Six Cavity Test 7.

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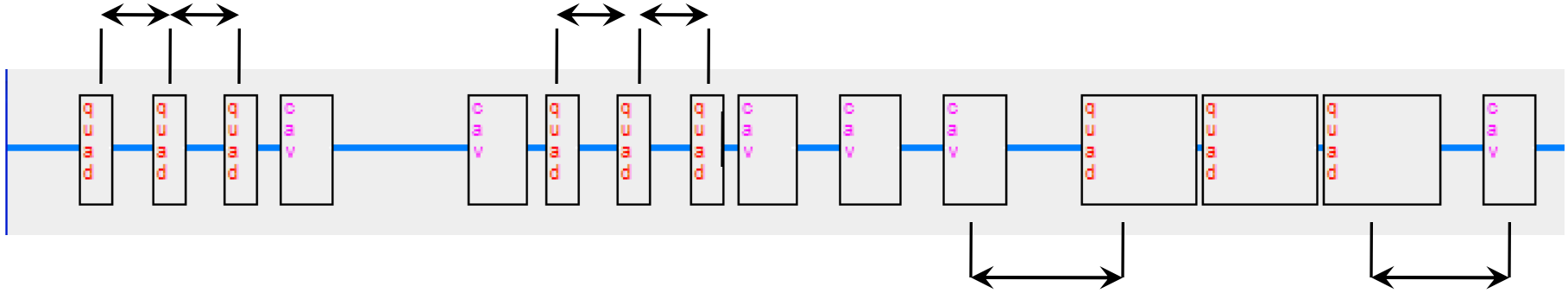
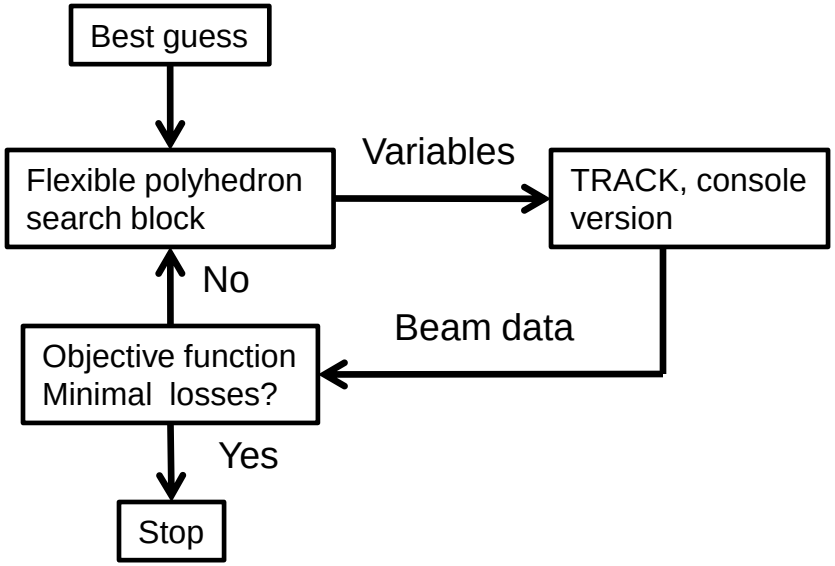
Iteration 7.

