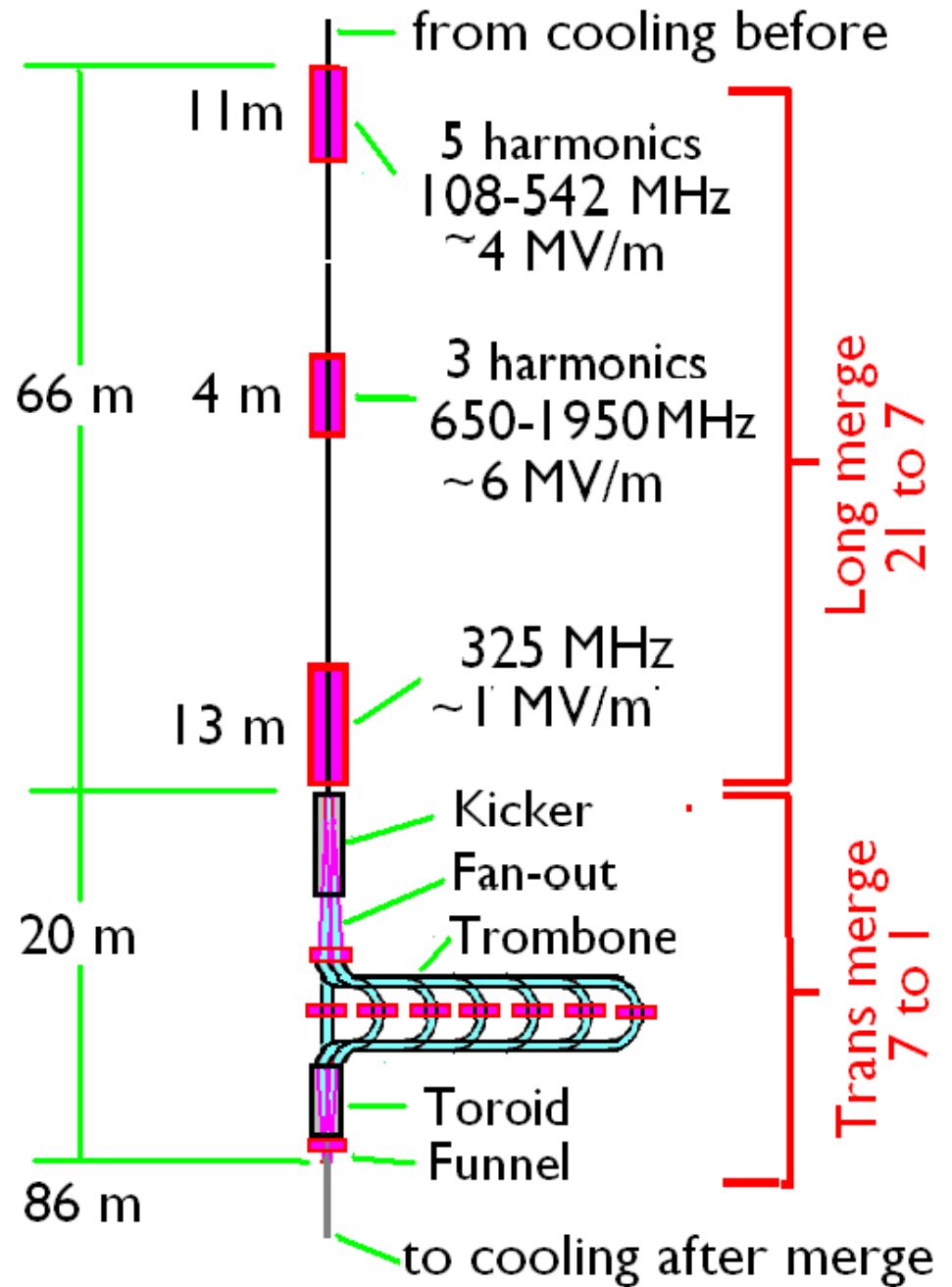# Quicky Merge for Diktys

Bob Palmer
