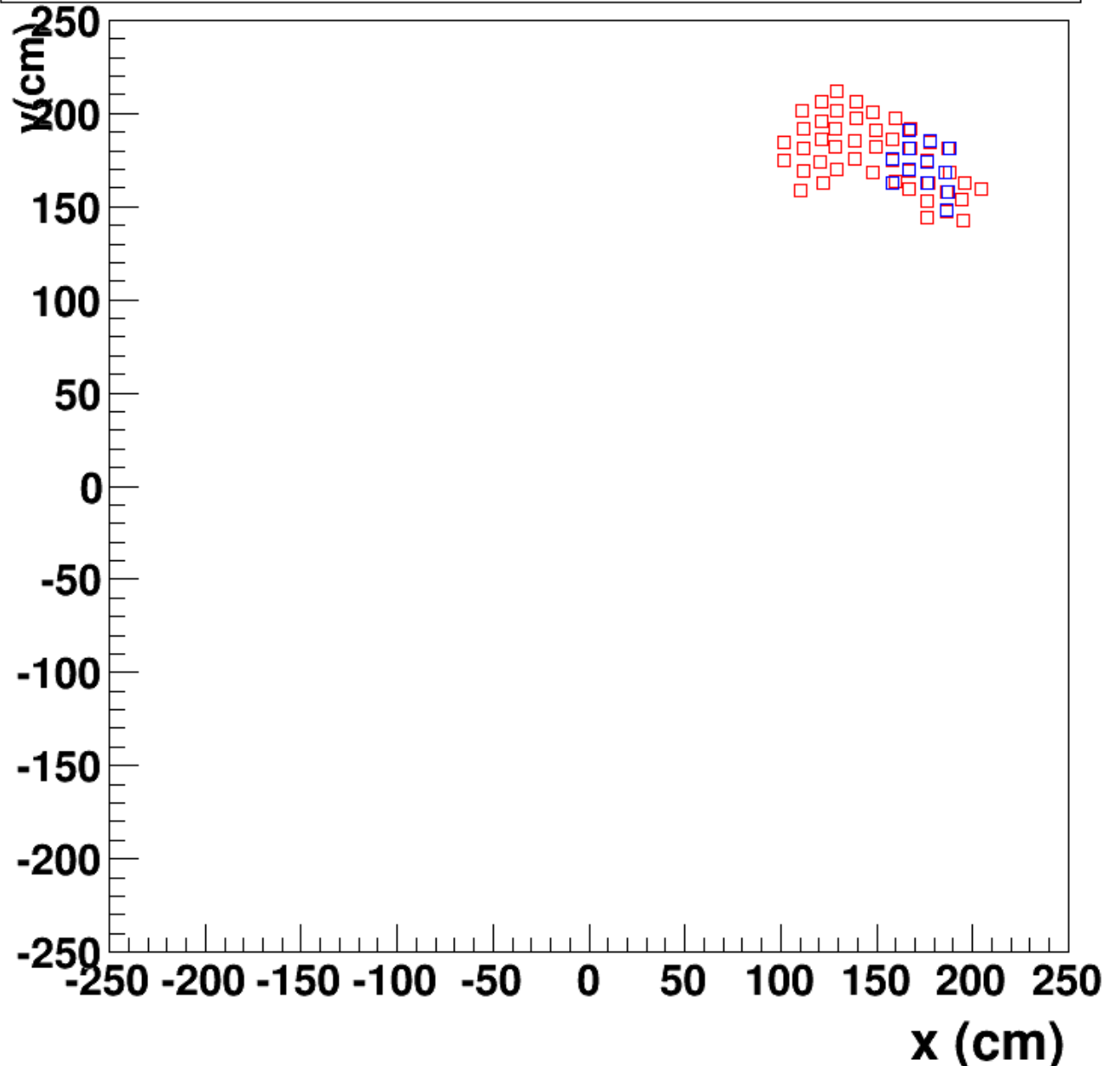
Incident Mom. 4 GeV  
Incident R 130 cm  
Energy weighted



