New Plotting Tools

ECLOUD spacecharge field
(Example: Trapped cloud space charge field)

Synrad3D output analysis
(Example: RFA 40E1 SEY station after L3 vacuum chamber correction)

-- Updated Synrad3D plots on 3/4/2014. Added comparison to Synrad3D analysis of Jan/2012 --

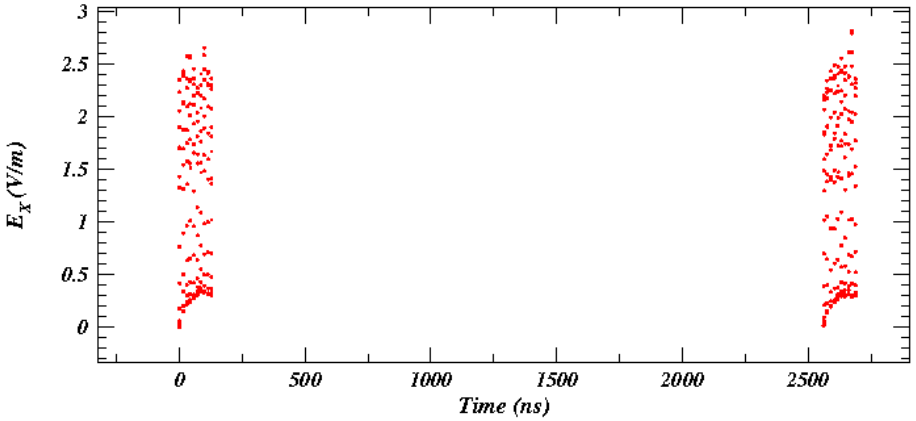
Jim Crittenden

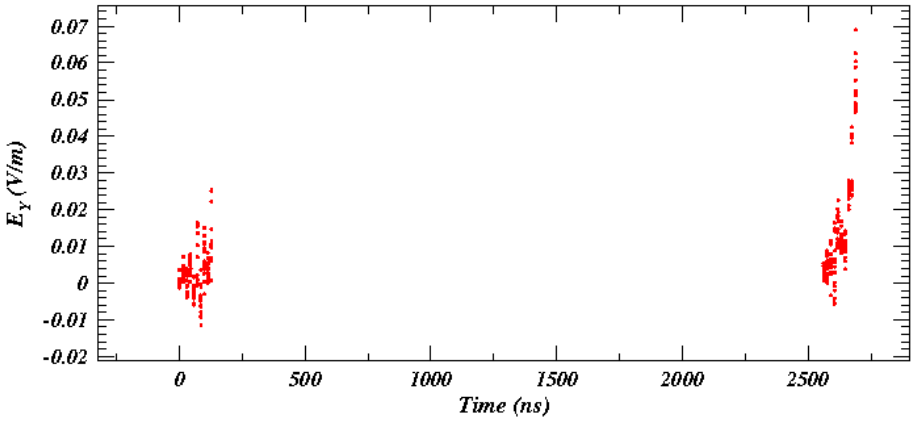
Electron Cloud Meeting

26 February 2014

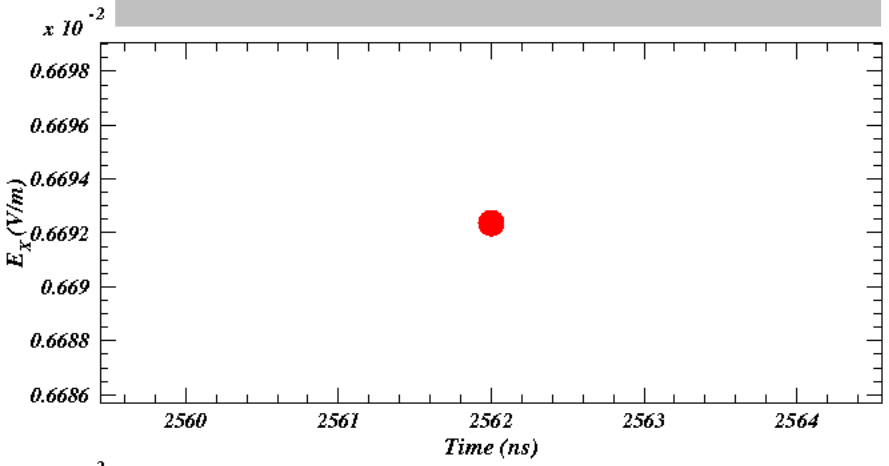
ECLOUD quad trapping model
Central spacecharge field values