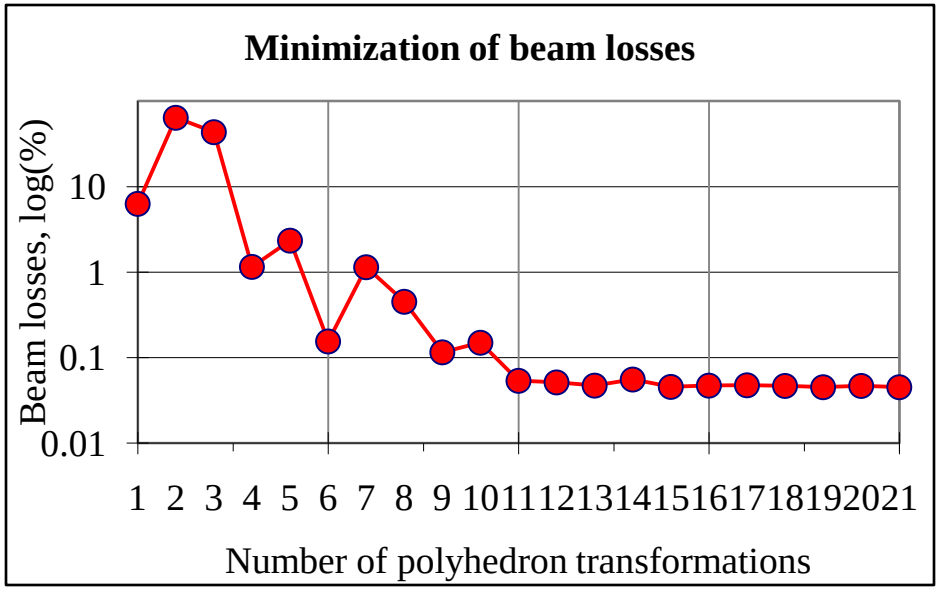
1. Distances between the centers of HEL quadrupole lenses increased from 180 mm to 221.4 mm (center to center)
2. Distance between centers of CH4 and MI quadrupole lens Q7 increased from 352.6 mm to 500.2 mm
3. Distance between centers of MI quadrupole lens Q9 and re-buncher #2 increased up to 289 mm (beam pipe with bore of 7.6 cm)

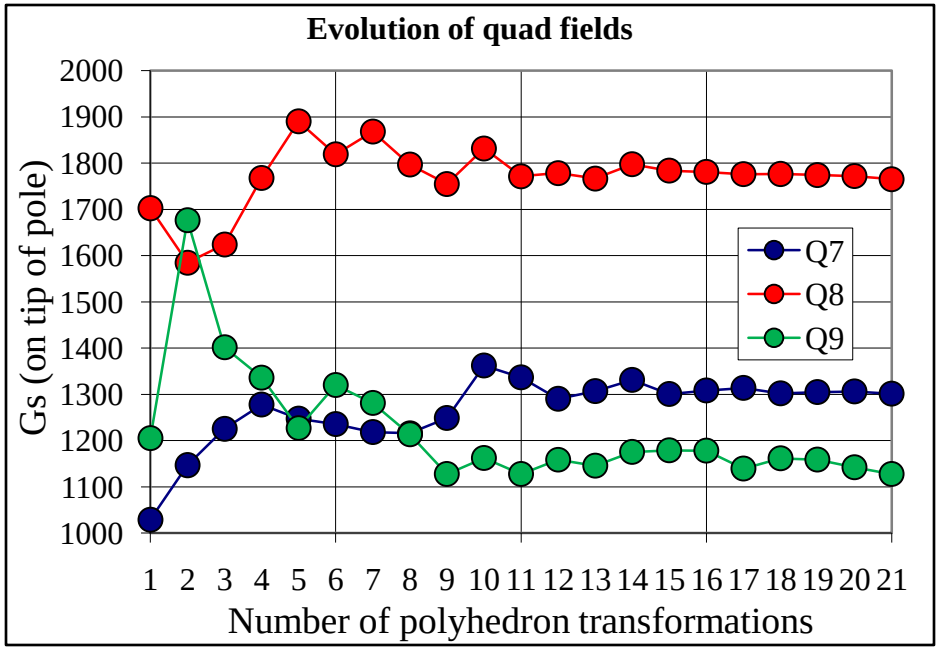


Optimization in Mathematica with TRACK

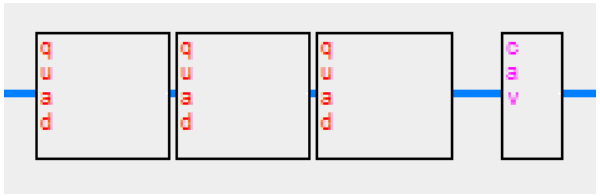
- Flexible polyhedron search (Nelder-Mead)
- Optimization of the beam line piece by piece
- Minimal total losses as an objective
- Quad fields as variables