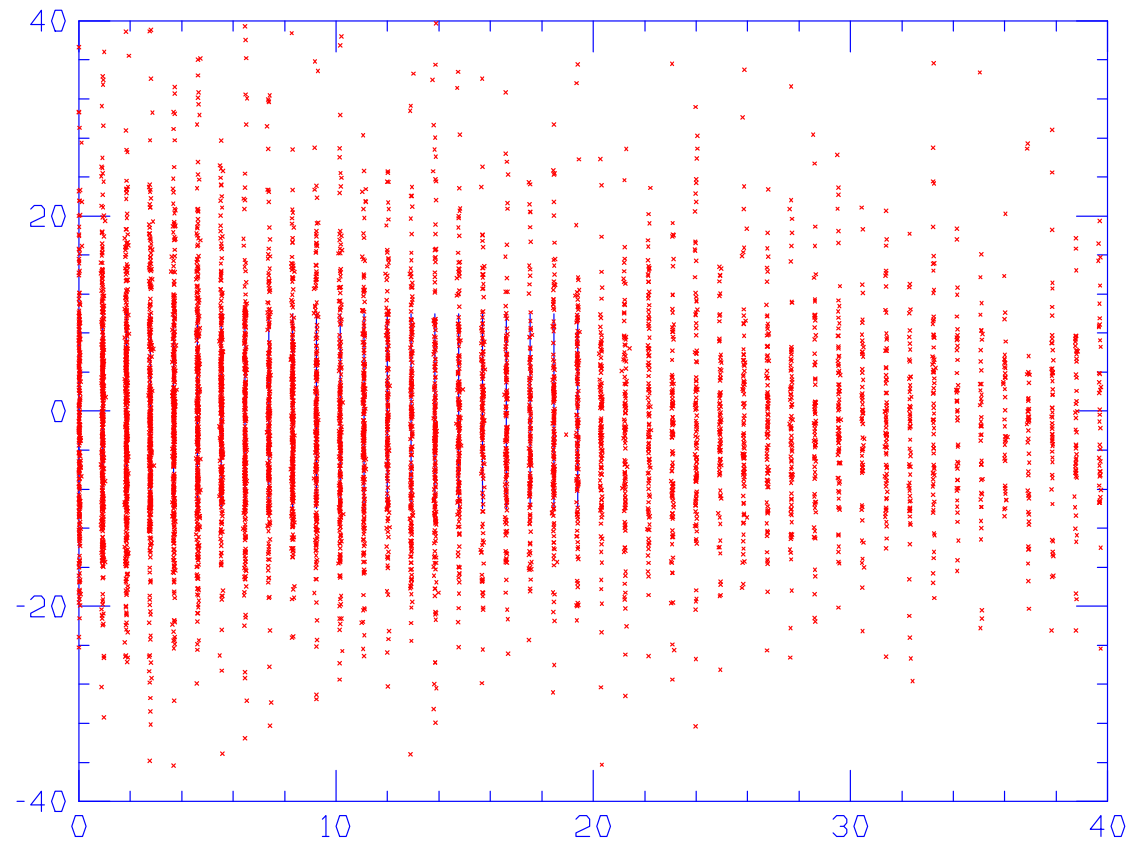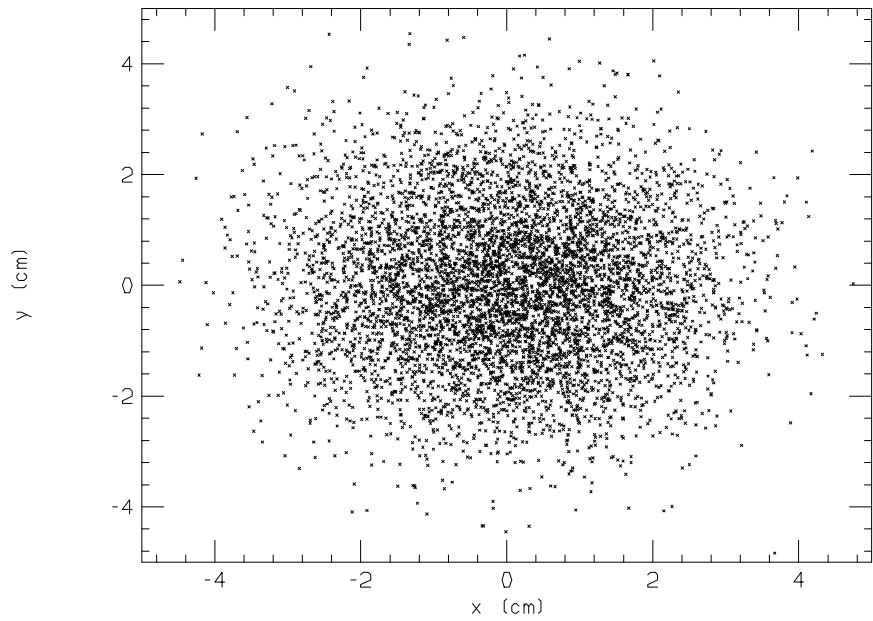
November 3, 2013

