First Look at Forward ECAL Simulation

December 3, 2014

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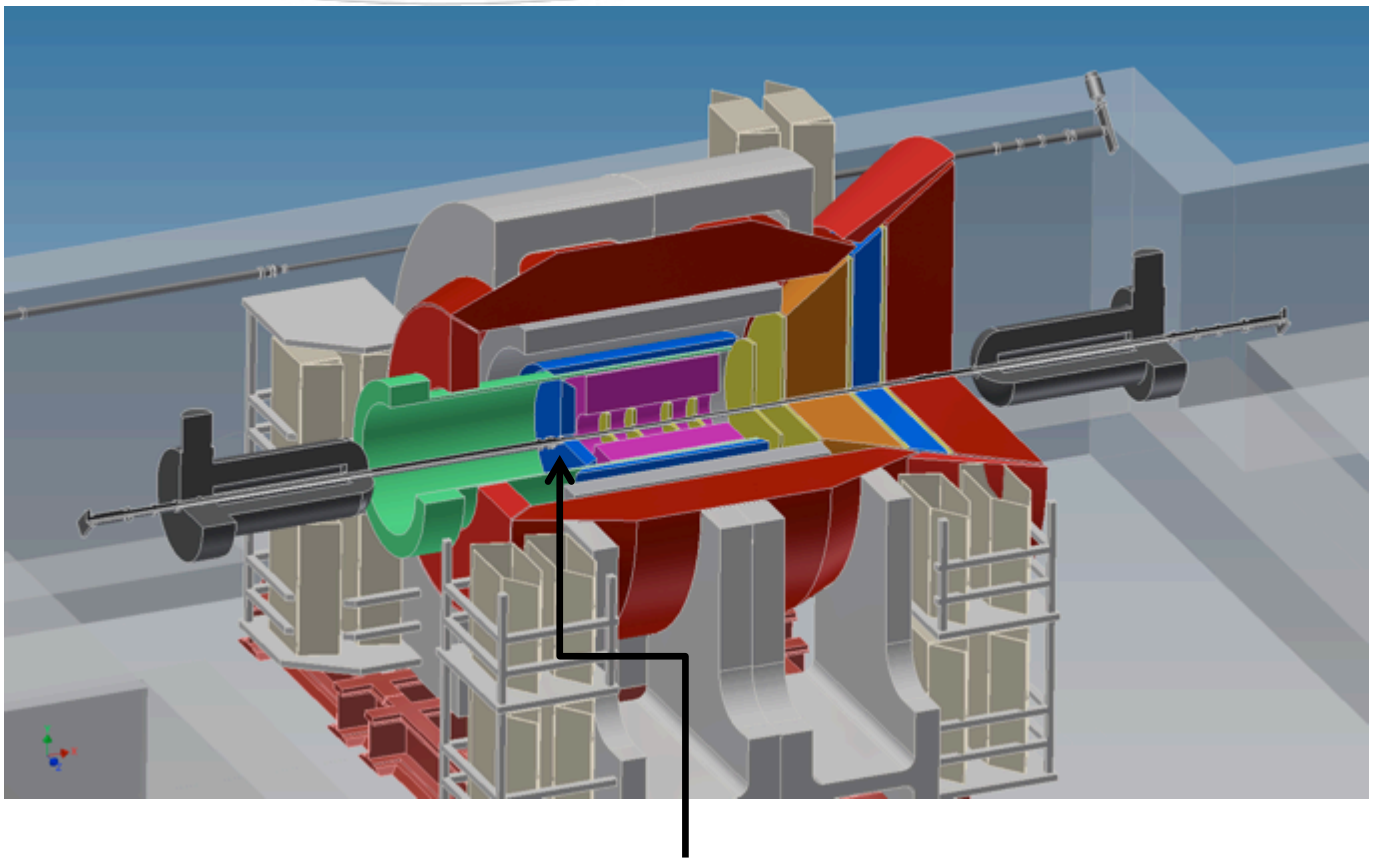
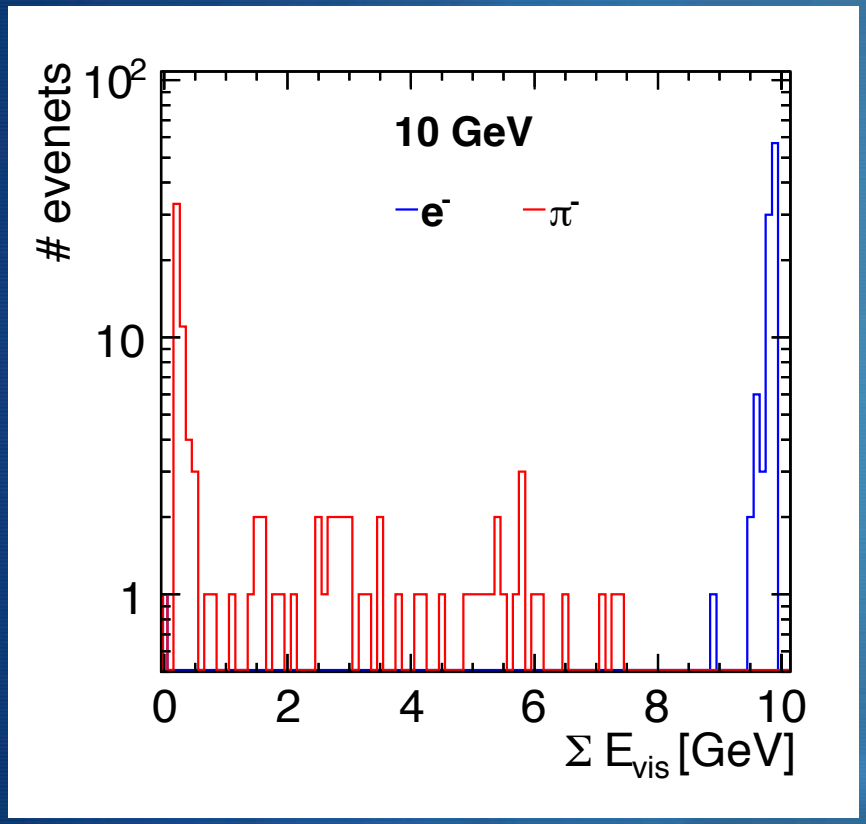
…And Nils Feege