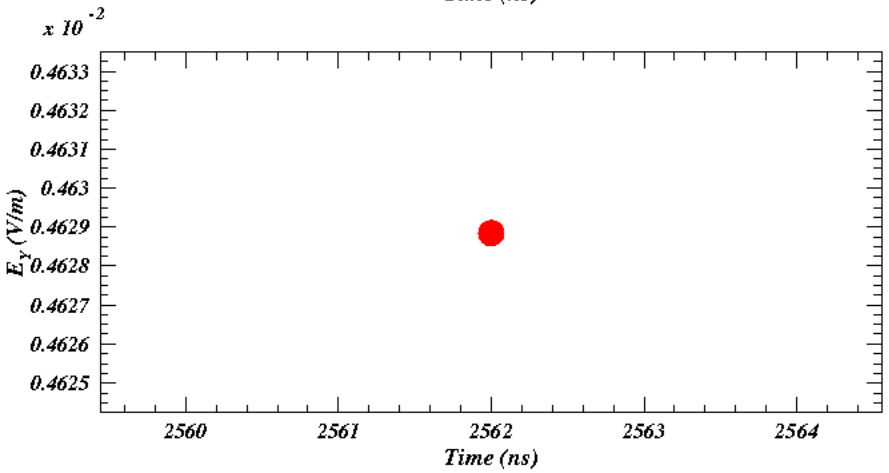
Averaged over entire 2.7 μs of simulation





Snapshot at end of turn



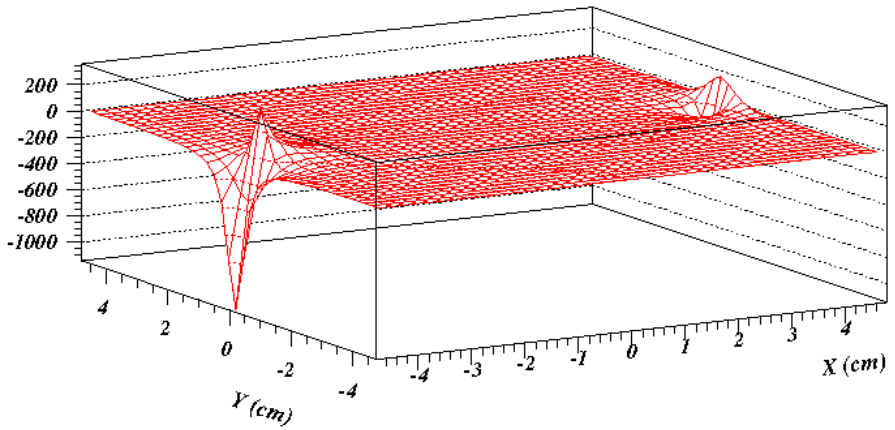


Spacecharge field written prior and during each beam bunch (15 slices). Field values are small.

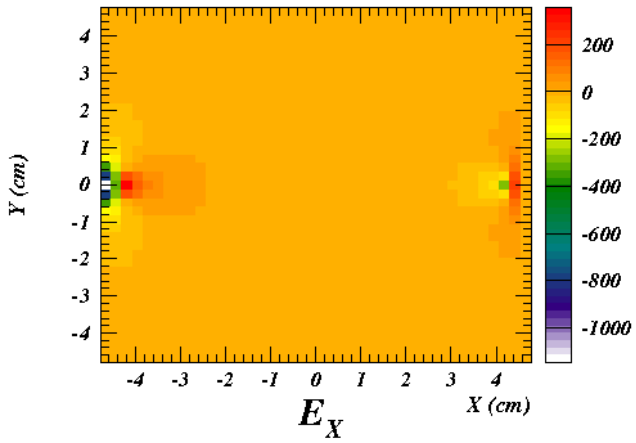
2D time-averaged field profile over full 4.8-cm-radius circular vacuum chamber