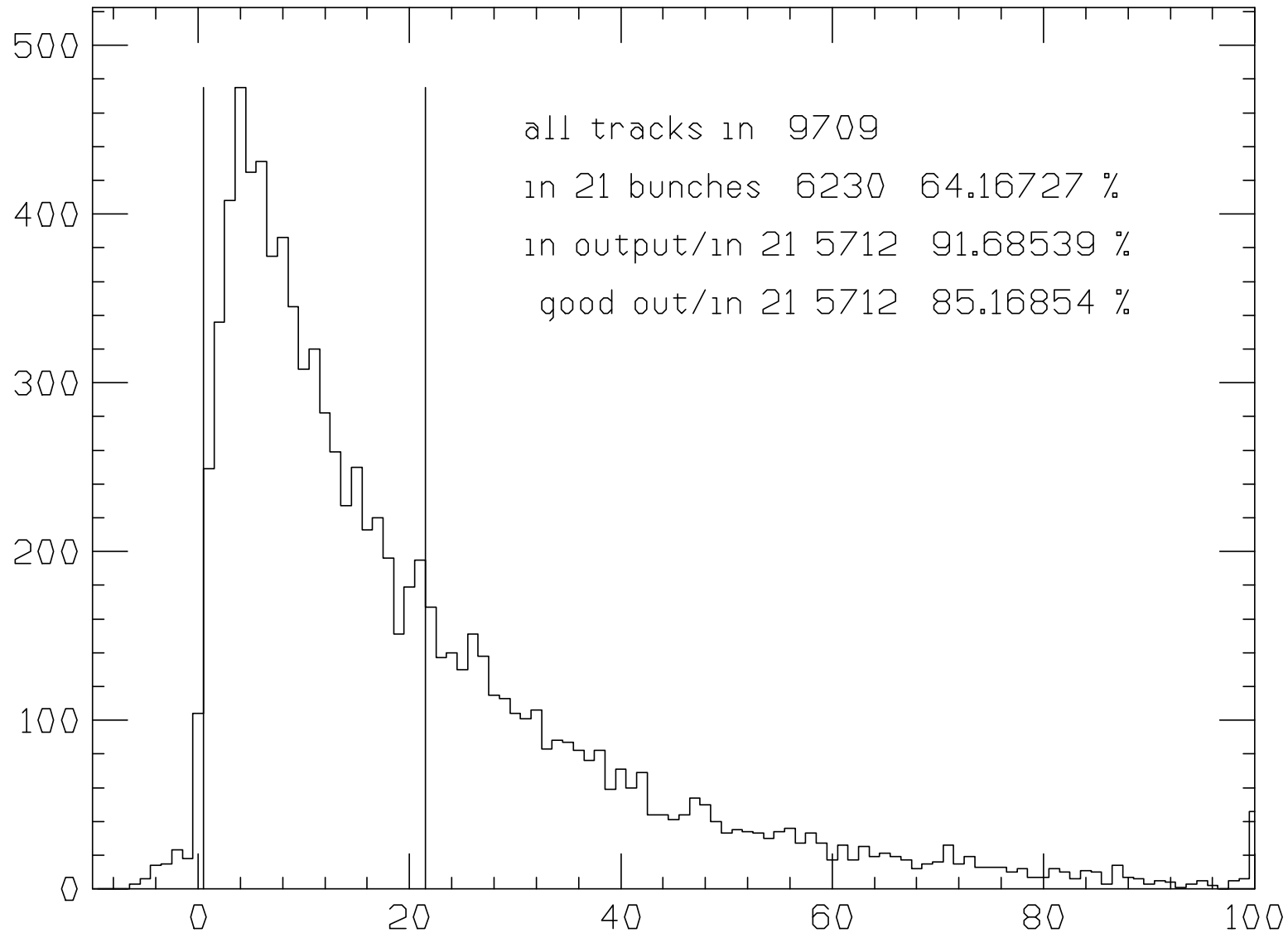# Need

- 6D merge simulation in G4BL in progress
- but Diktys needed a file to work with now
- so I ran a quicky version of the merge