ELC Detector - EEMC

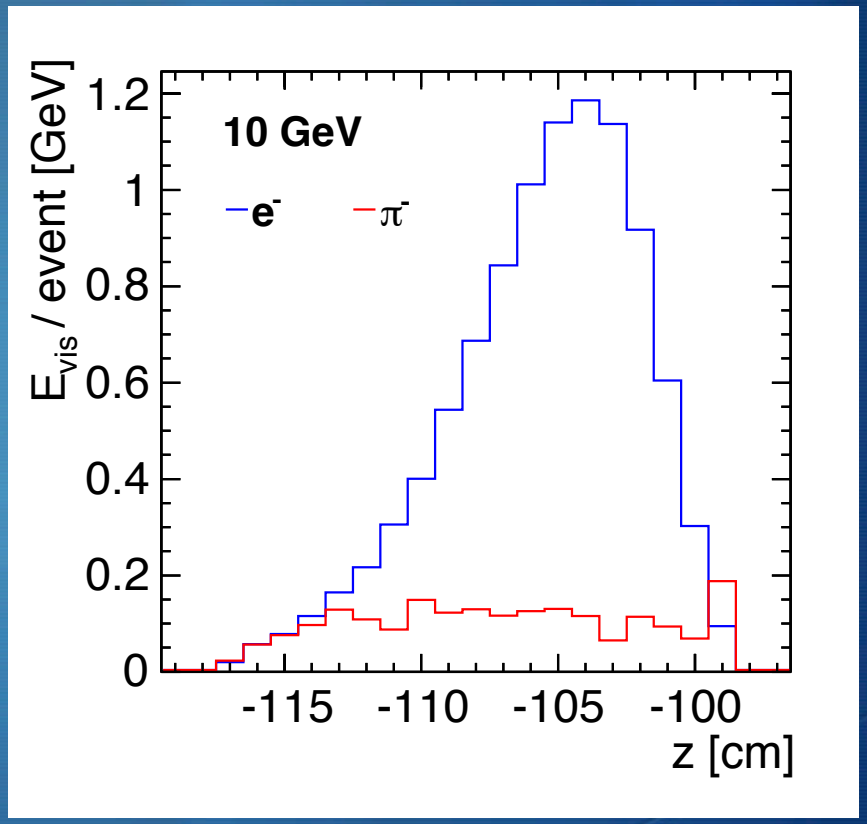


EEMC – (Electron-going Electromagnetic Calorimeter):
Lead Tungstate Calorimeter

Energy Visibility in the EEMC

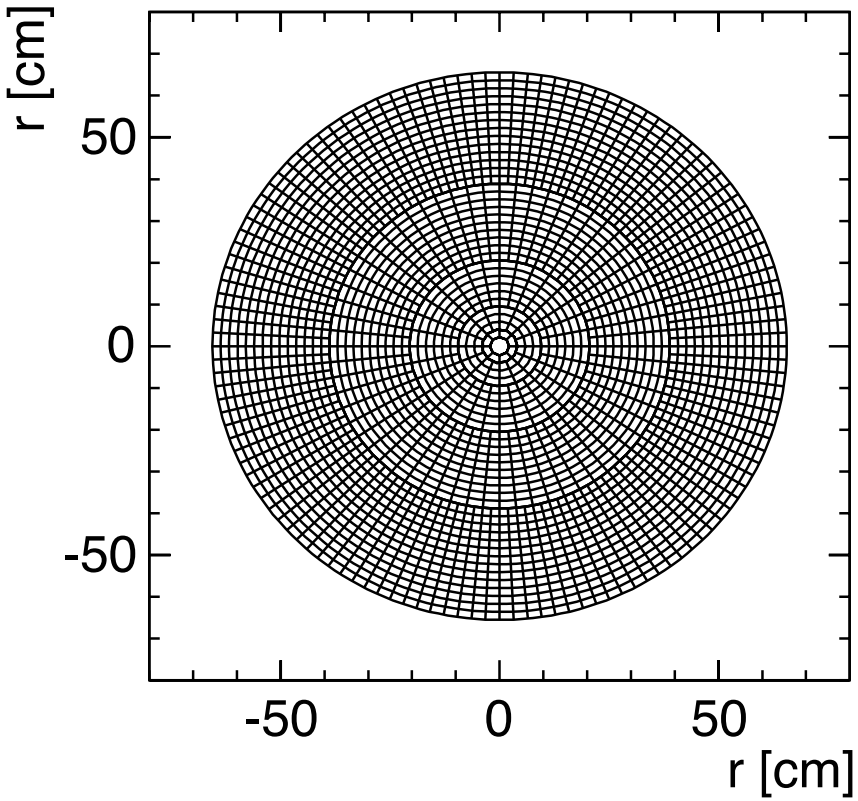