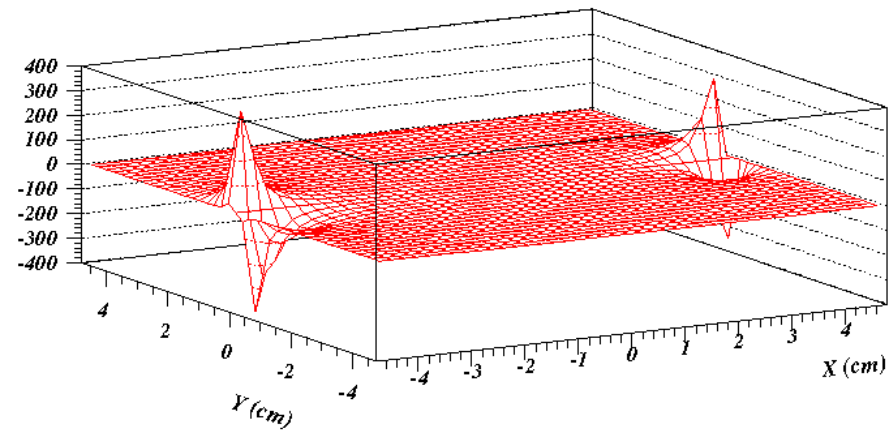
Averaged over entire 2.7 μs of simulation

Average electric field (V/m) for 0.02 < T < 2688.39 ns

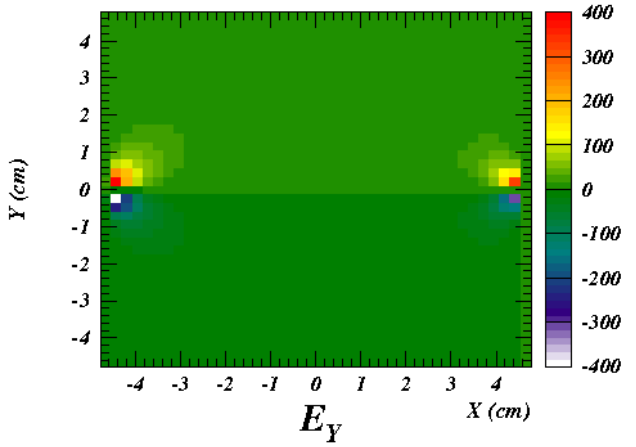


E_X





E_Y

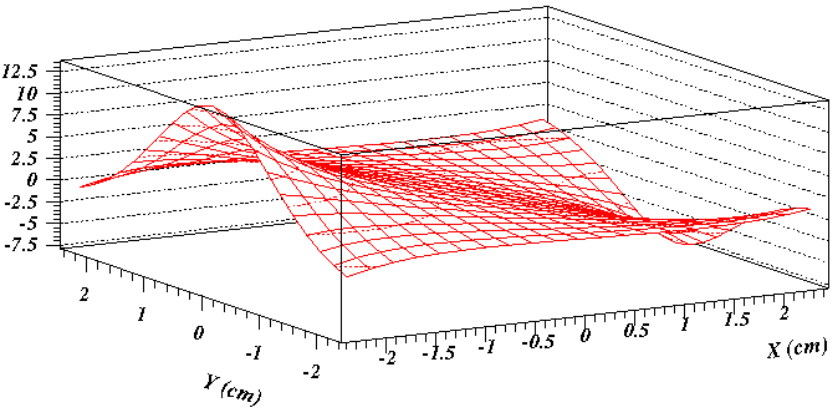


Hot spots in horizontal plane

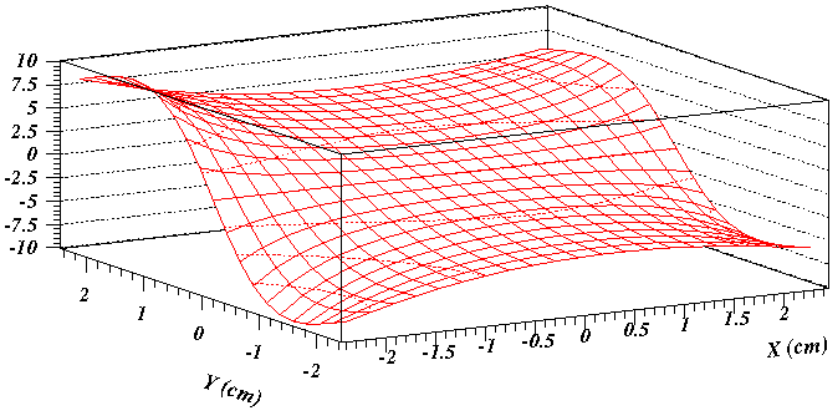
2D spacecharge field profile over +- 2.4 cm