from cooling before

11 m

5 harmonics
108-542 MHz
~4 MV/m

66 m   4 m

3 harmonics
650-1950 MHz
~6 MV/m

325 MHz
~1 MV/m

13 m

Kicker

Fan-out

Trombone

20 m

86 m

Toroid

Funnel

to cooling after merge

Long merge
21 to 7

Trans merge
7 to 1

Input from Diktys pre-merge simulation

Histogram of bunches

all tracks in 9709

in 21 bunches 6230   64.16727 %

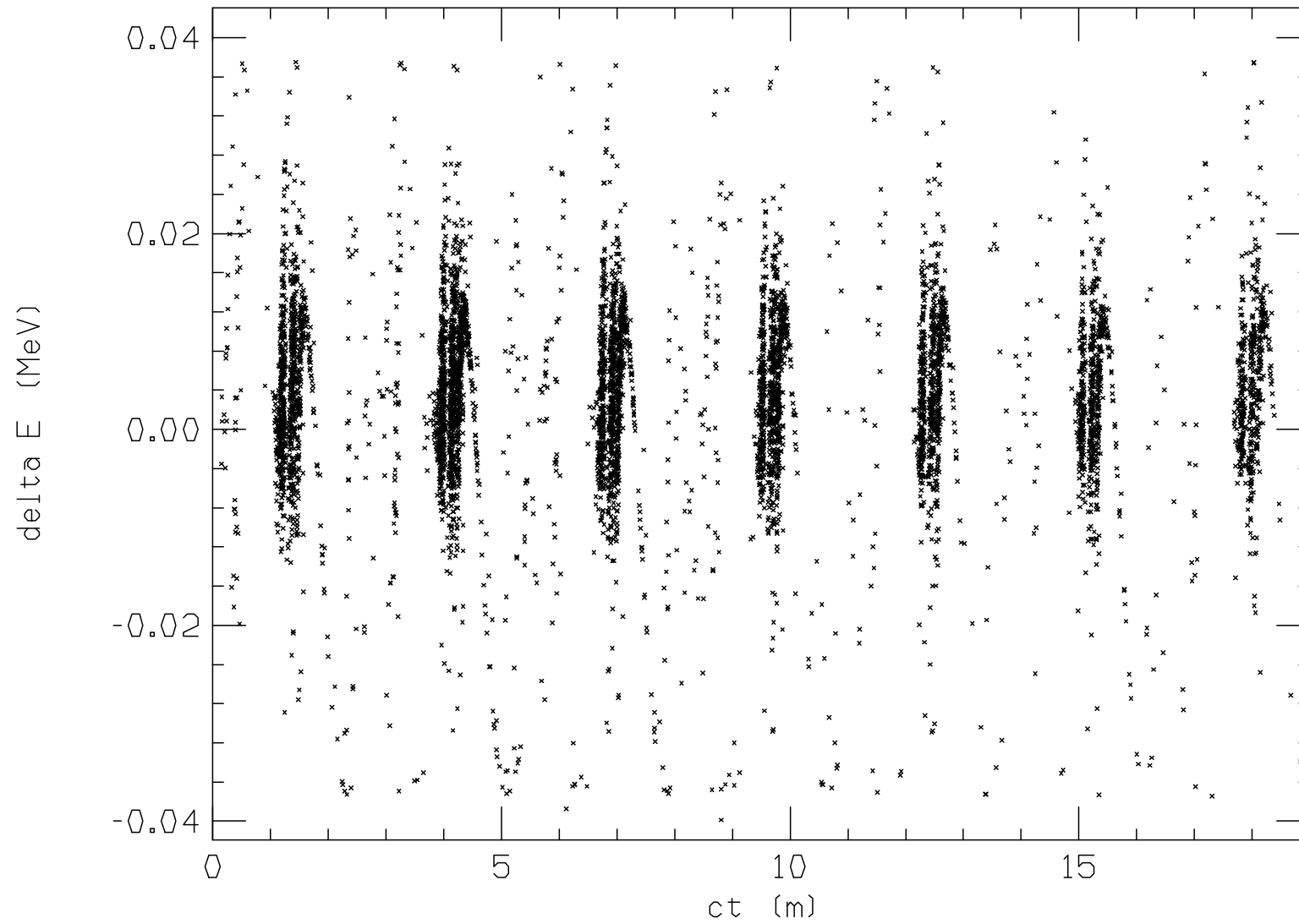in output/in 21 5712   91.68539 %
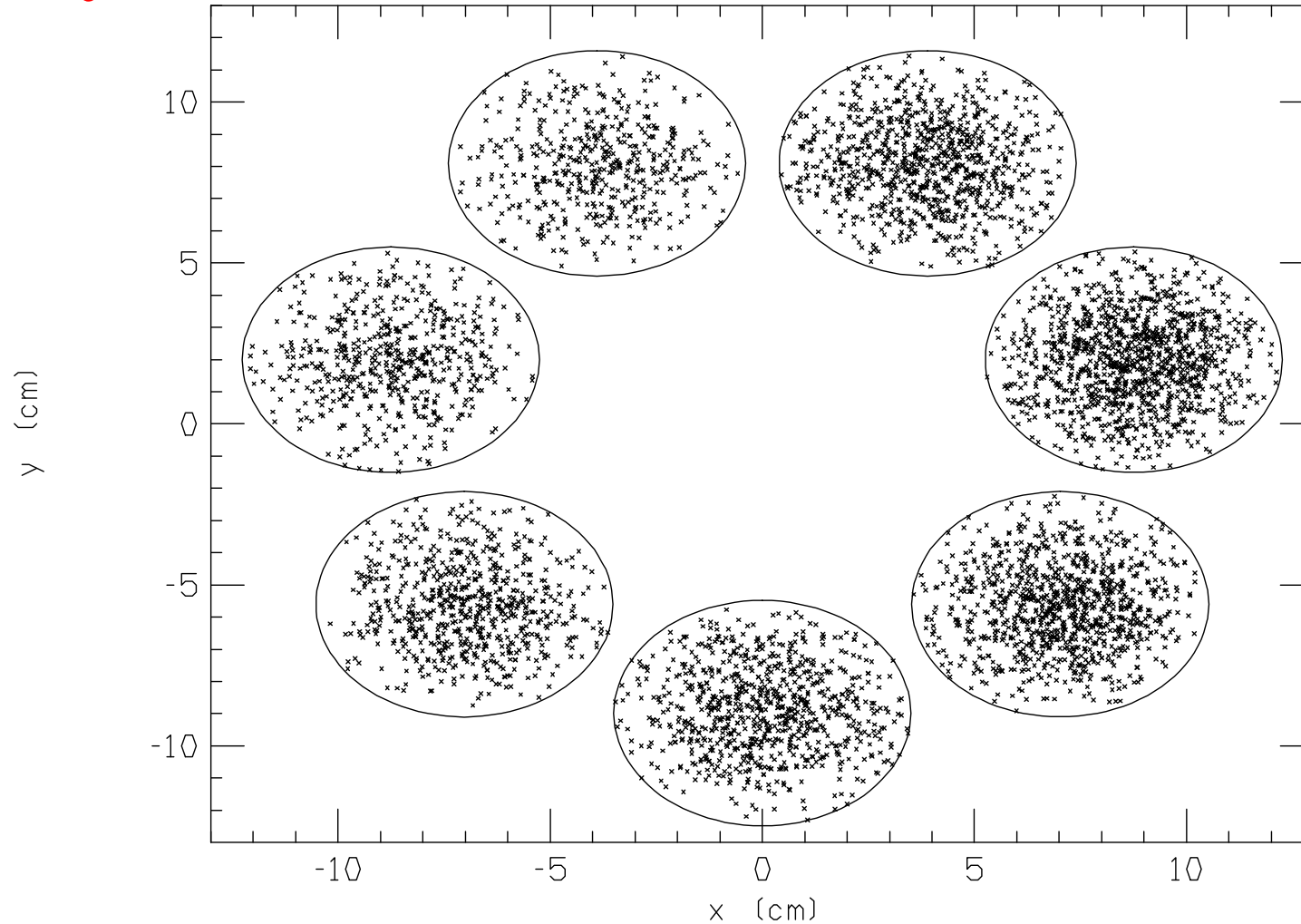
good out/in 21 5712   85.16854 %