Total Visible Energy for Electrons and Pions



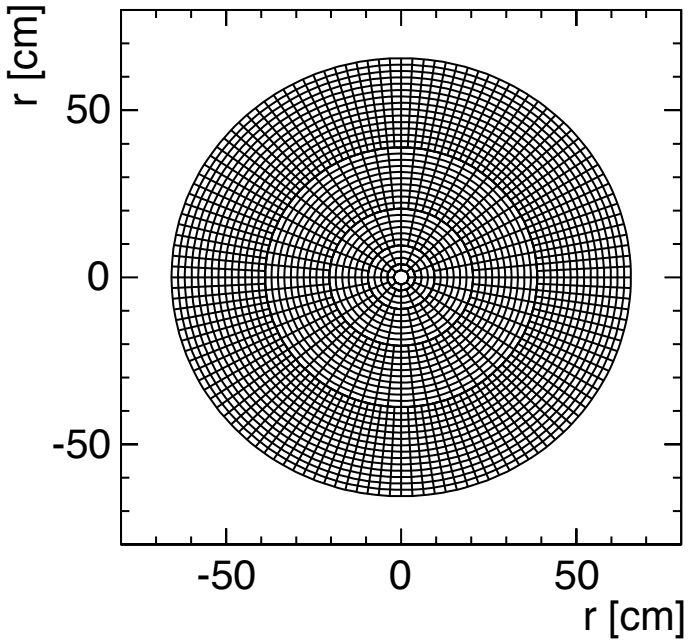
Longitudinal Energy Visibility

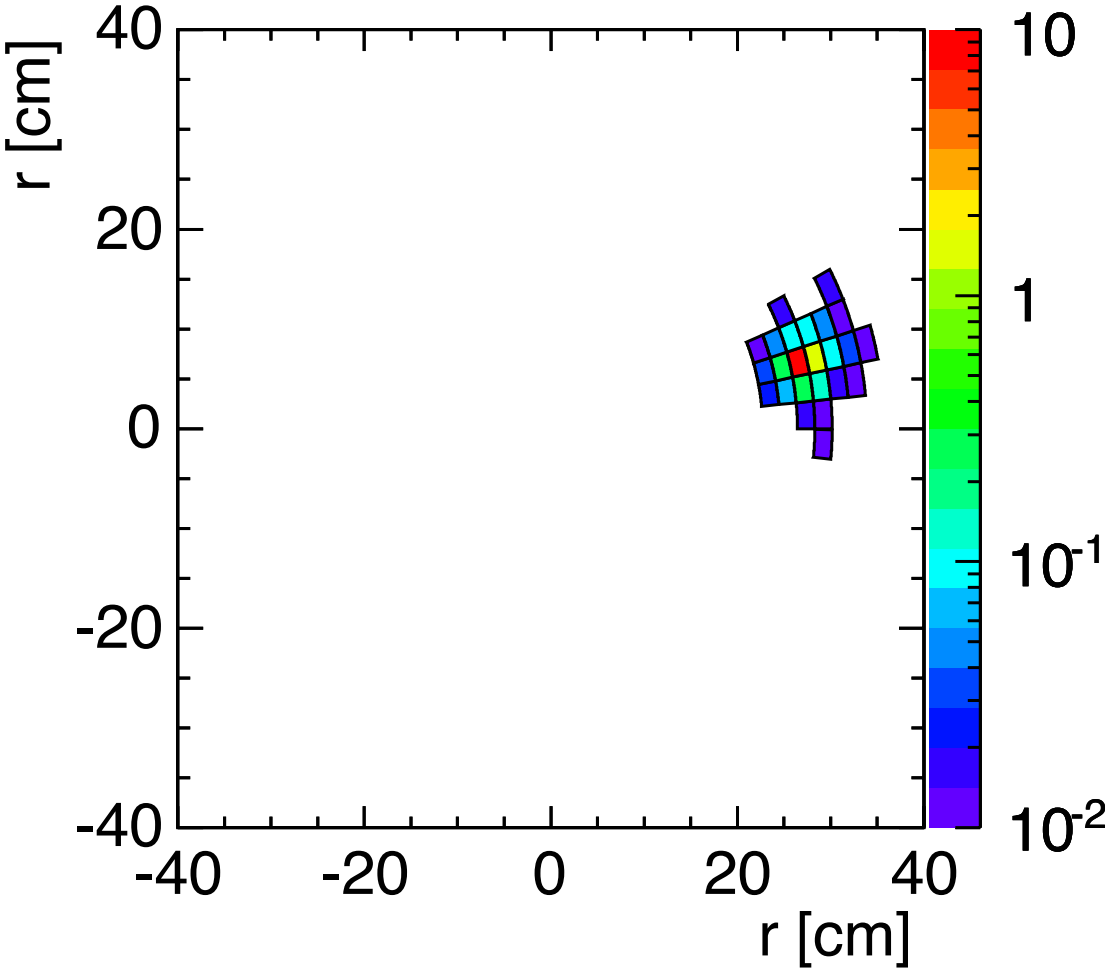
EEMC Tower Segmentation



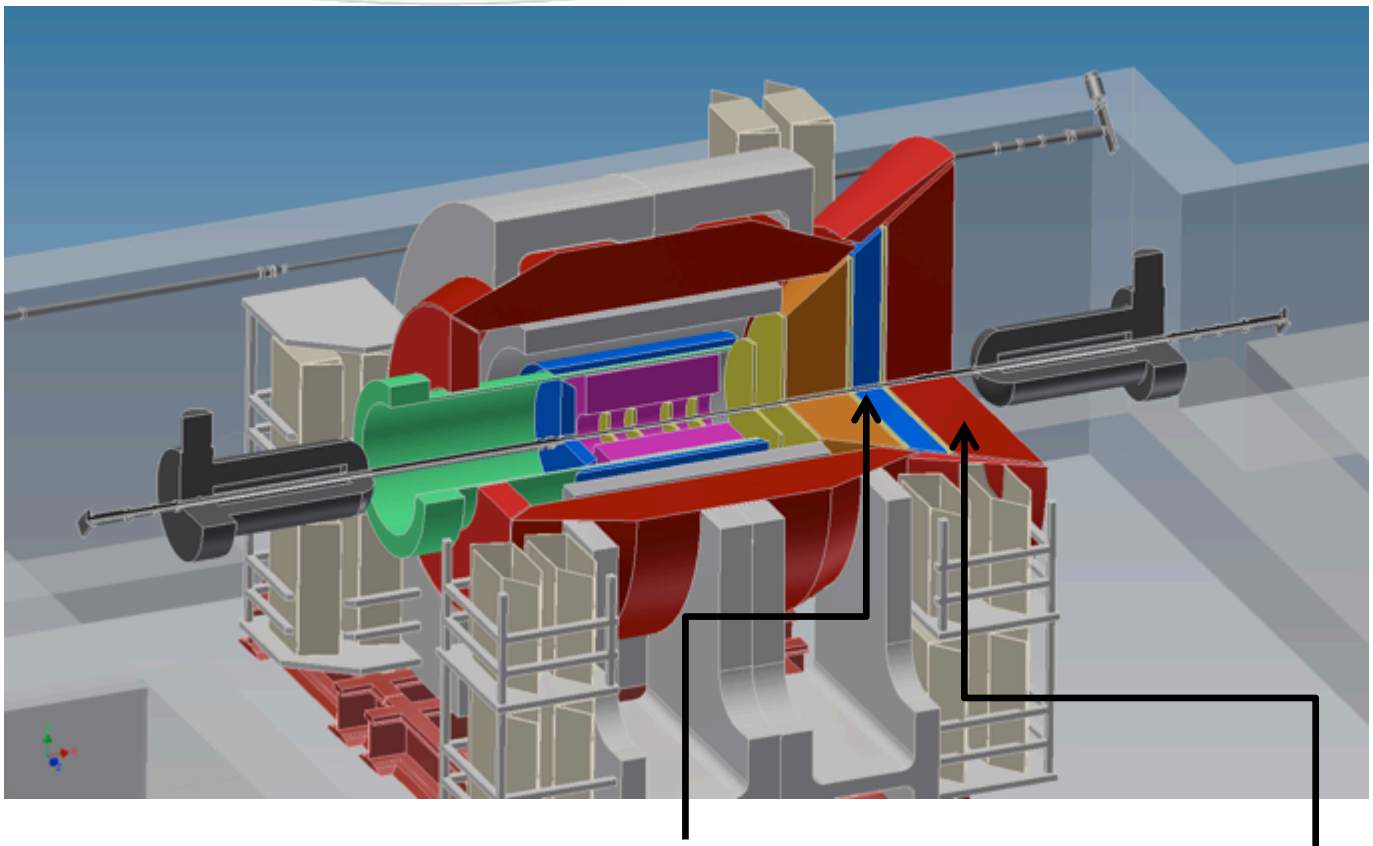
	1	2	3	4	5
# Bins r	1	3	6	10	14
Width r (cm)	1.833	1.833	1.833	1.833	1.833
# Bins ϕ	8	16	32	64	128
Width ϕ –min (cm)	1.728	1.584	1.872	2.016	1.908
Width ϕ –max (cm)	3.168	3.744	4.032	3.816	3.219
# Towers	8	48	192	640	1792