Averaged over entire 2.7 μs of simulation

Average electric field (V/m) for 0.02 < T < 2688.39 ns



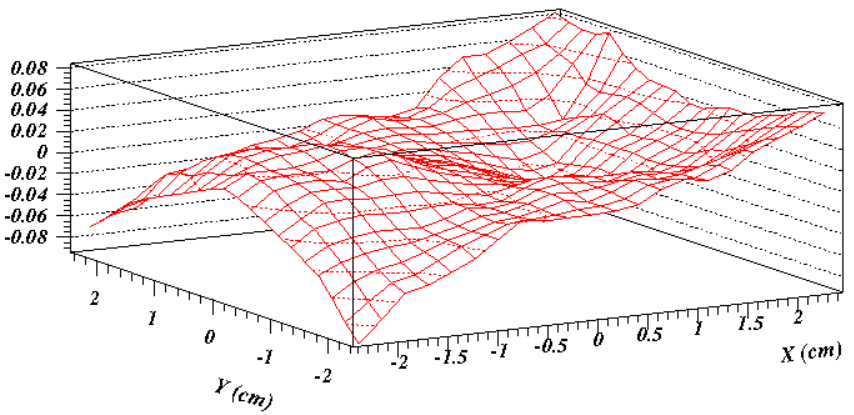
E_X



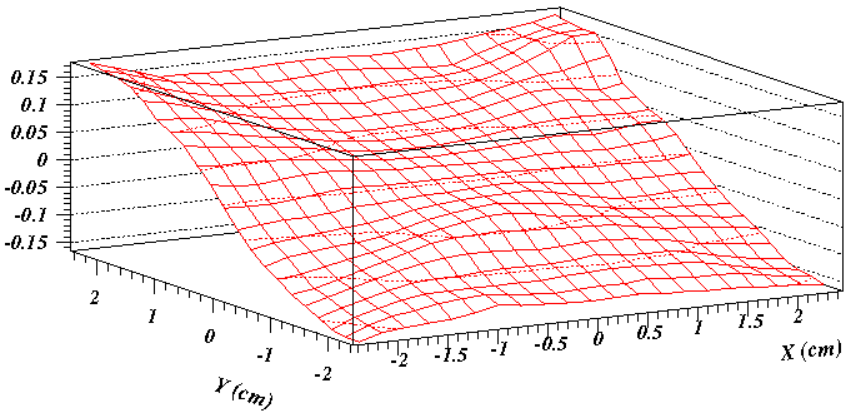
E_Y

Snapshot at end of turn

Average electric field (V/m) for 2562 < T < 2562 ns



E_X

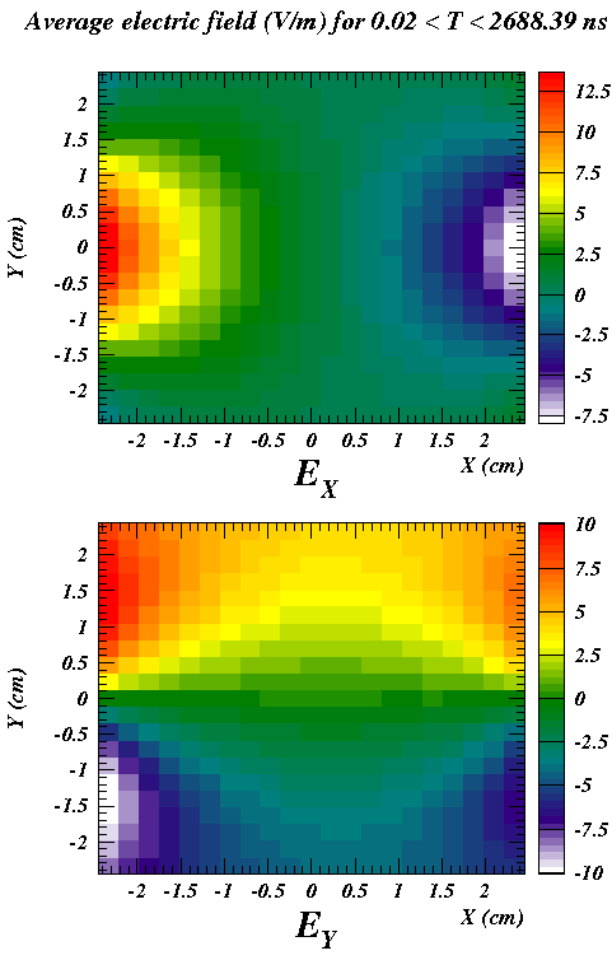