64% of tracks (6230/9709) are in the best 21 bunches
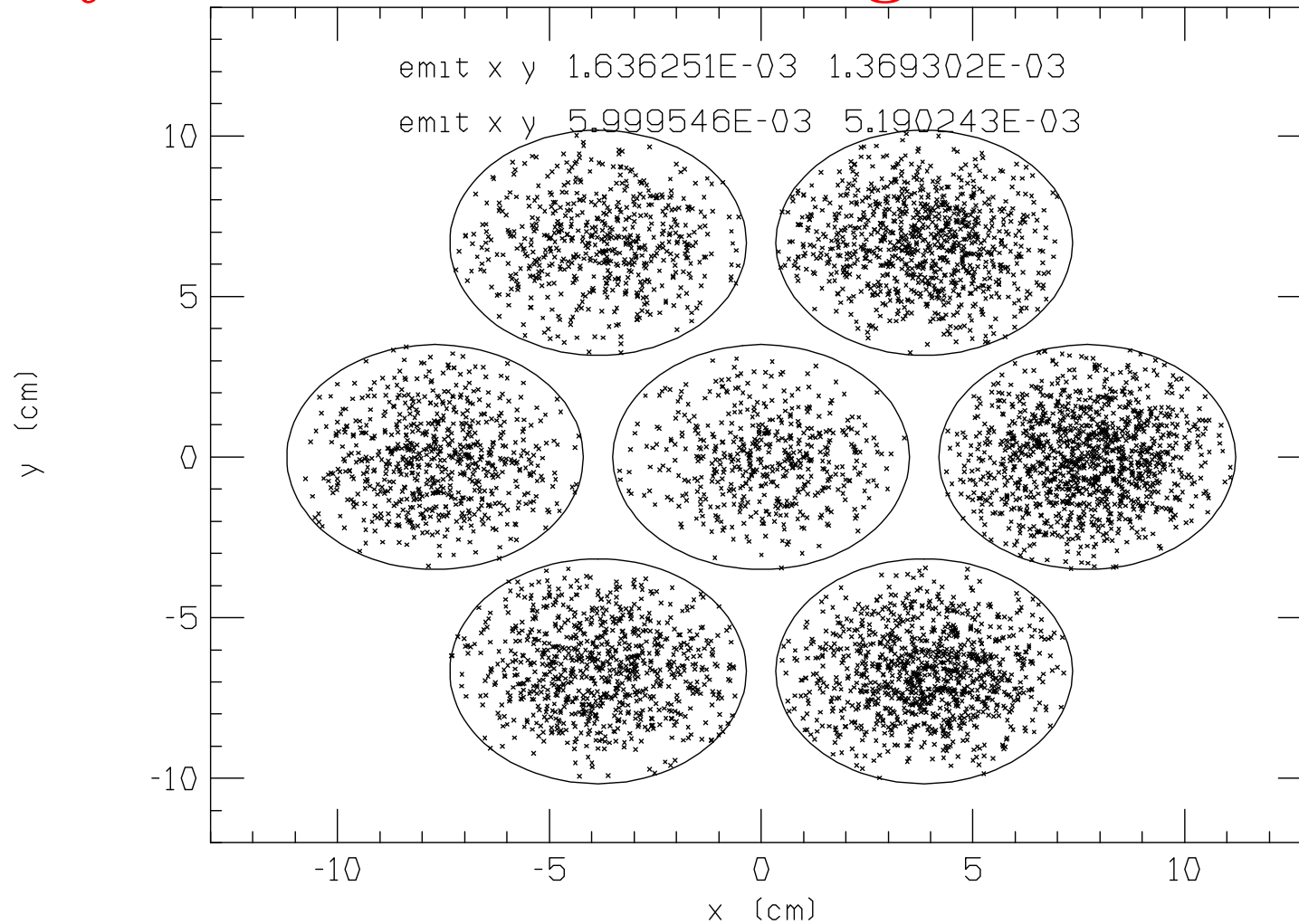
After longitudinal merge

