Quadrupole Shielded-Pickup Data

Initial Results from ECLOUD Modeling for 10- and 20-Bunch Trains in Q48W 5.3 GeV 8 mA/bunch

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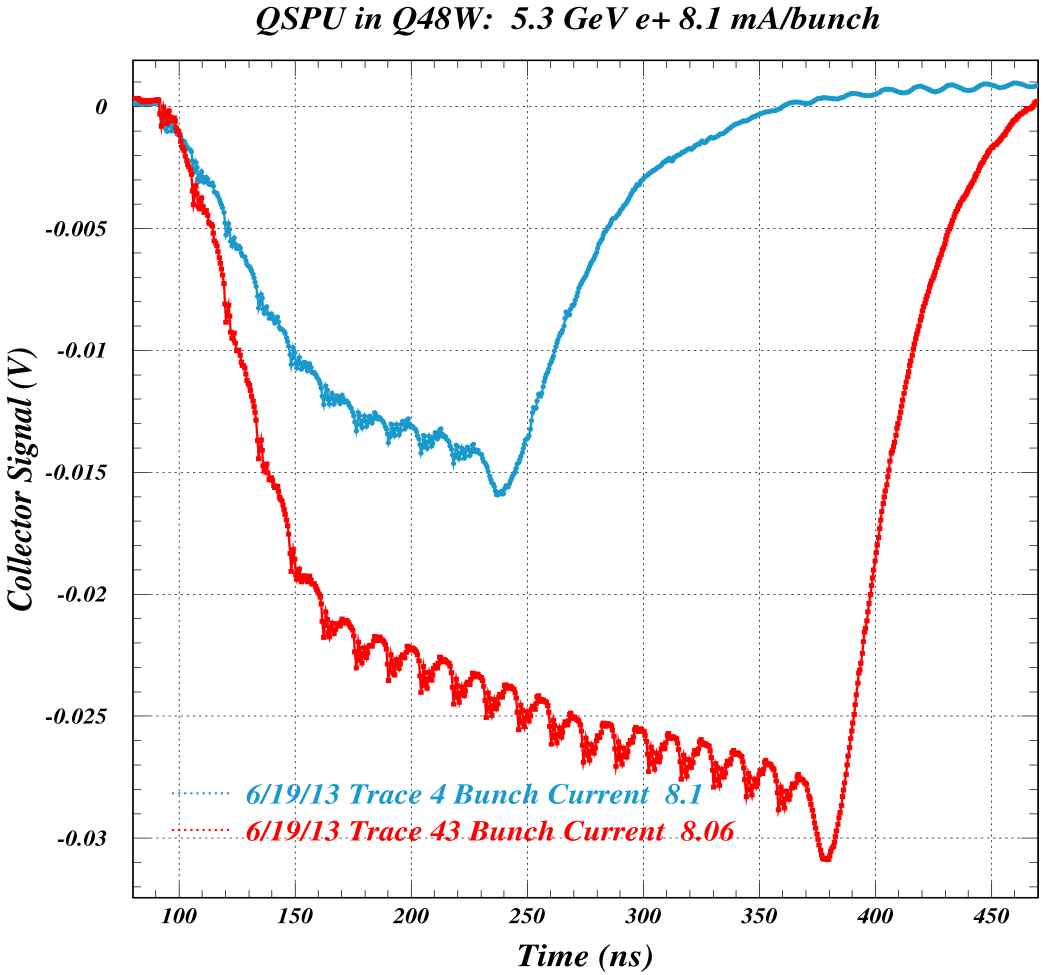
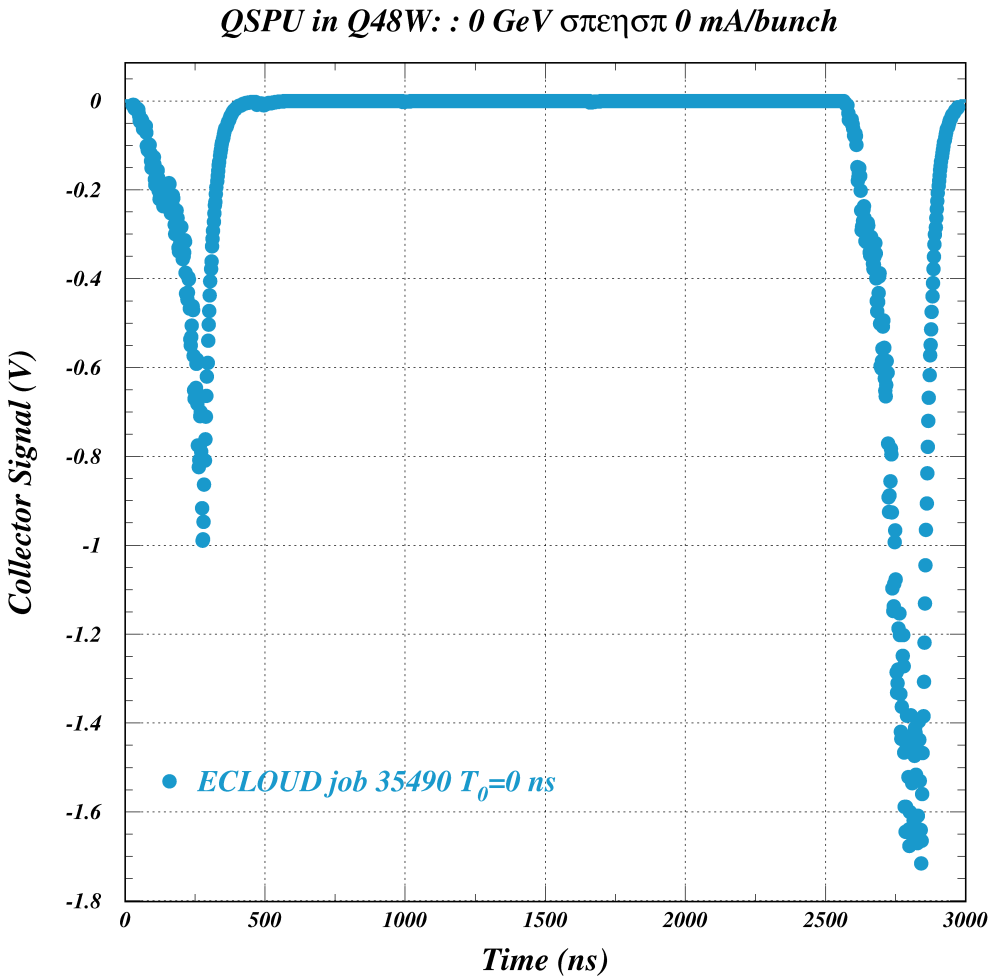
10- and 20-Bunch Data



