

Six cavity test 4.

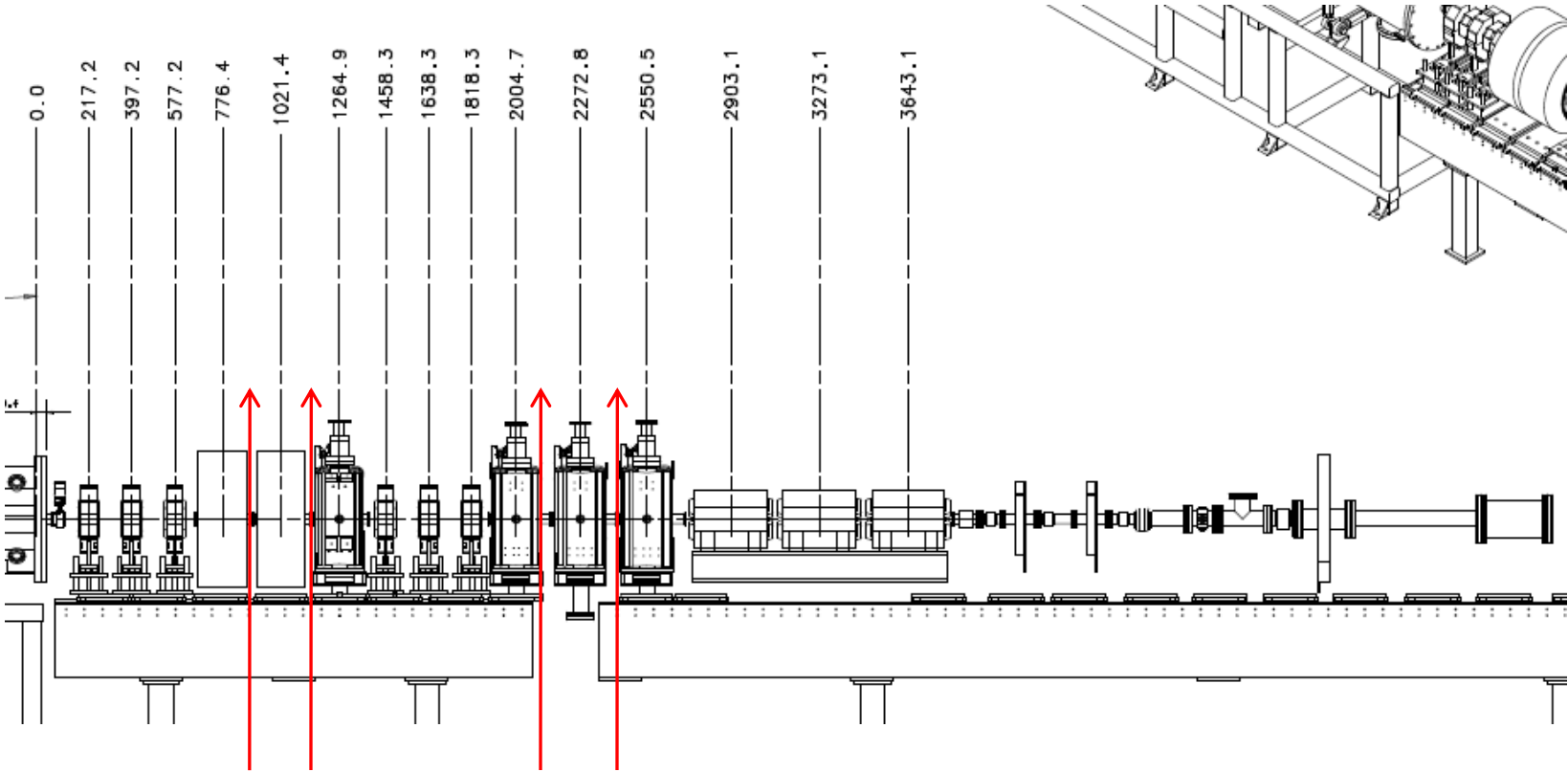
Gennady Romanov