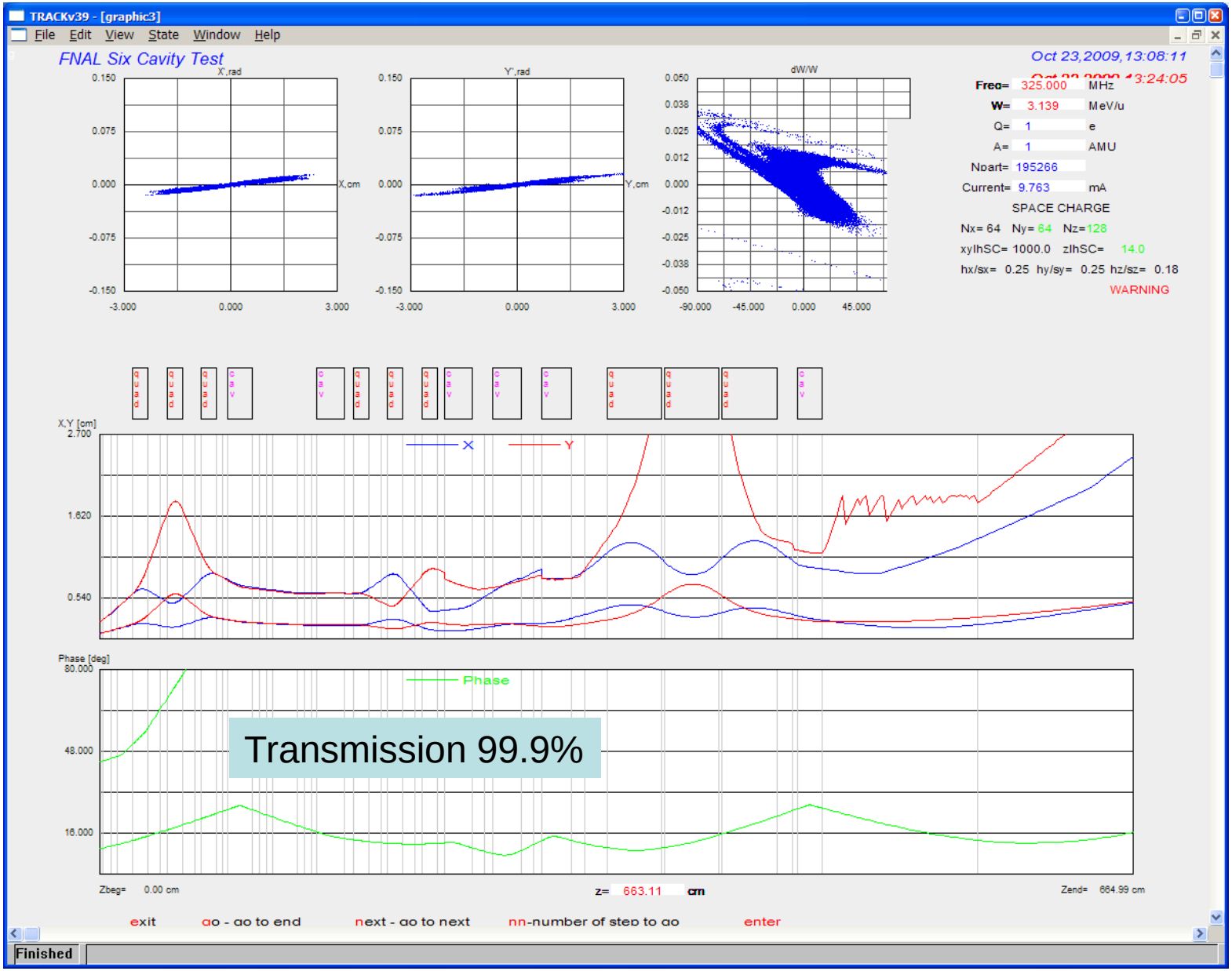






Example: optimization of this piece took 4 hours




TRACKv39 - [graphic3]
File Edit View State Window Help
FNAL Six Cavity Test
Oct 23,2009,13:08:11
X',rad
Y',rad
dW/W
X,cm
Y,cm
Freq= 325.000 MHz
W= 3.139 MeV/u
Q= 1 e
A= 1 AMU
Npart= 195266
Current= 9.763 mA
SPACE CHARGE
Nx= 64 Ny= 64 Nz=128
xyIhSC= 1000.0 zIhSC= 14.0
hx/sx= 0.25 hy/sy= 0.25 hz/sz= 0.18
WARNING
X,Y [cm]
X
Y
Phase [deg]
Phase
Transmission 99.9%
Zbeg= 0.00 cm
z= 663.11 cm
Zend= 664.99 cm
exit go - go to end next - go to next nn-number of step to go enter
Finished

Plan

- Wait for the final mechanical design
- Focus on misalignments and errors