Evidence of trapping and a "charge reservoir" is seen in the data.

Does the model predict the trapping phenomenon?

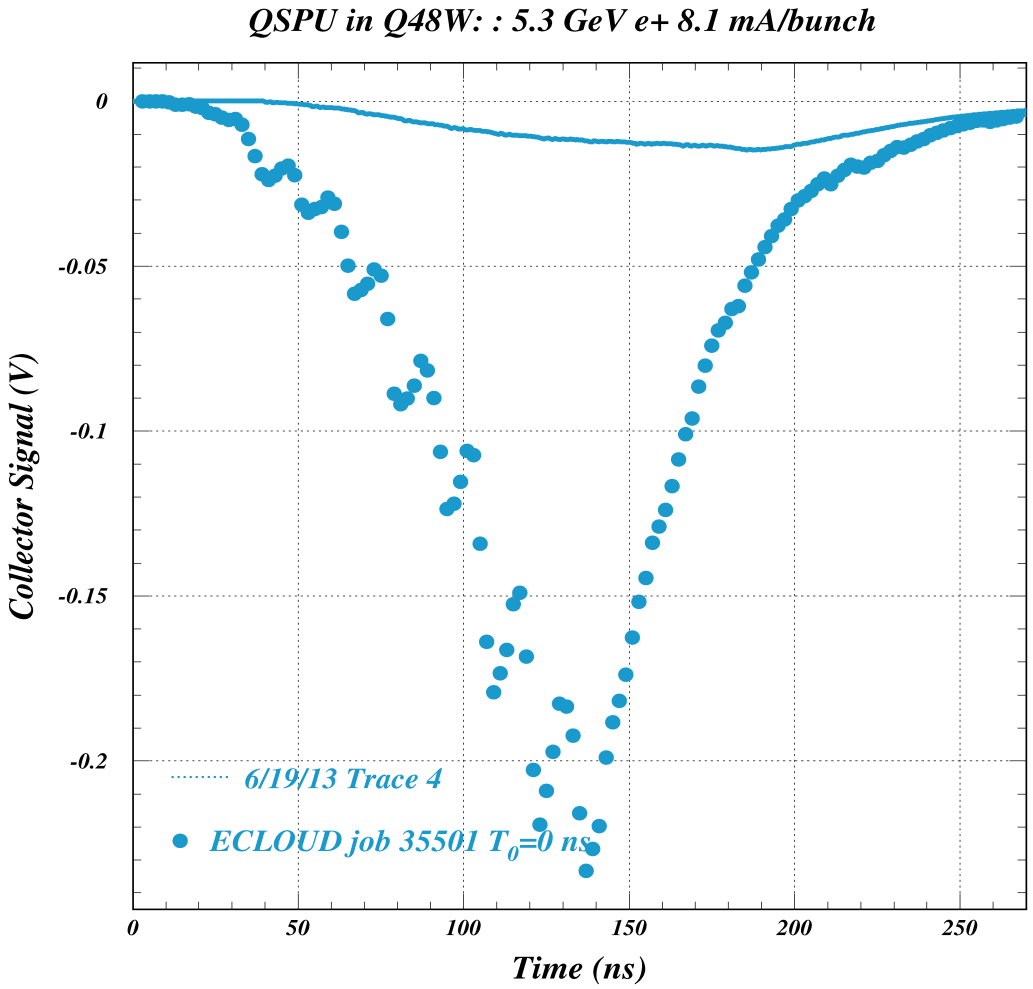
10-Bunch Train
5.3 GeV 8 mA/Bunch: 2 Turns



Model is 80% larger in the second turn.

This is a result of EC trapping in the model.