September 23, 2009

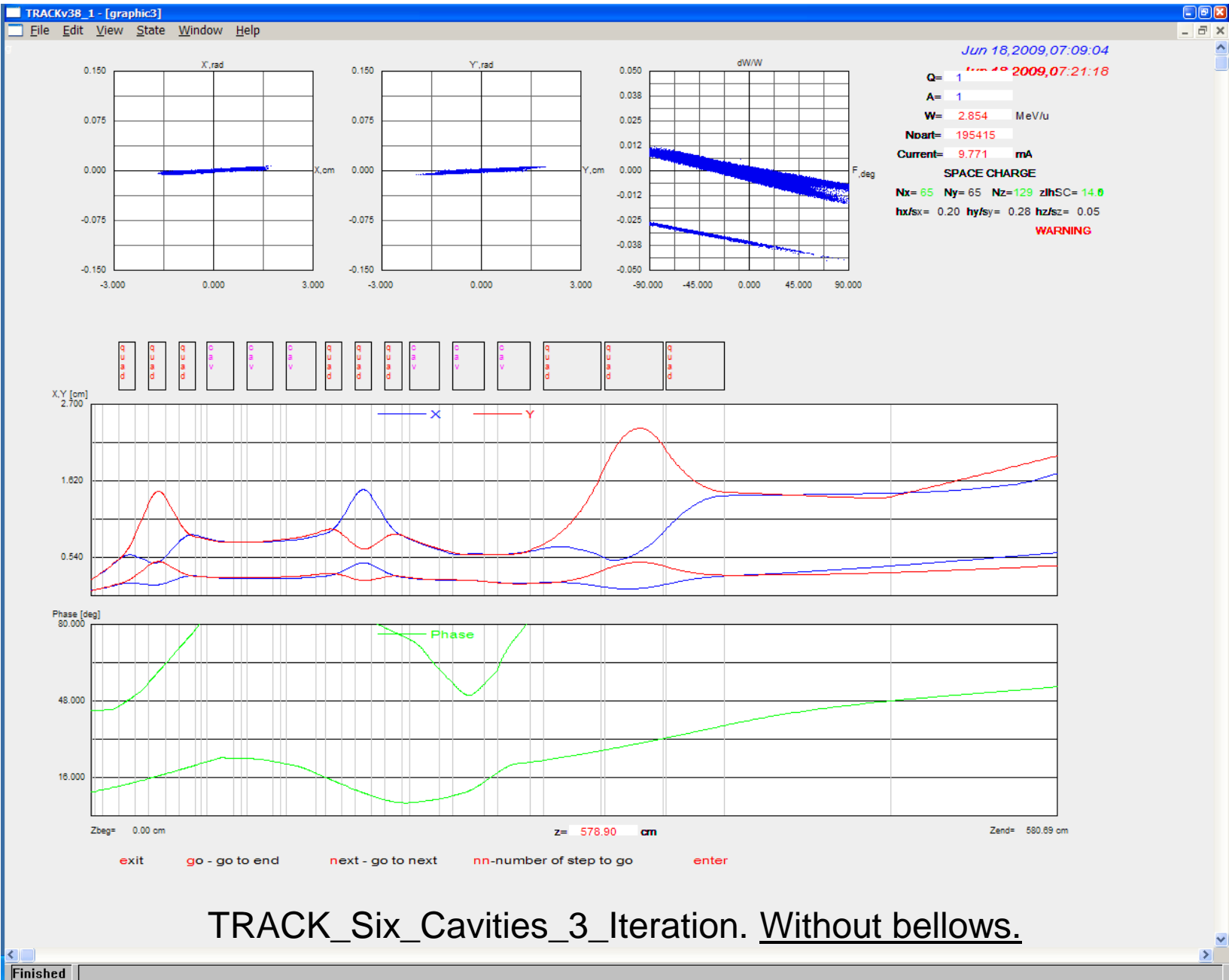
Simulations on:

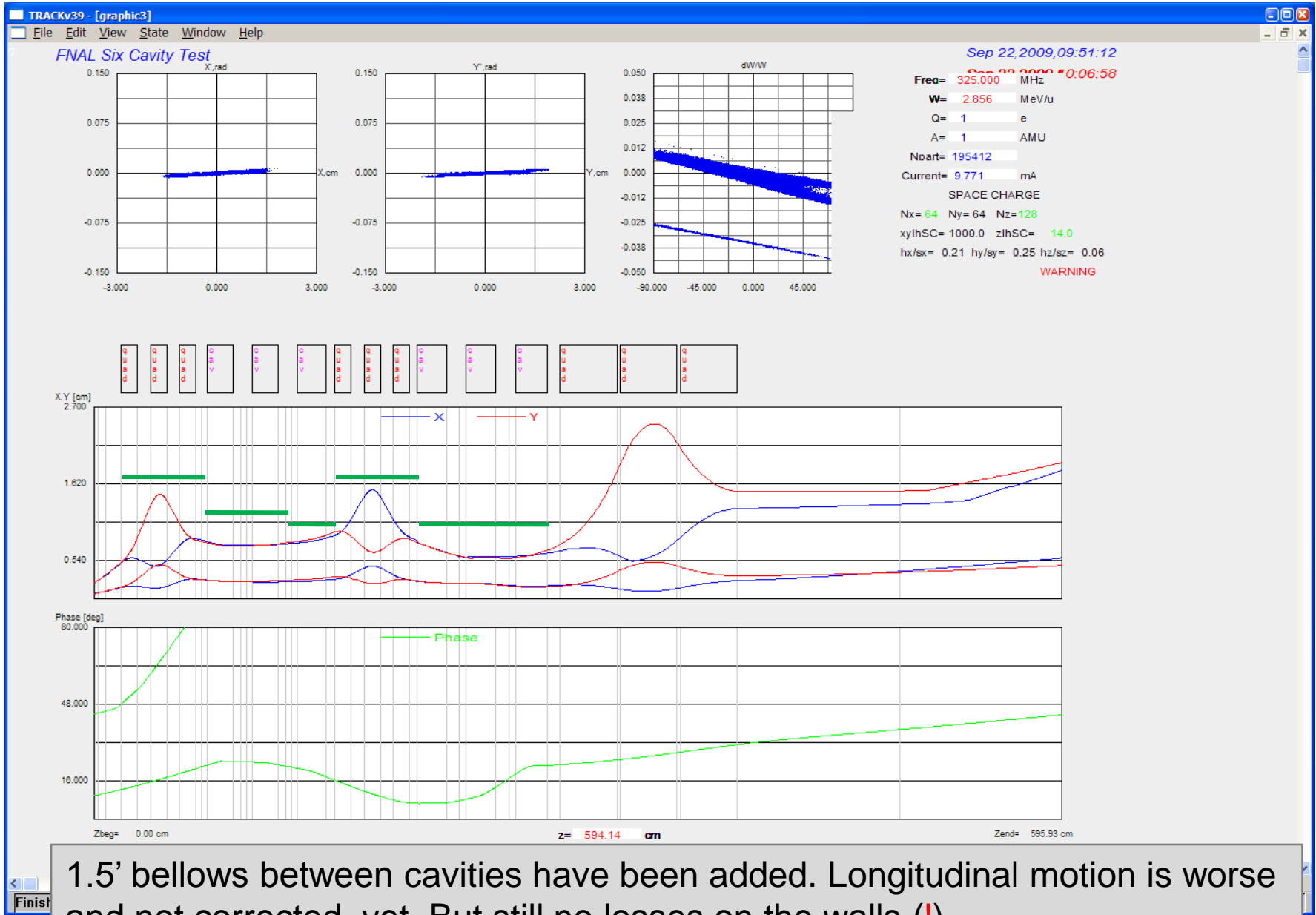
- Layout with 1.5" bellows added between cavities
- The same without acceleration
- The same with acceleration of zero current beam
- RFQ + diagnostic line
- RFQ + triplet + diagnostic line