Now 7 combined bunches

x y after transverse kicker

Feed into 7 trombones to bring times in line
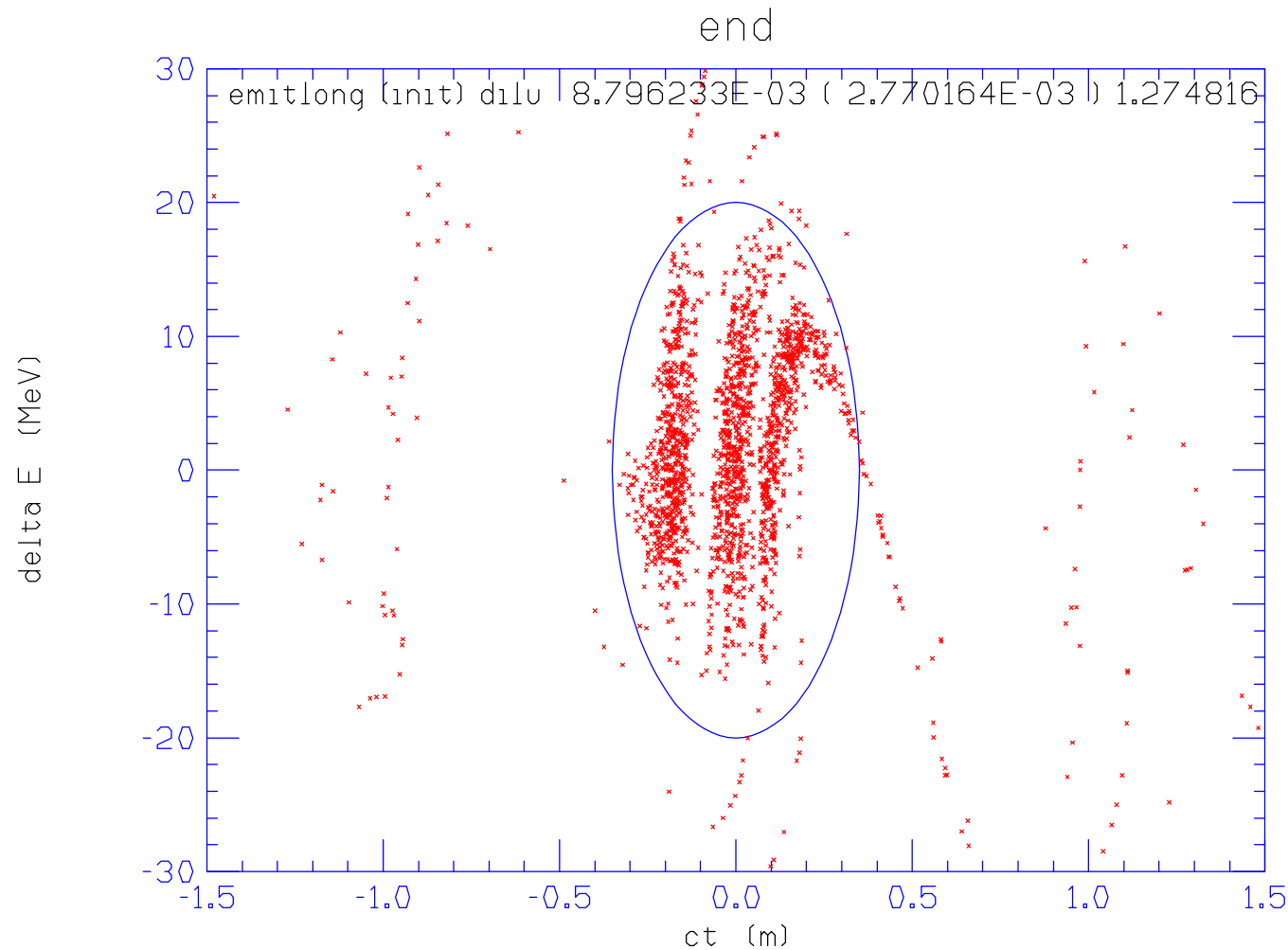After trombones beams are assembled in hexagon.