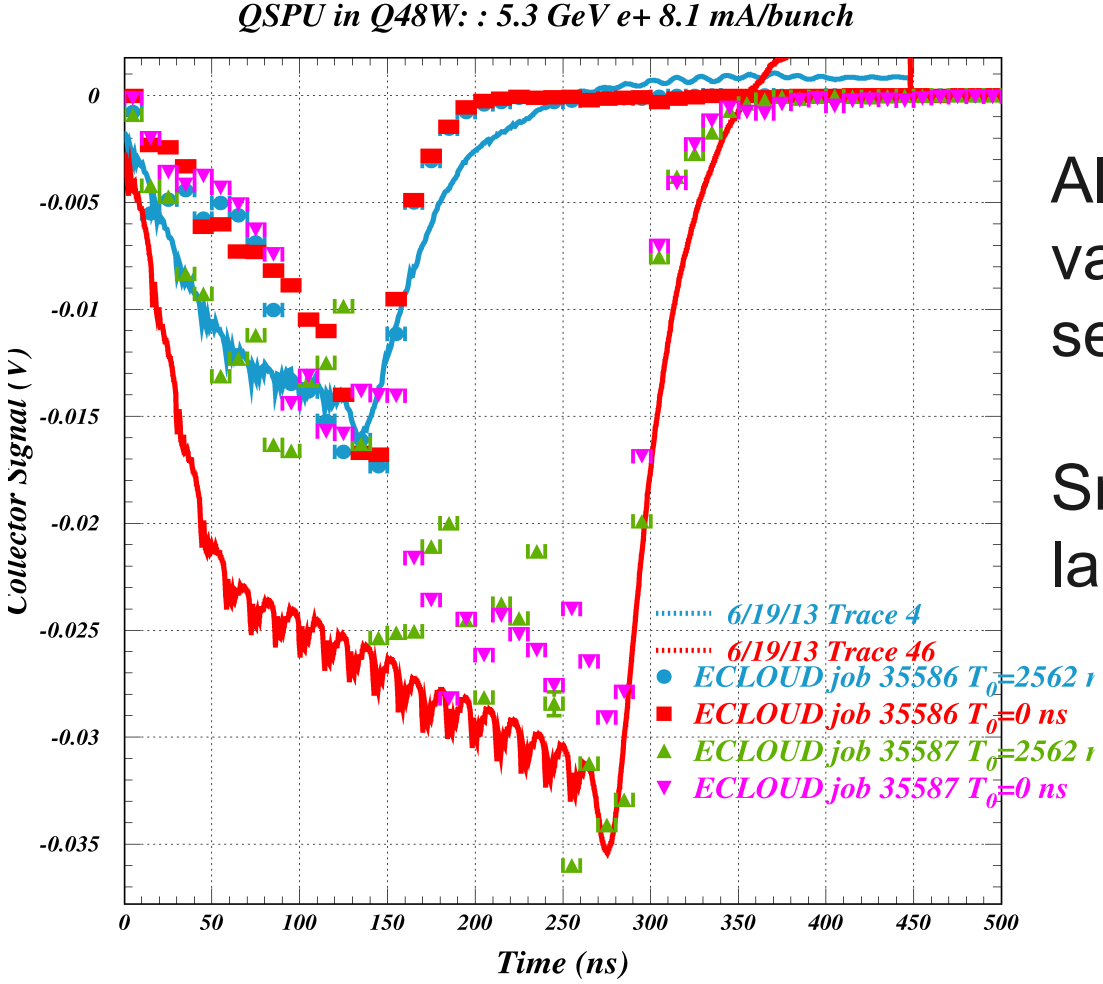
10-Bunch e+ Train
5.3 GeV 8 mA/Bunch



Model is much too large.

Need to account for an altered acceptance due to quadrupole field.