Mechanical layout as for 6/16/2009



Iter.4: 1.5" spaces have been added between cavities for bellows

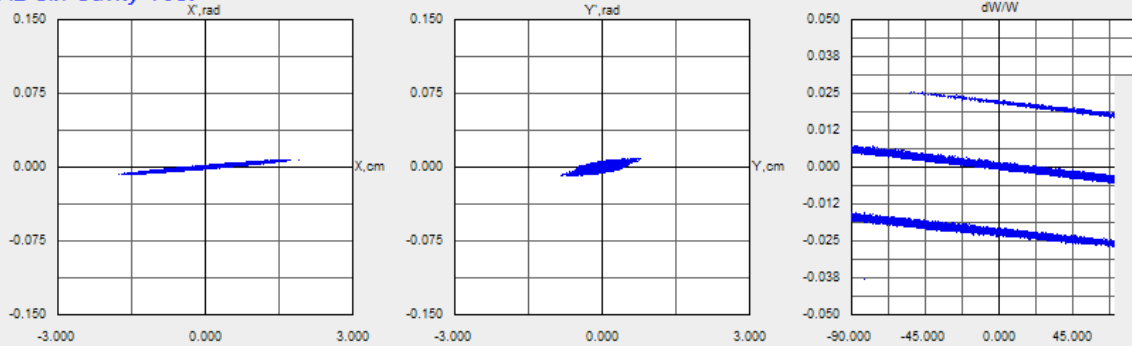




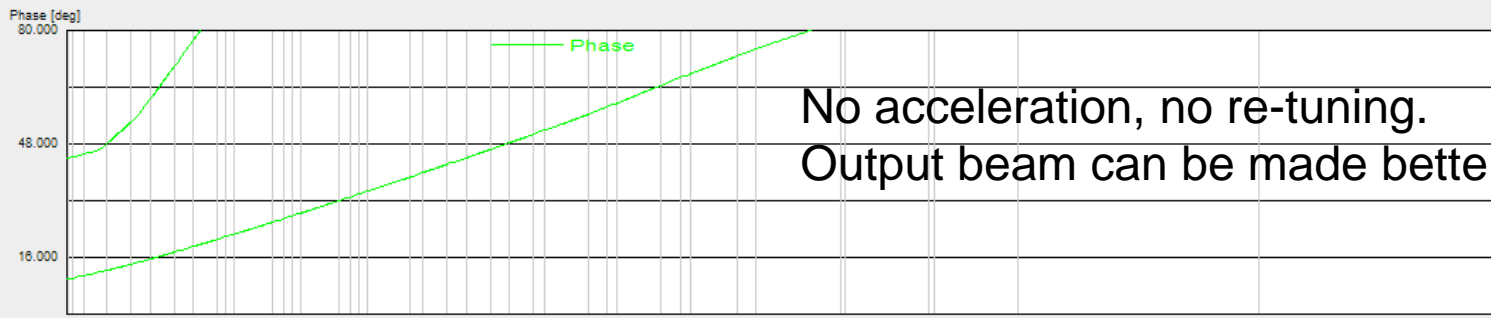
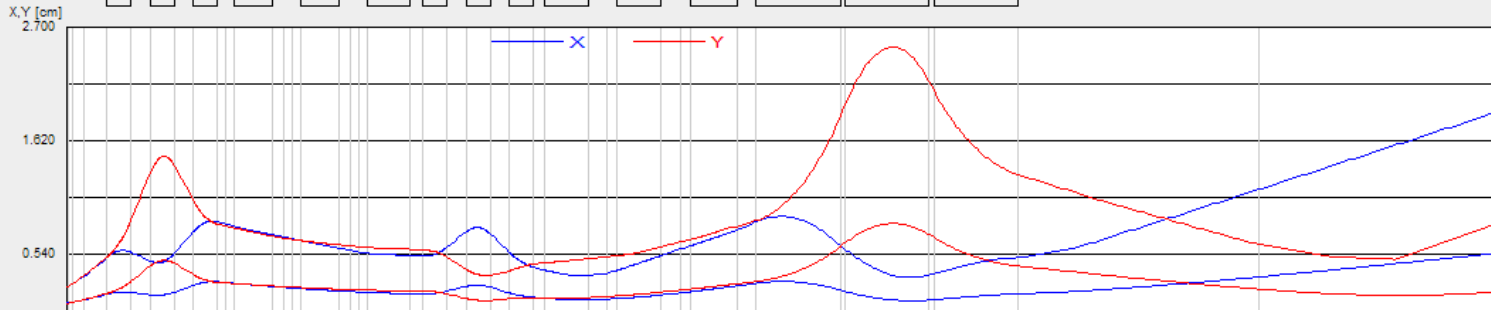
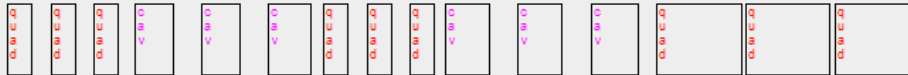
1.5' bellows between cavities have been added. Longitudinal motion is worse and not corrected yet. But still no losses on the walls (!).