E_Y

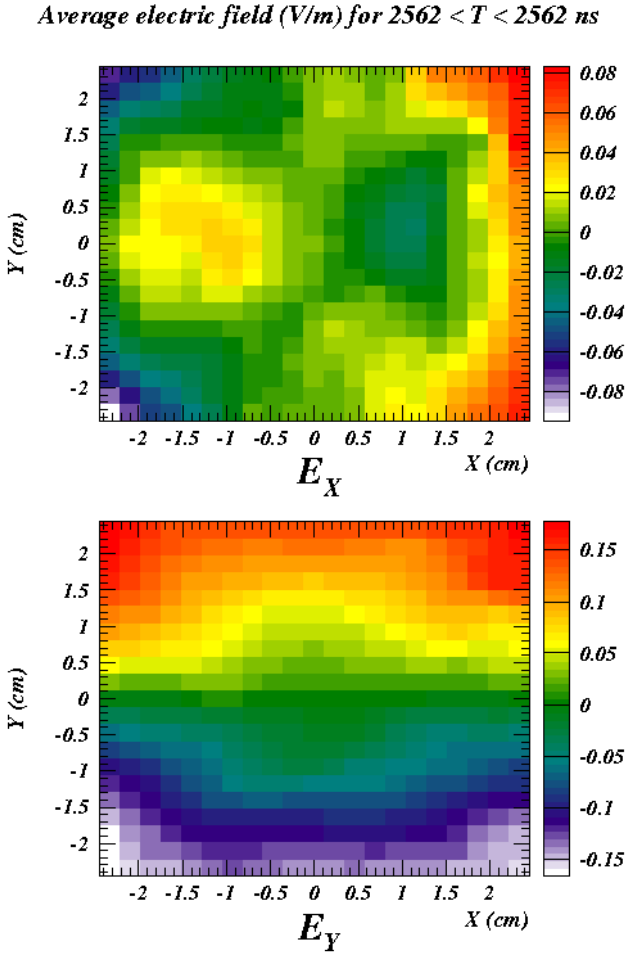
The trapped field is about 1/10 V/m.

2D spacecharge field profile over +- 2.4 cm

Averaged over entire 2.7 μs of simulation



Snapshot at end of turn

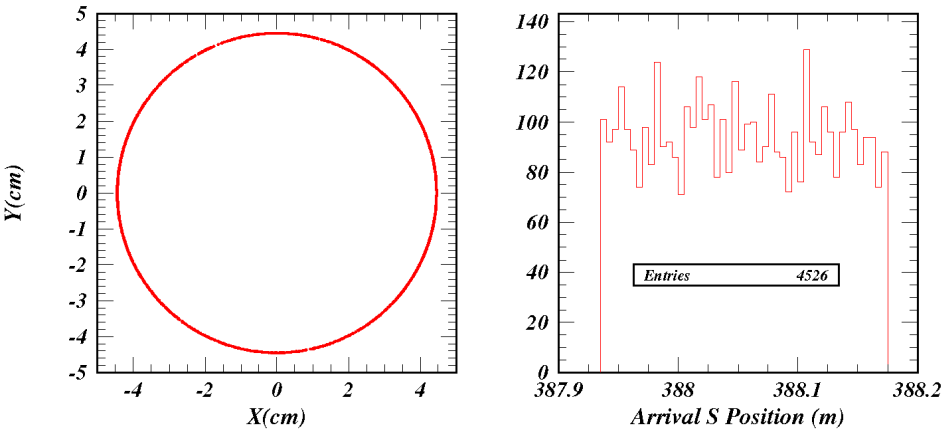


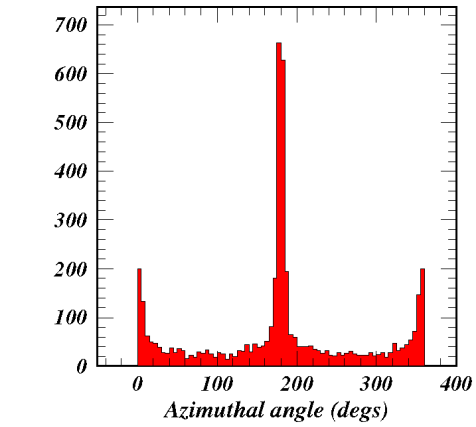
The trapped field is about 1/10 V/m.