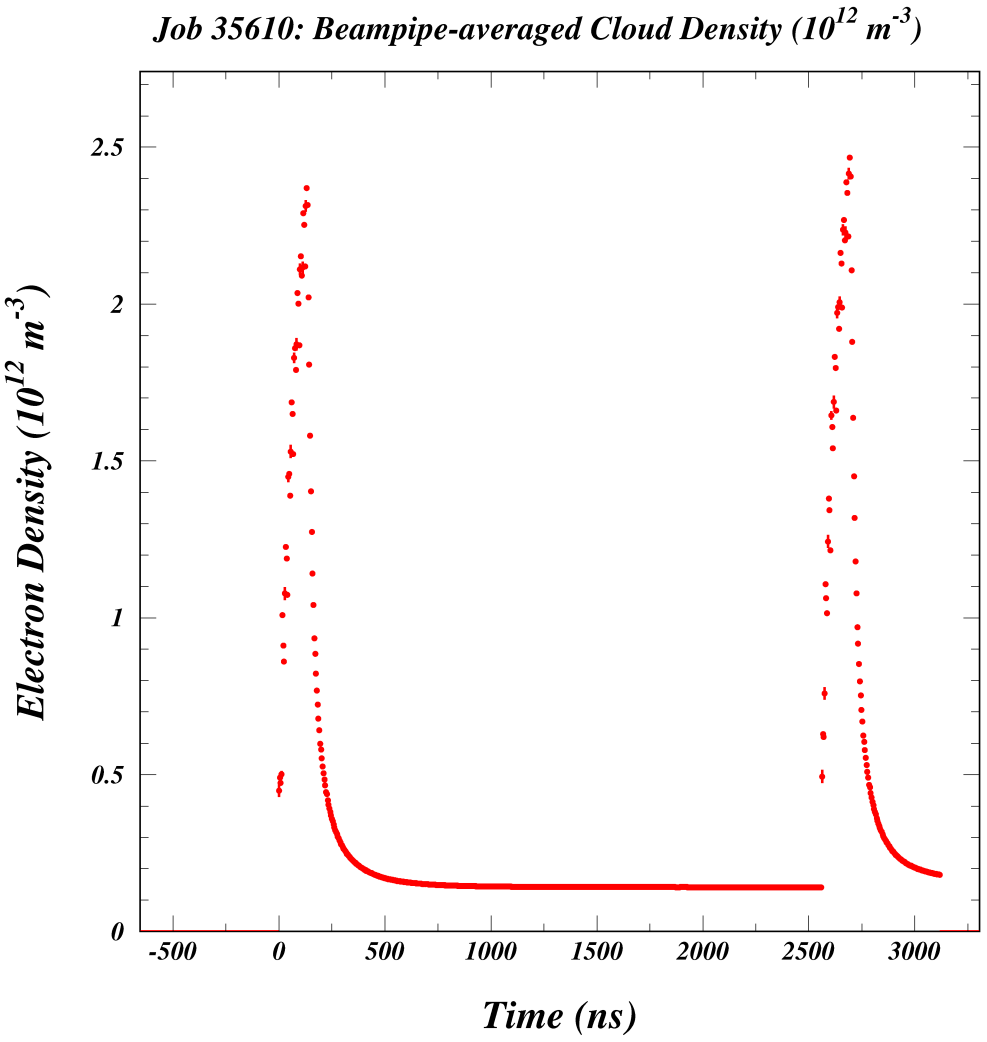
Altering SEY Value



Altering the re-diffused SEY value from 0.7 to 0.2 severely reduces model size.

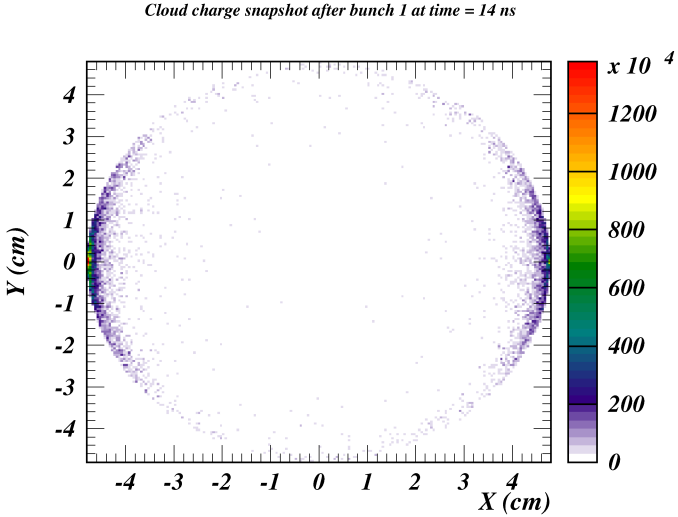
Small changes in SEY have large impacts on the model.