FNAL Six Cavity Test

Sep 22, 2009, 14:03:3



Freq= 325.000 MHz
 W= 2.489 MeV/u
 Q= 1 e
 A= 1 AMU
 Noart= 195411
 Current= 9.771 mA
 SPACE CHARGE
 Nx= 64 Ny= 64 Nz= 128
 xylhSC= 1000.0 zlhSC= 14.0
 hx/sx= 0.22 hy/sy= 0.67 hz/sz= 0.03
WARNING

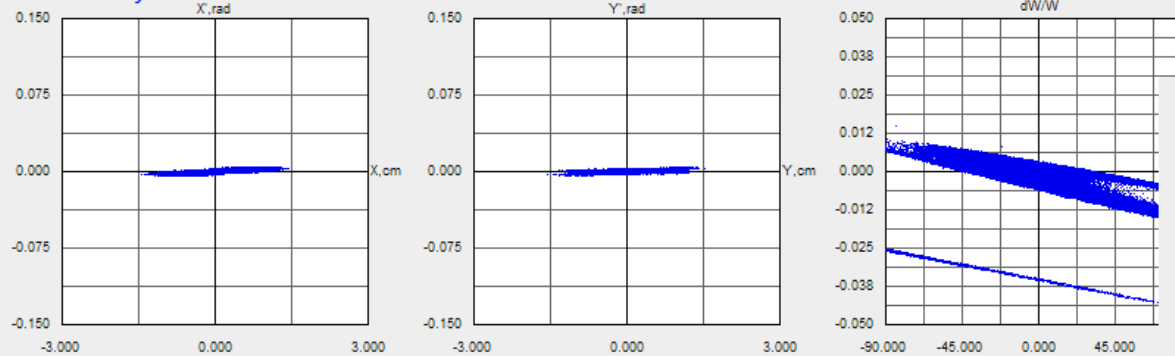


No acceleration, no re-tuning.
Output beam can be made better

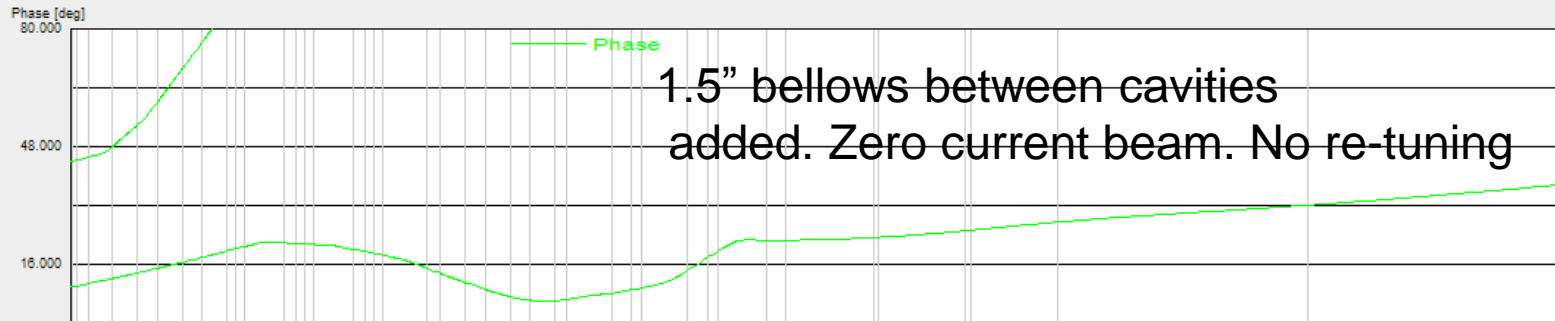
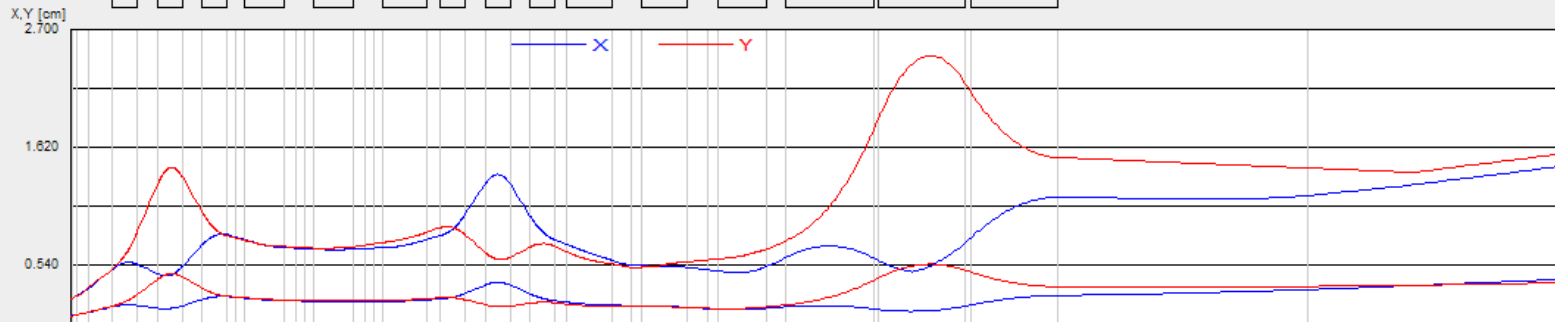
Zbeg= 0.00 cm z= 594.26 cm Zend= 595.93 cm