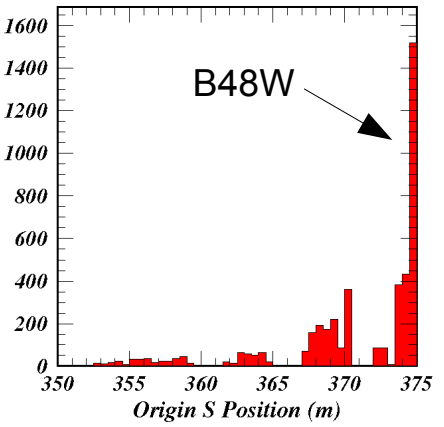
Synrad3D Output for RFA 49E1 (SEY station) CHESS lattice – 5k photons

Positron beam (0.04 γ/m/e+, 8 hrs run time)

SYNRAD3D: CHESS e+ beam. L3 vacuum chamber updated Feb/14. RFA 49E1

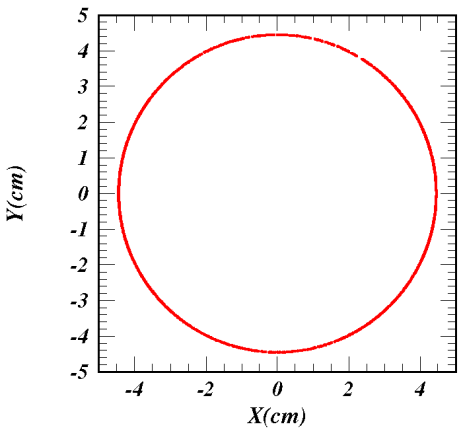


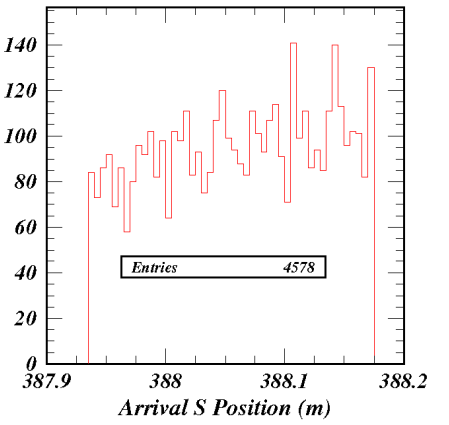


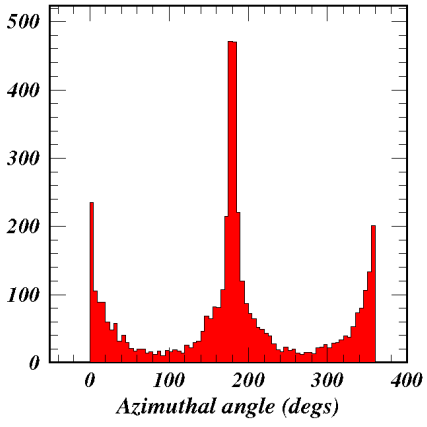


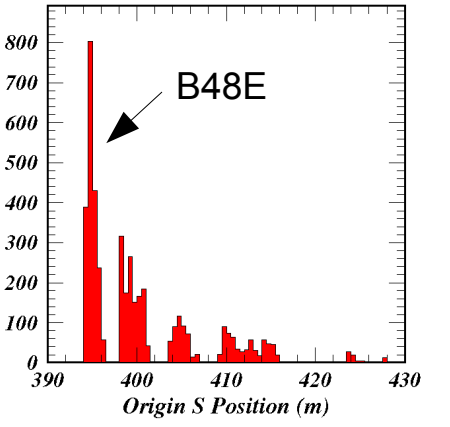
Electron beam (0.30 γ/m/e-, 1 hr run time)

SYNRAD3D: CHESS e- beam. L3 vacuum chamber updated Feb/14. RFA 49E1







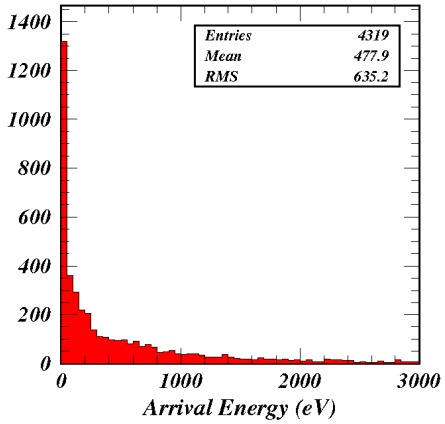


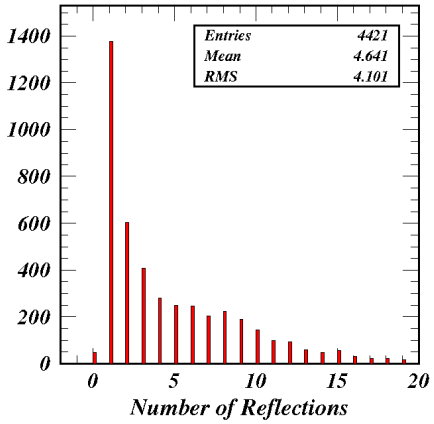
L3 vacuum chamber corrected for these runs. Now 3.5 inch (8.9 cm) diameter throughout.