10-Bunch e+ Train
5.3 GeV 8 mA/bunch: Density

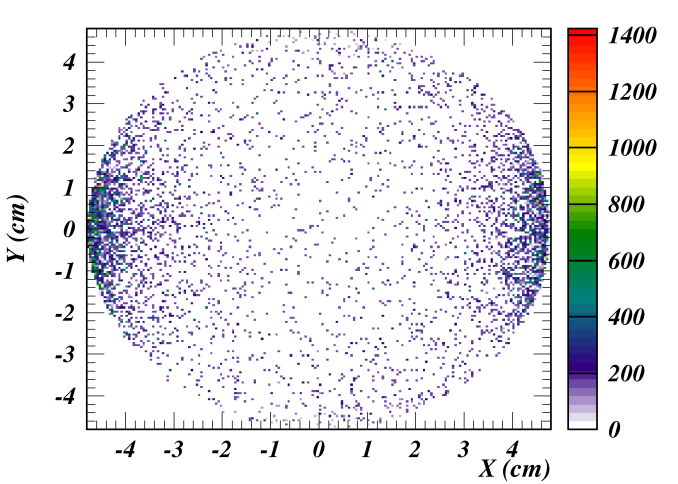


Buildup during first 10-bunch train

Prior to Turn 1 Bunch 2



No energy cut: 54160 macroparticles, 3.13895e+09 e-



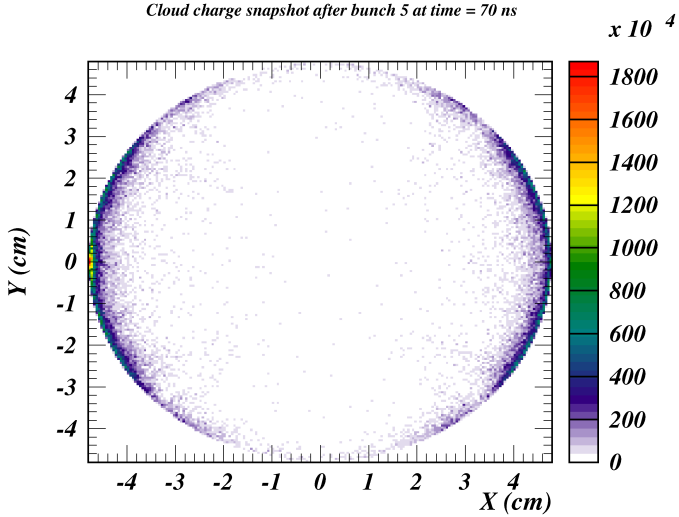
E_{kin}>10 eV: 6710 macroparticles, 889138176 e-

No E_e selection

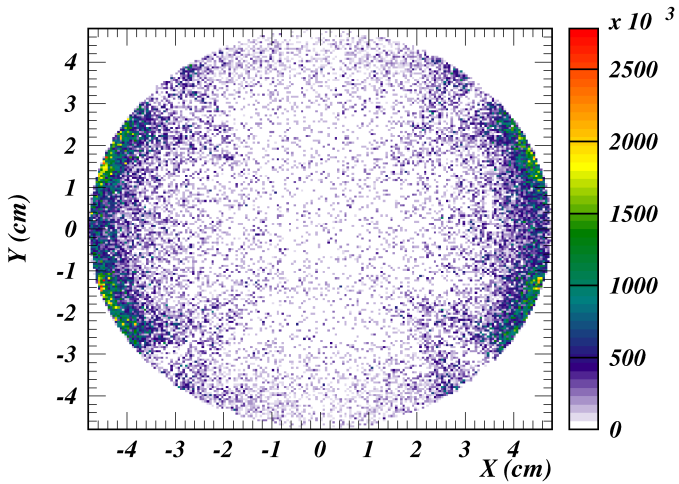
E_e > 10 eV

Escape zones appear
Buildup on inner and outer surfaces

Prior to Turn 1 Bunch 6



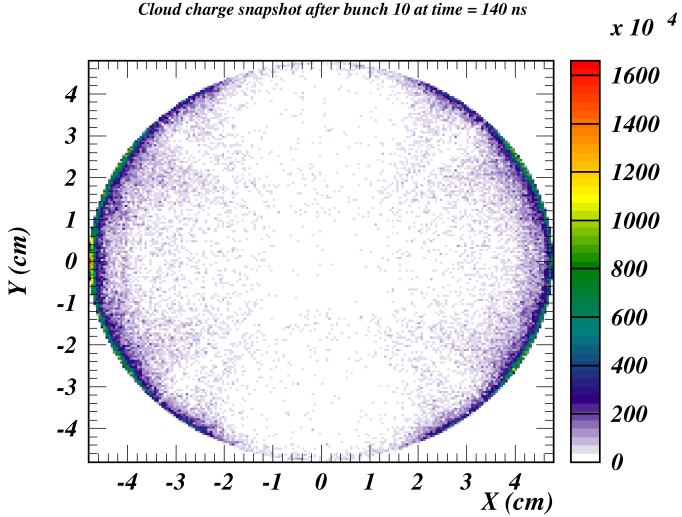
No energy cut: 189394 macroparticles, 1.00406e+10 e-

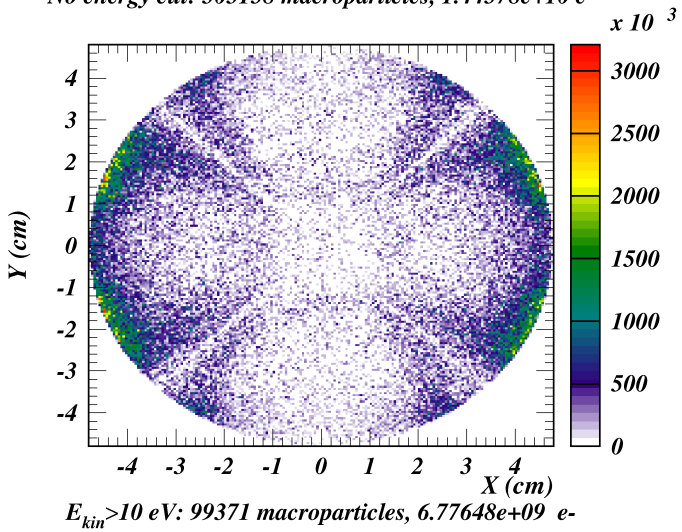


E_{kin}>10 eV: 48634 macroparticles, 4.18799e+09 e-

Cloud decay following first 10-bunch train

Prior to Turn 1 Bunch "11"