exit go - go to end next - go to next nn-number of step to go enter

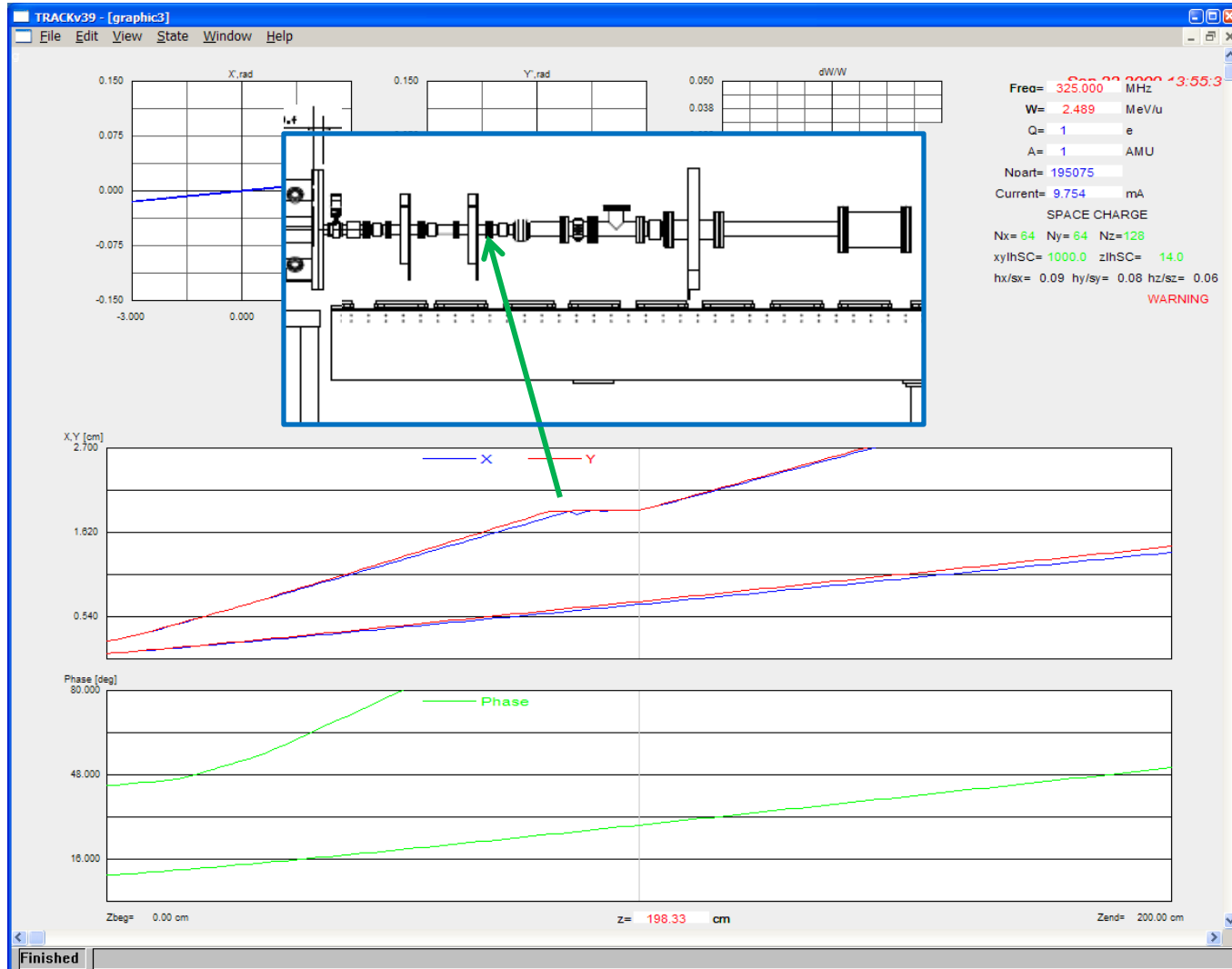
FNAL Six Cavity Test



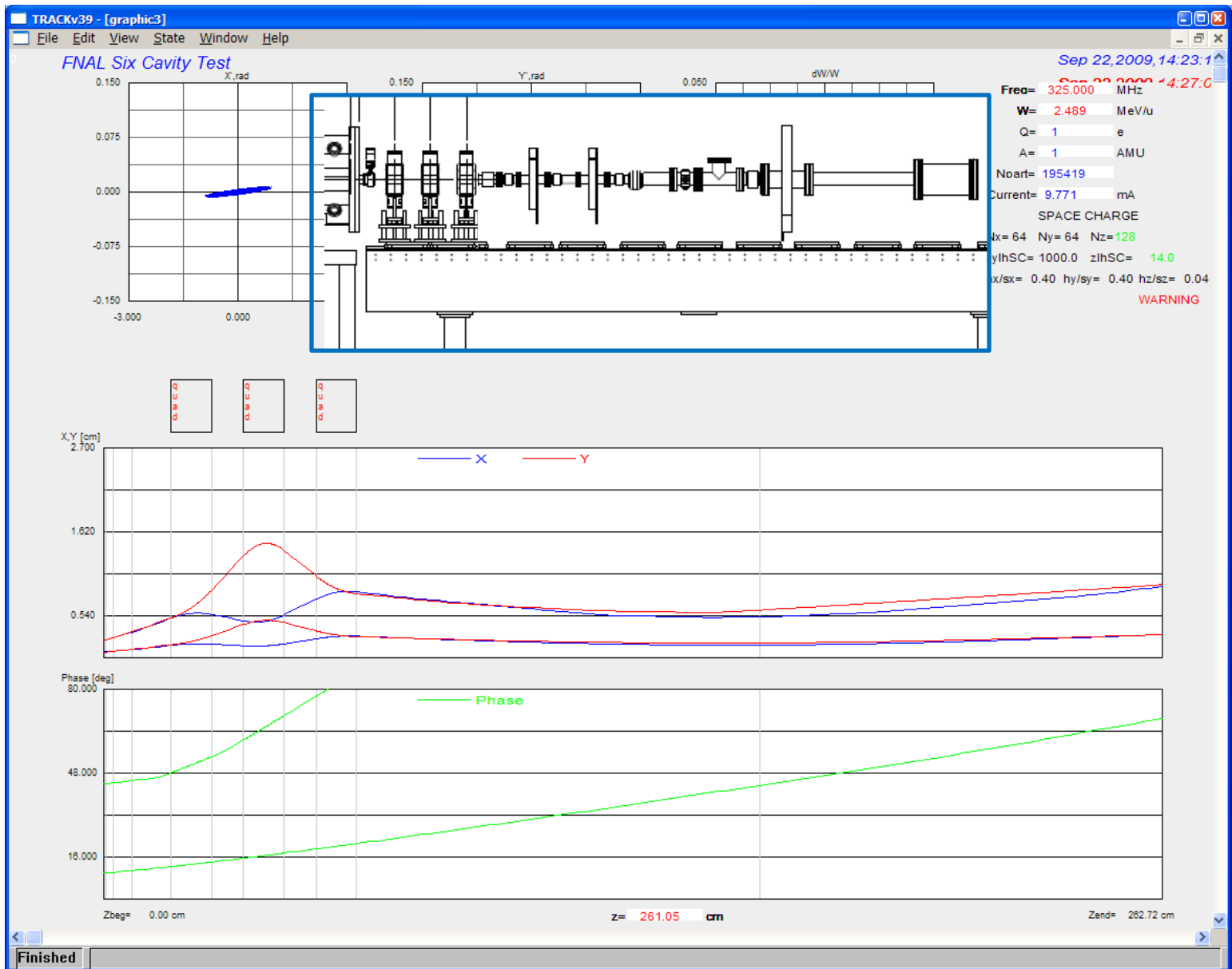
Freq= 325.000 MHz
 W= 2.855 MeV/u
 Q= 1 e
 A= 1 AMU
 Npart= 195419
 Current= 0.000 mA
 SPACE CHARGE
 Nx= 64 Ny= 64 Nz=128
 xylhSC= 1000.0 zlhSC= 14.0
 hx/sx= NaN hy/sy= NaN hz/sz= NaN
 GRID OK



1.5" bellows between cavities added. Zero current beam. No re-tuning



RFQ + diagnostic line. Beam losses are 0.2 % only



RFQ + one triplet + diagnostic line.

- Current design can work with different beam current and acceleration. May be just some minor re-tuning would be required.
- It seems that the slightly bigger distances between the cavities can be tolerated.

Next to do after mechanical layout is done:

- Check and adjust transverse beam optic
- Maximize acceleration, optimize longitudinal motion
- Prepare tables for quad gradients and power table for the accelerating cavities and the bunchers