x y after transverse merge

emit x y 1.636251E-03 1.369302E-03
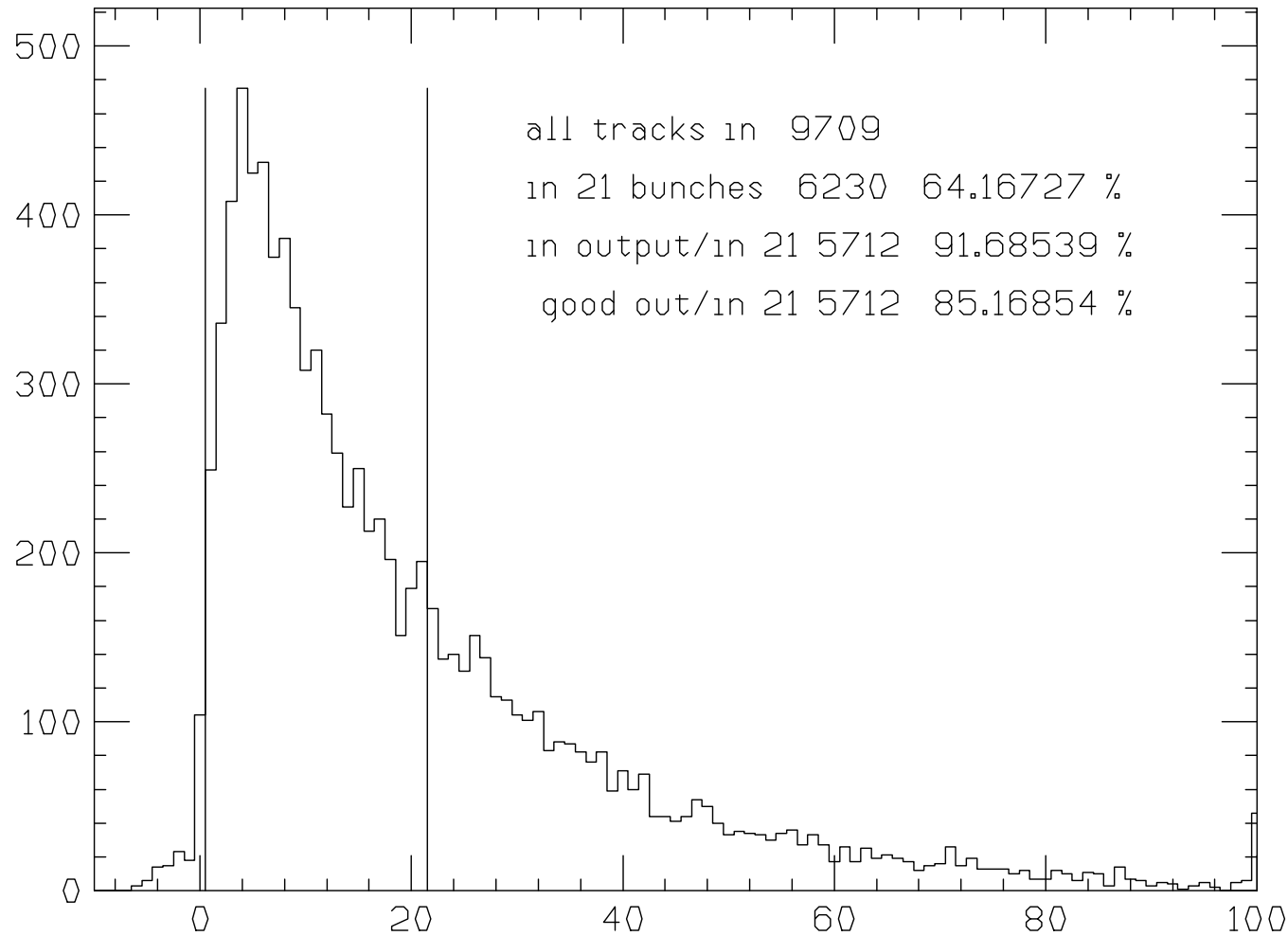emit x y 5.999546E-03 5.190243E-03

After move of #2 to center:

$$\text{Dilution} = \frac{\epsilon_\perp(out)}{\sqrt{7}\,\epsilon_\perp(in)} = \frac{5.47}{\sqrt{7}\,1.45} = 1.30$$

Longitudinal phase space at end

With cut :   Dilution $= \dfrac{\epsilon_{\parallel}(out)}{3\,\epsilon_{\parallel}(in)} = \dfrac{8.8}{3\,2.77} = 1.07$

Histogram of bunches

all tracks in 9709

in 21 bunches 6230 64.16727 %

in output/in 21 5712 91.68539 %

good out/in 21 5712 85.16854 %

Transmission through merge = 91%
Percent of 'good' = 85%