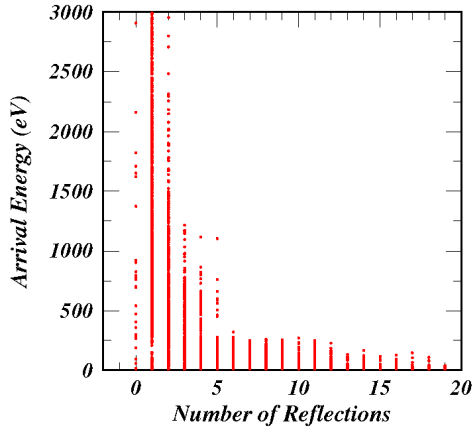
Synrad3D Output for RFA 49E1 (SEY station) CHESS lattice – 5k photons

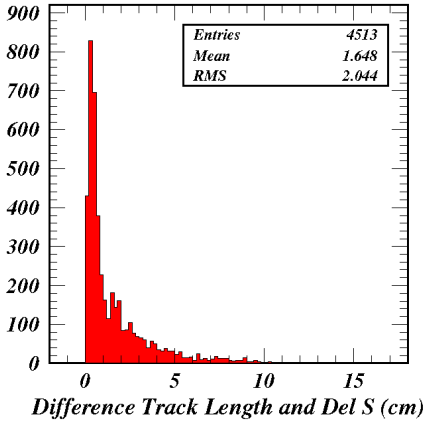
Positron beam

SYNRAD3D: CHESS e+ beam. L3 vacuum chamber updated Feb/14. RFA 49E1



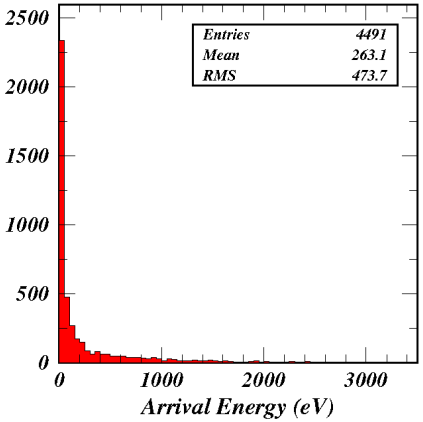


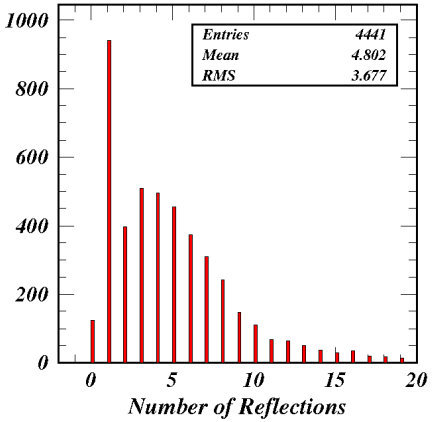


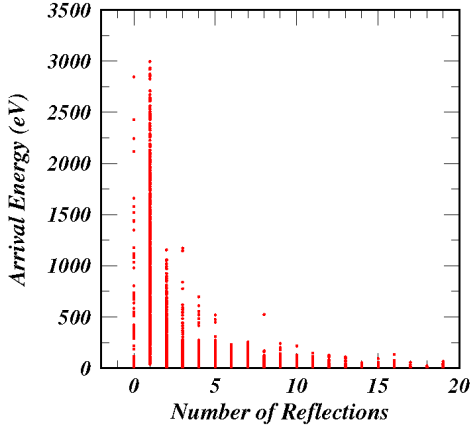


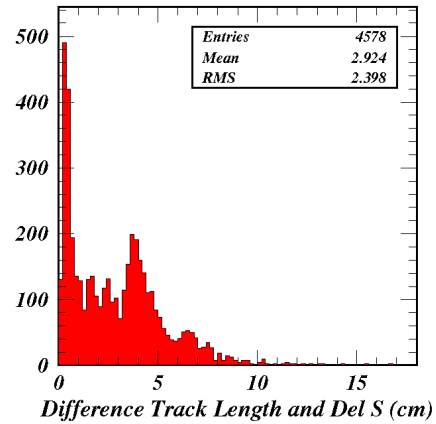
Electron beam

SYNRAD3D: CHESS e- beam. L3 vacuum chamber updated Feb/14. RFA 49E1





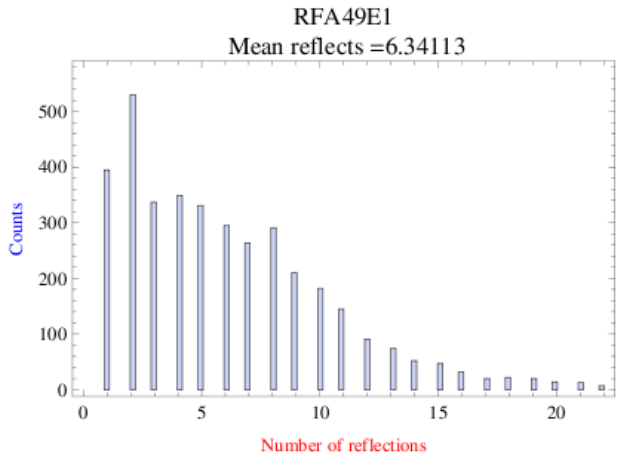


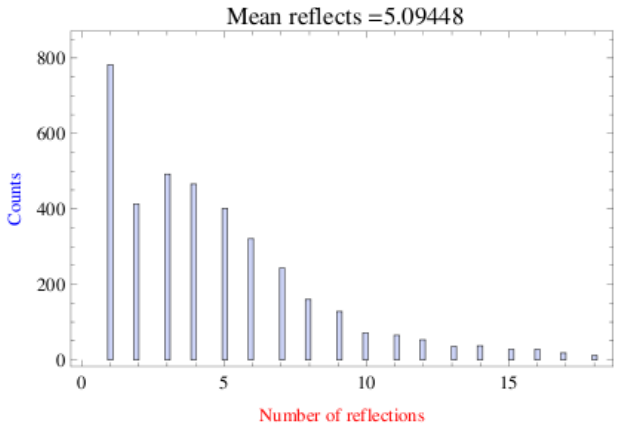