# Single $\pi^-$ Hit on ECAL

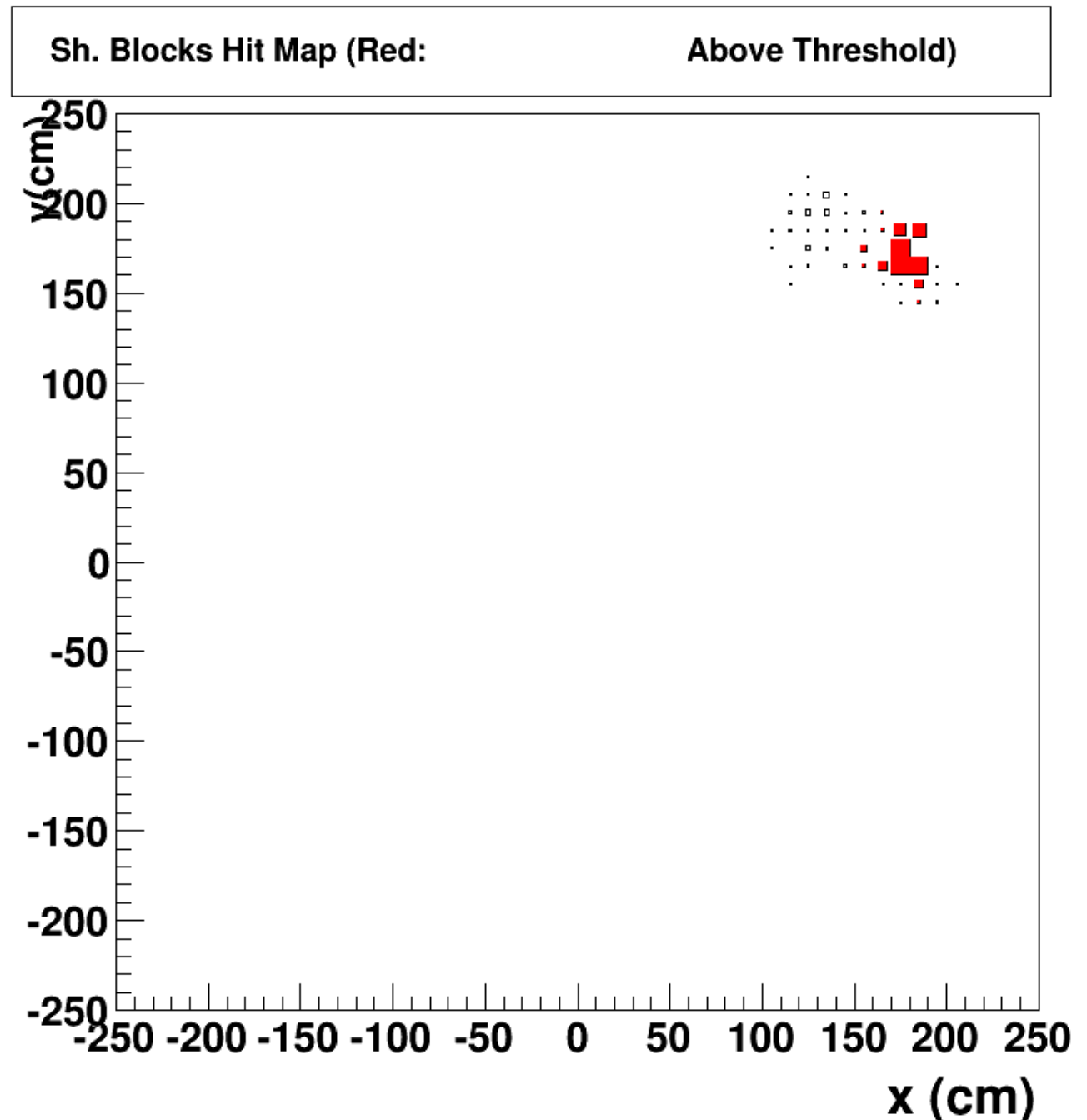
Sh. Blocks Hit Map (Red: All Blocks, Blue Above Threshold)