EEMC – One Electron Hit





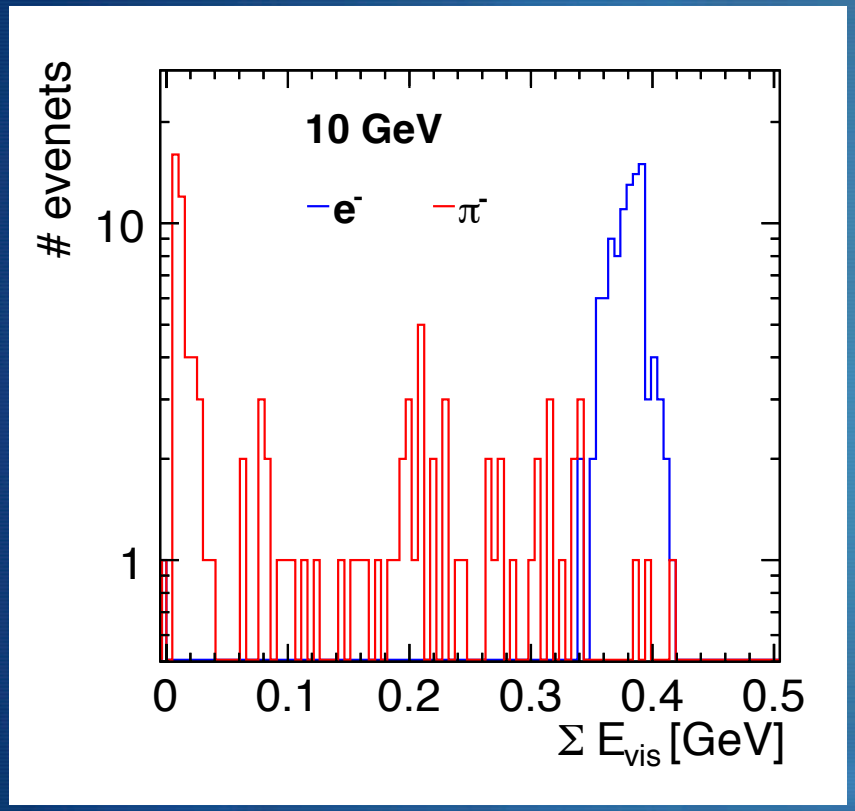
ELC Detector



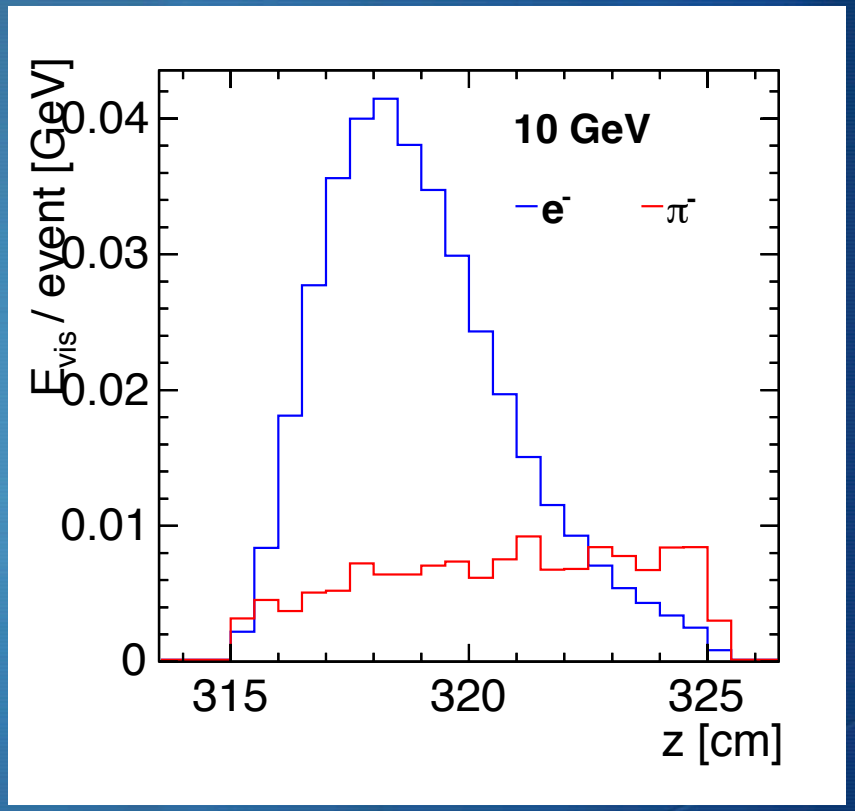
FEMC – (Forward Electromagnetic Calorimeter):
Scintillator Tungsten Calorimeter