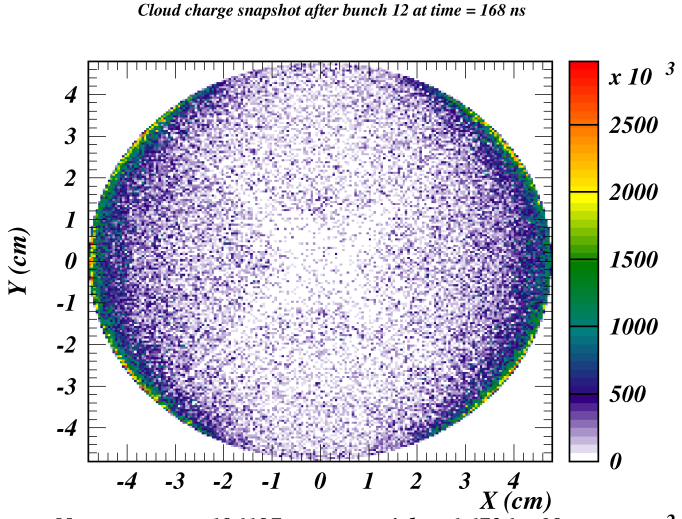
No E_e selection

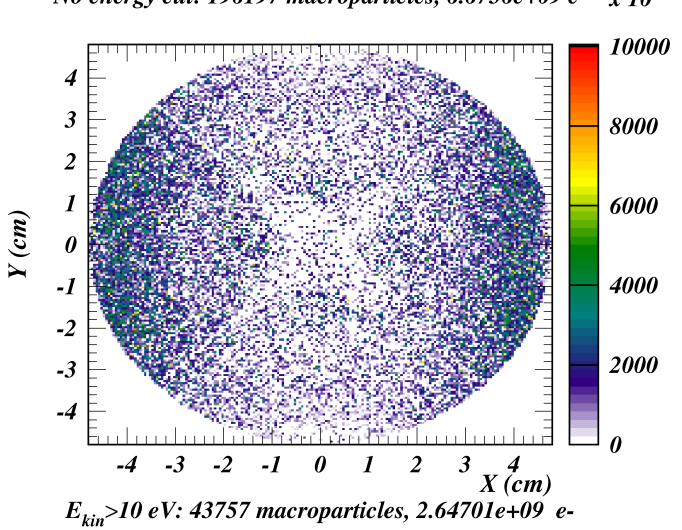
E_e > 10 eV

Cloud migrates away from walls

Energy decreases

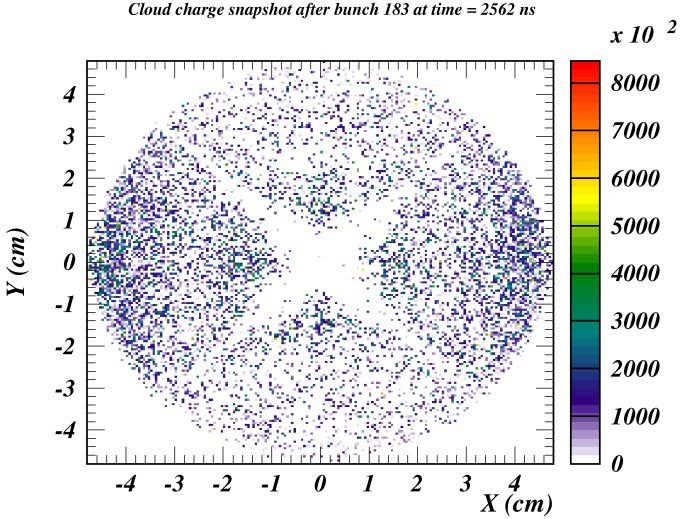
Prior to Turn 1 Bunch "13"