Incident Mom. 3 GeV  
Incident R 235 cm



# Single $\pi^-$ Hit on ECAL

Incident Mom. 3 GeV  
Incident R 235 cm  
Energy weighted

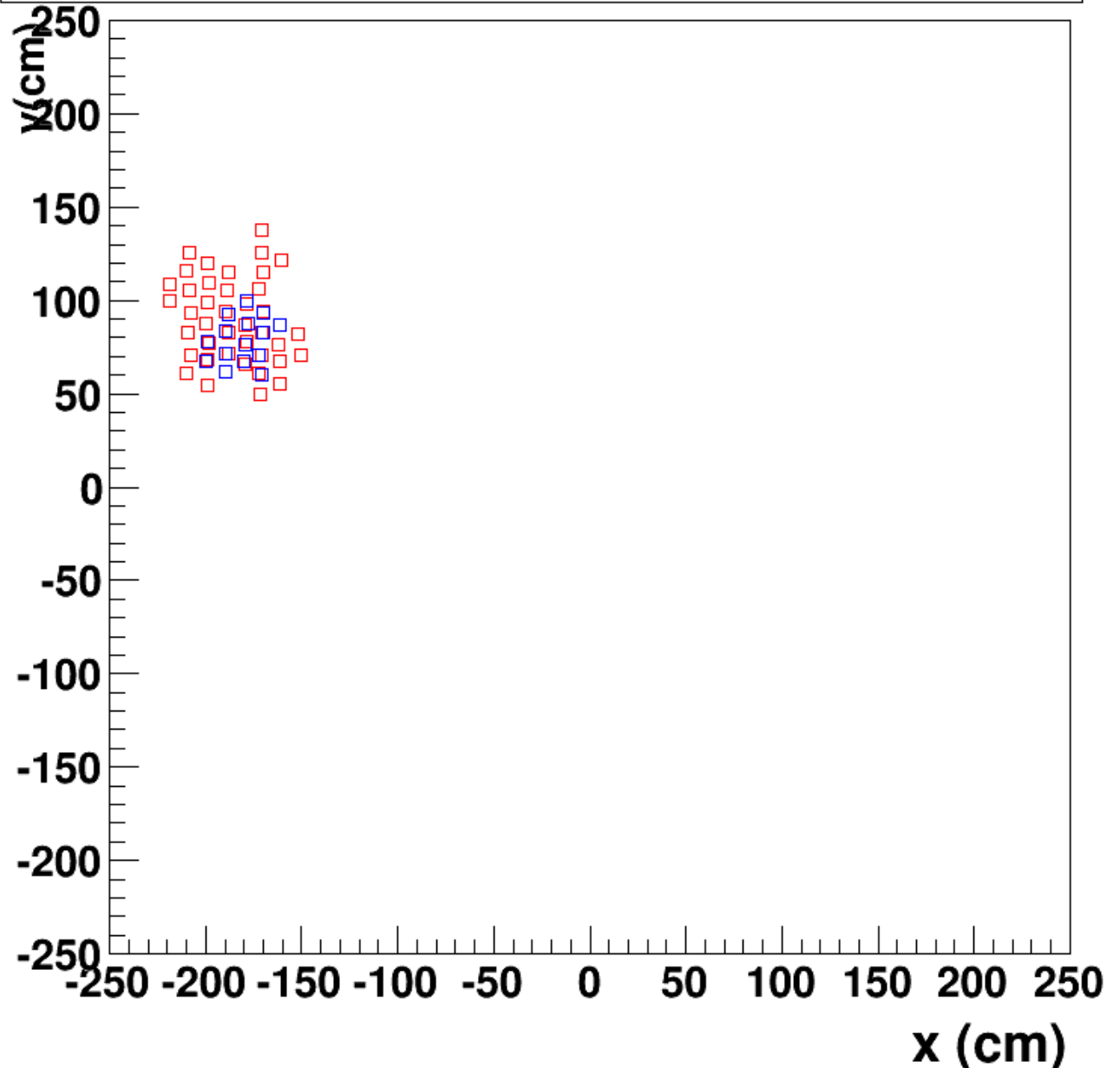




# Single $\pi^-$ Hit on ECAL

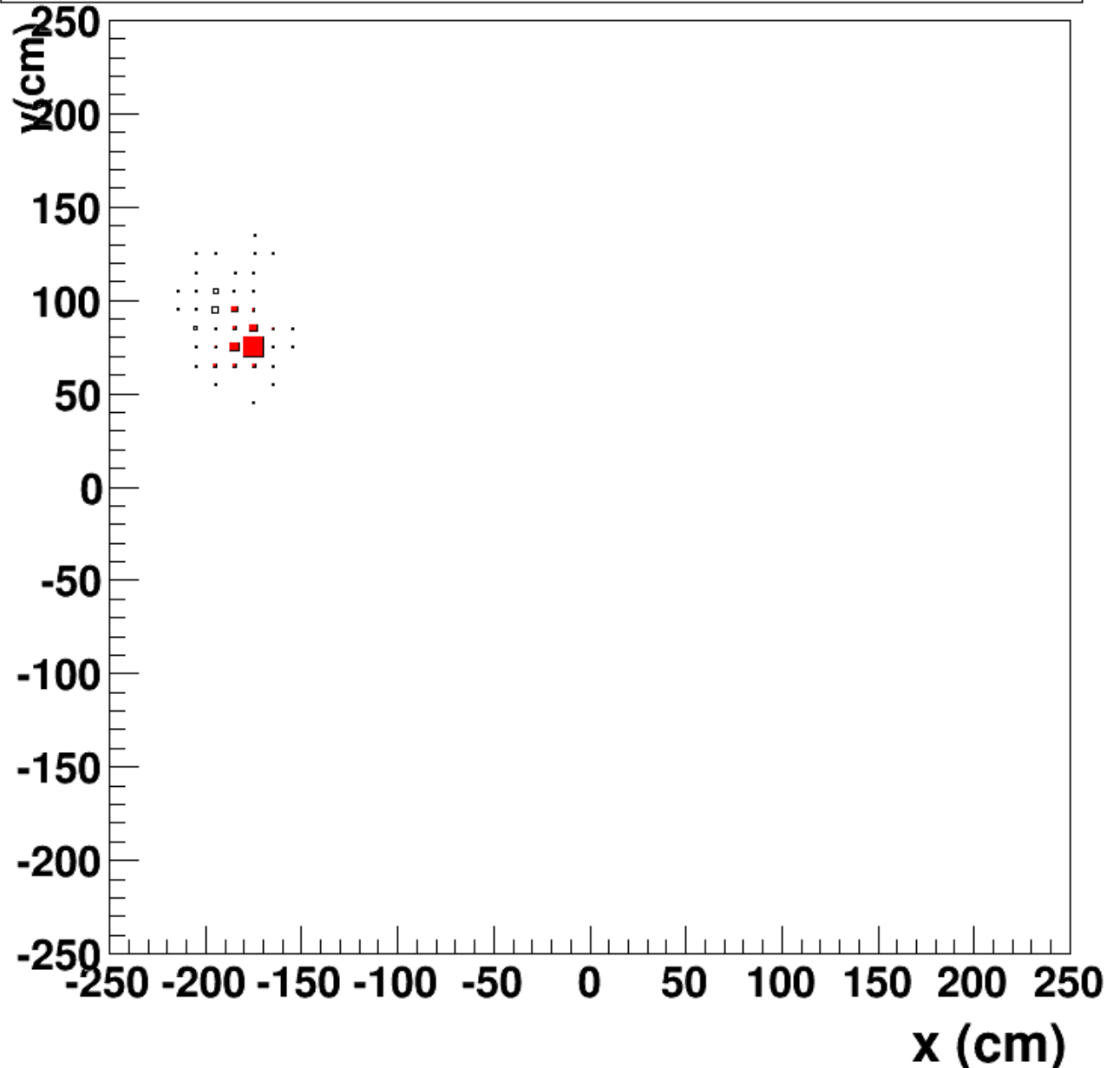
Sh. Blocks Hit Map (Red: All Blocks, Blue Above Threshold)

Incident Mom. 2 GeV  
Incident R 190 cm



# Single $\pi^-$ Hit on ECAL

Sh. Blocks Hit Map (Red: All Blocks, Blue Above Threshold)



Incident Mom. 2 GeV  
Incident R 190 cm  
Energy weighted