FHCAL – (Forward Hadron Calorimeter):
Scintillator Steel Hadron Calorimeter

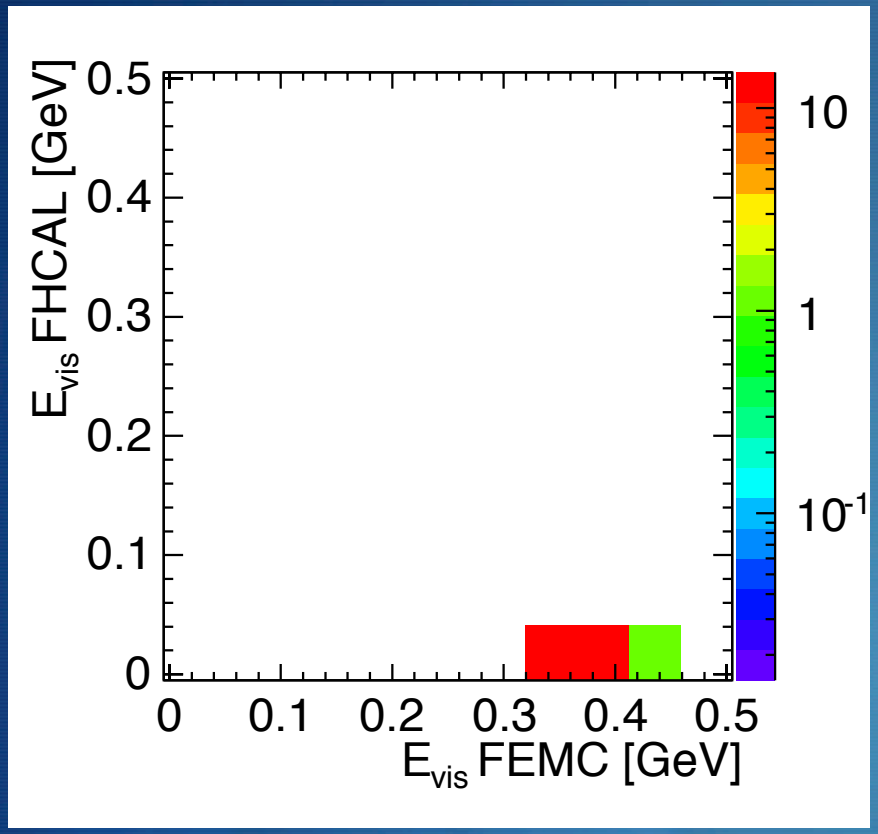
Energy Visibility in the FEMC

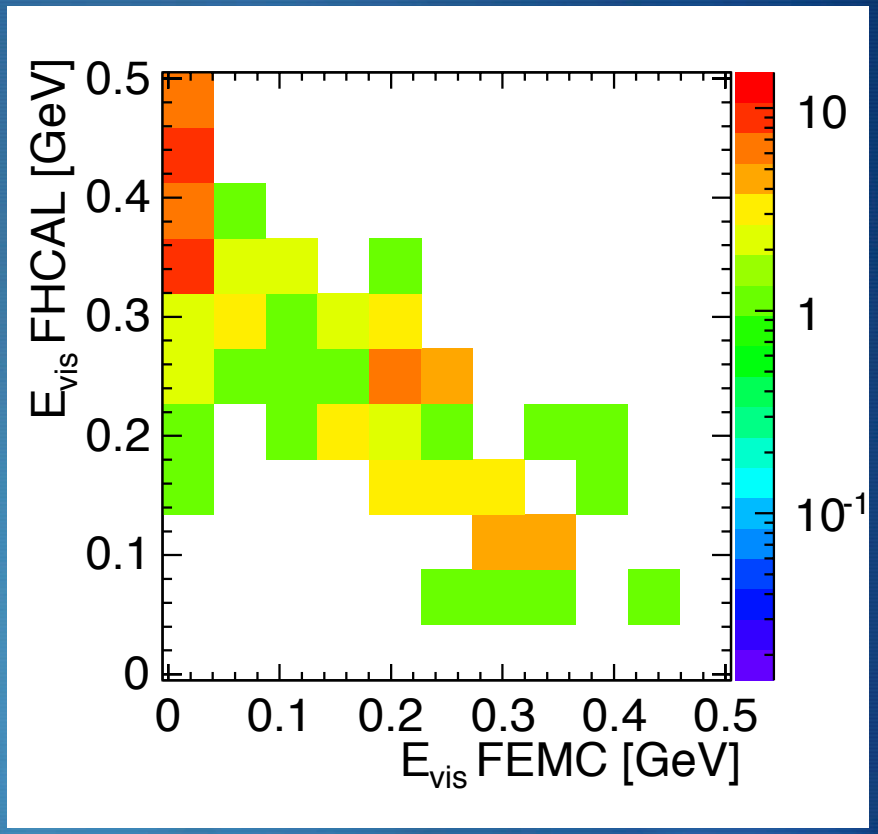


Total Visible Energy for Electrons and Pions



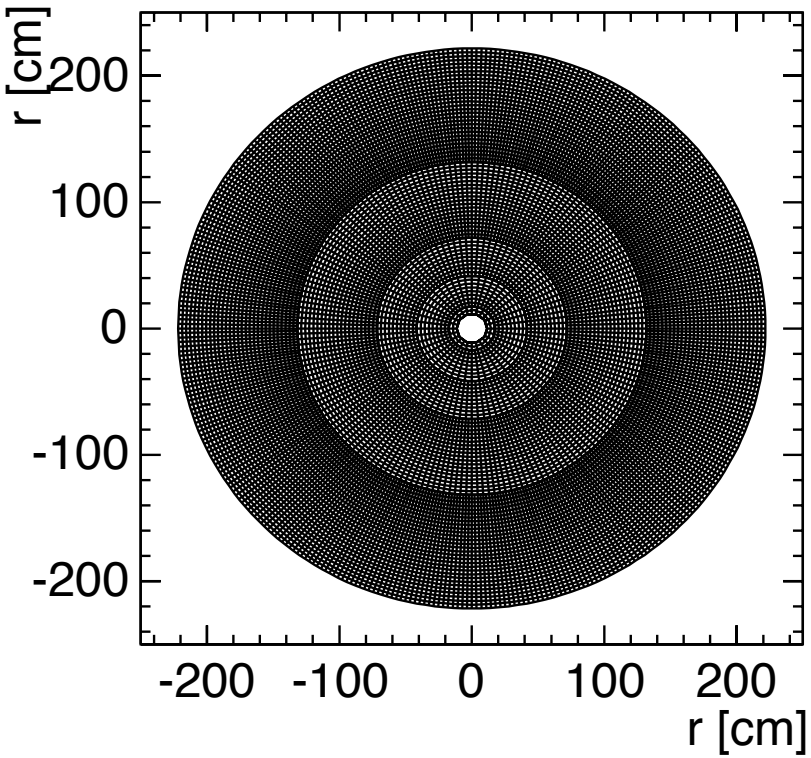
Longitudinal Energy Visibility





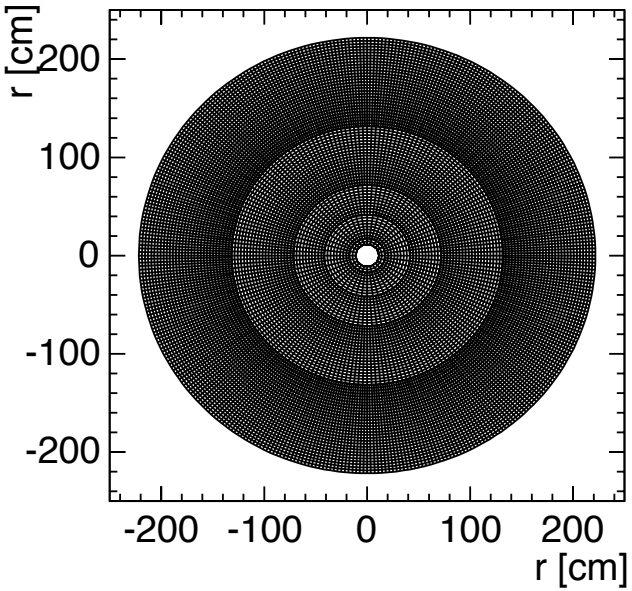
FEMC / FHCAL Correlation

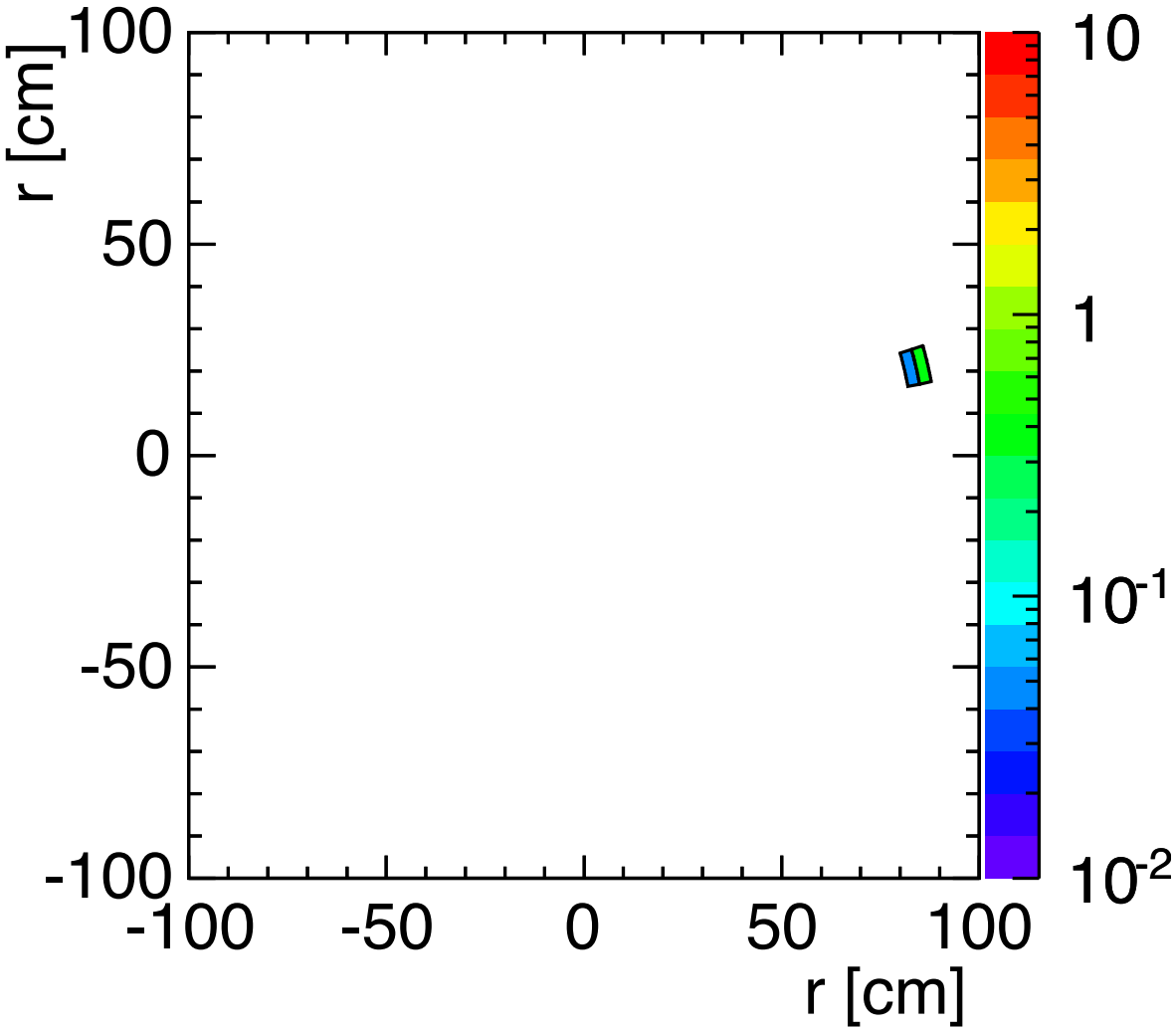
FEMC Tower Segmentation



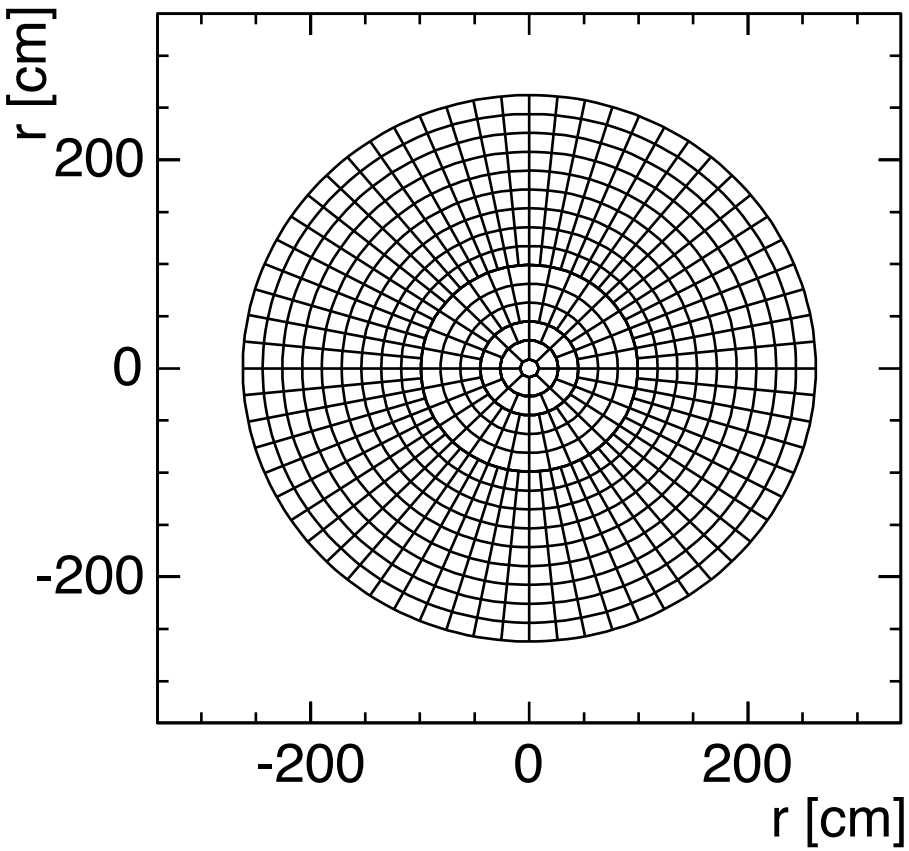
	1	2	3	4	5
# Bins r	2	8	10	20	30
Width r (cm)	3.000	3.021	3.000	3.000	3.000
# Bins ϕ	24	48	96	192	384
Width ϕ –min (cm)	3.022	3.021	2.730	2.347	2.155
Width ϕ –max (cm)	3.022	5.460	4.693	4.310	3.628
# Towers	48	384	960	3840	11520

FEMC – One Electron Hit





FHCAL Tower Segmentation



	1	2	3	4
# Bins r	1	1	3	9
Width r (cm)	18.093	18.093	18.093	18.093
# Bins ϕ	8	16	32	64
Width ϕ –min (cm)	6.872	10.541	8.823	9.740
Width ϕ –max (cm)	21.082	17.646	19.480	25.726
# Towers	8	16	96	576

Summary

- Using the Geant4 simulations, we were able to get a first look at electromagnetic calorimeter response to single electrons and pions.
- We defined preliminary tower segmentation for electromagnetic calorimeters.

Next Steps:

- To find the criteria for electron and pion separation based on tower information in electromagnetic calorimeters and hadron calorimeter.
- Get efficiency of electron and pion separation in electron-proton collisions (Deep Inelastic Scattering).