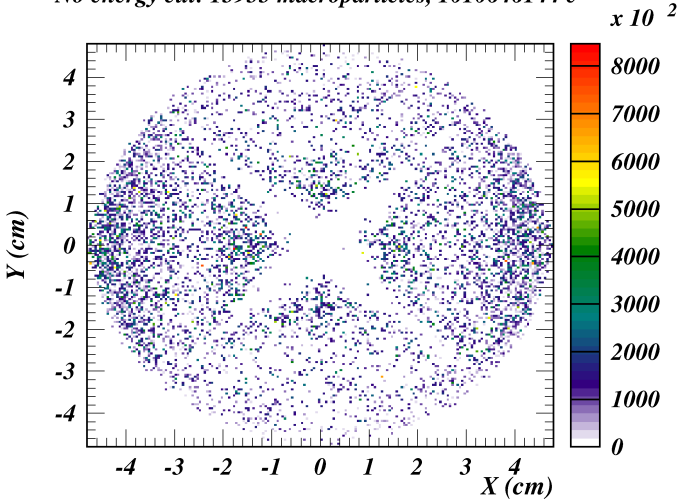


Prior to second turn and after second train

Prior to Turn 2 Bunch 1



No energy cut: 13933 macroparticles, 1010646144 e-



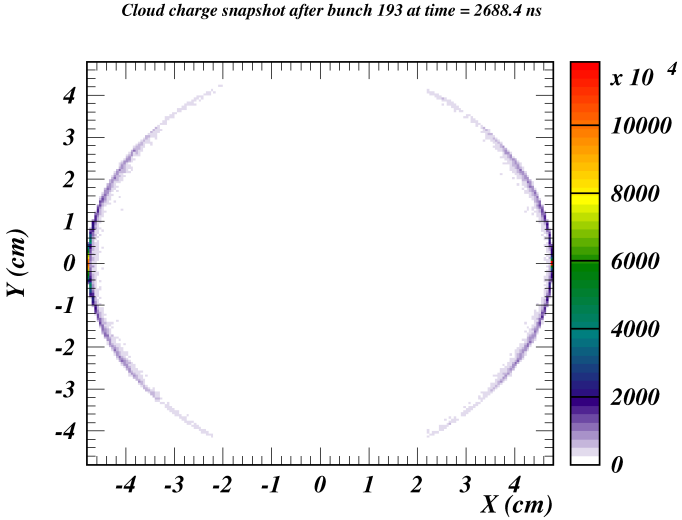
E_{kin}>10 eV: 10674 macroparticles, 873396928 e-

No E_e selection

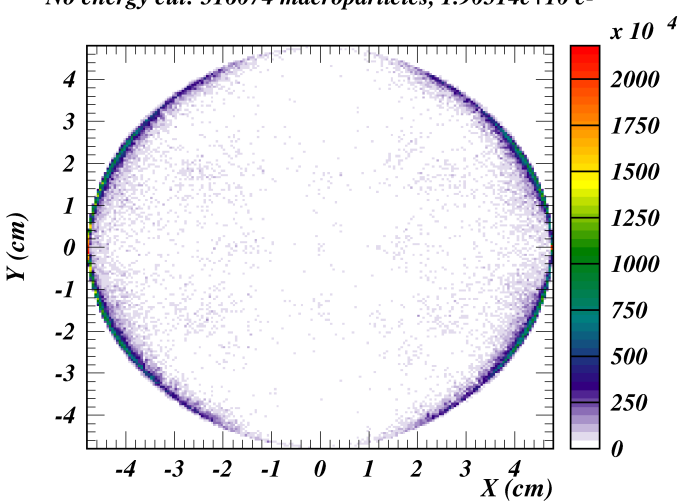
E_e > 10 eV

Cloud trapped near beam Energies 90% > 10 eV (!)

Prior to Turn 2 Bunch "11"



No energy cut: 316074 macroparticles, 1.90314e+10 e-



E_{kin}>10 eV: 191459 macroparticles, 1.31319e+10 e-