Average absorbed photon energy falls rapidly with the number of reflections.

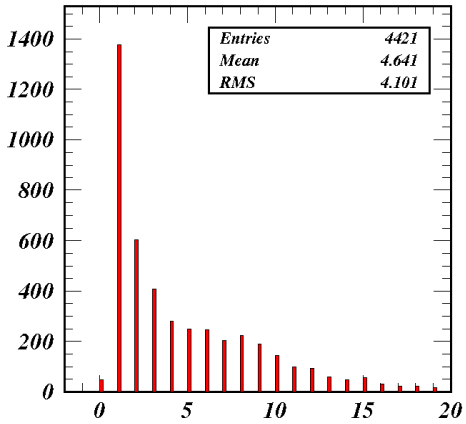
Synrad3D Output for RFA 49E1 (SEY station)
CHESS lattice – 5k photons

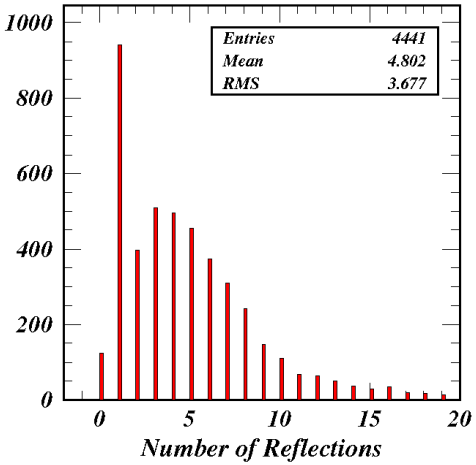
Synrad3D Jan/12
5.5 cm radius v.c. in L3





Synrad3D Feb/14
4.45 cm radius v.c. in L3





Positron beam

Electron beam

The vacuum chamber radius has been reduced from 5.5 cm to 4.45 cm between Q48W and Q48E, removing a nearby mask at 49E1 for the light from the electron beam.
Now there is more direct light from both beams, but it is only a relatively small contribution to the overall rate.