Updated layout of Linac4 CCDTL
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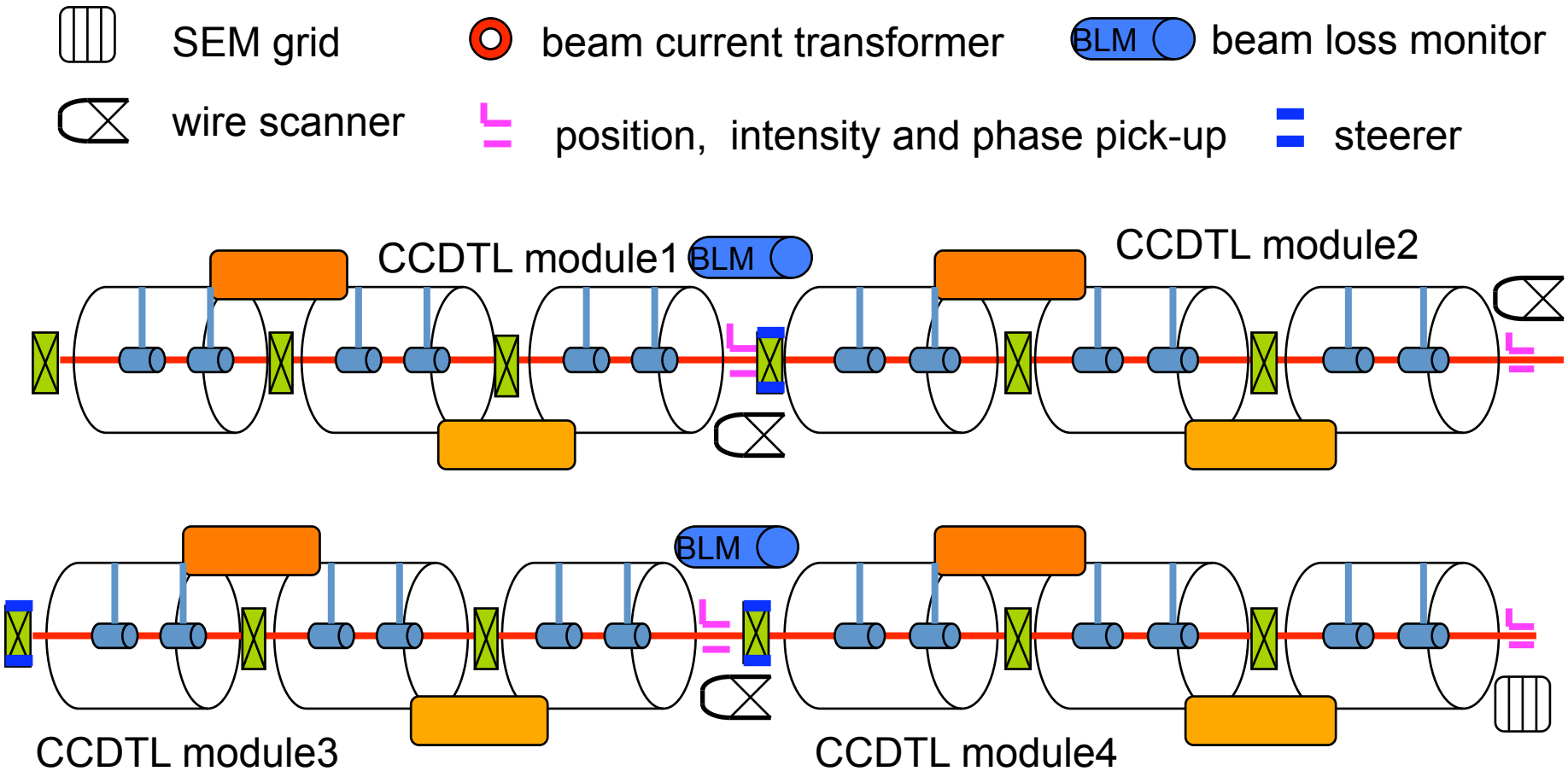
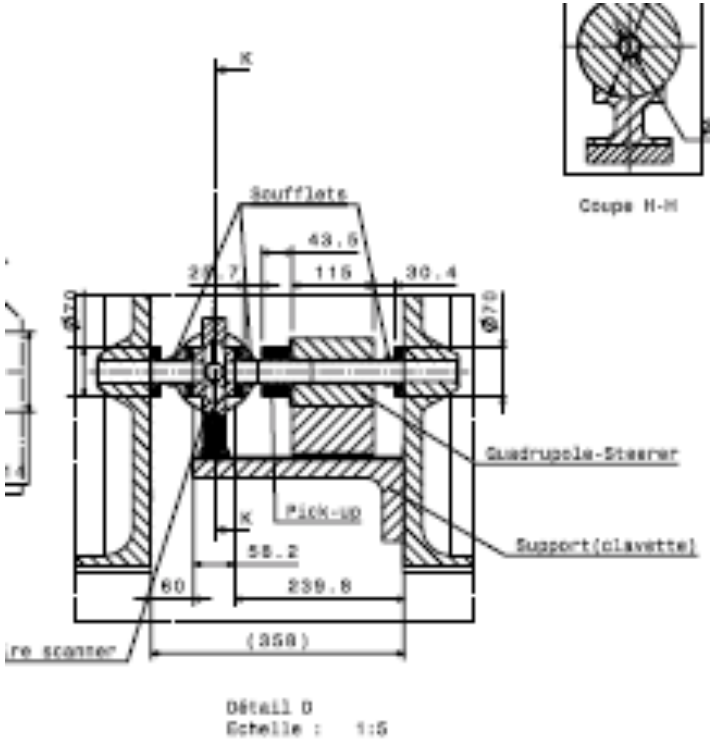
Sketch of the CCDTL- From K.Hanke presentation- CERN MAC





Technical drawing by Yves Cuvet

Distance between tanks is already max (beam dynamics limit)
Available space (inside wall-to-inside wall) : 410 mm
Wire scanner : 135 mm
Pick-up : 43.5 mm sticking out of quad
Quadrupole : 115 mm
Walls : 26 mm X 2
Bellows : 30 mm X 2

Situation autumn 2007:

1) CCDTL from 40 to 90 MeV
2) To control the losses to better than 1W/m at SPL (6%) duty cycle a steerer and a position monitor are needed at each module
3) Distance inter-module couldn't be further increased

Quadrupole + steerer combined This option was ok for beam dynamics, ok for layout, but not so good for the magnet (BULKY) and power supplies (cross-talk, stability).

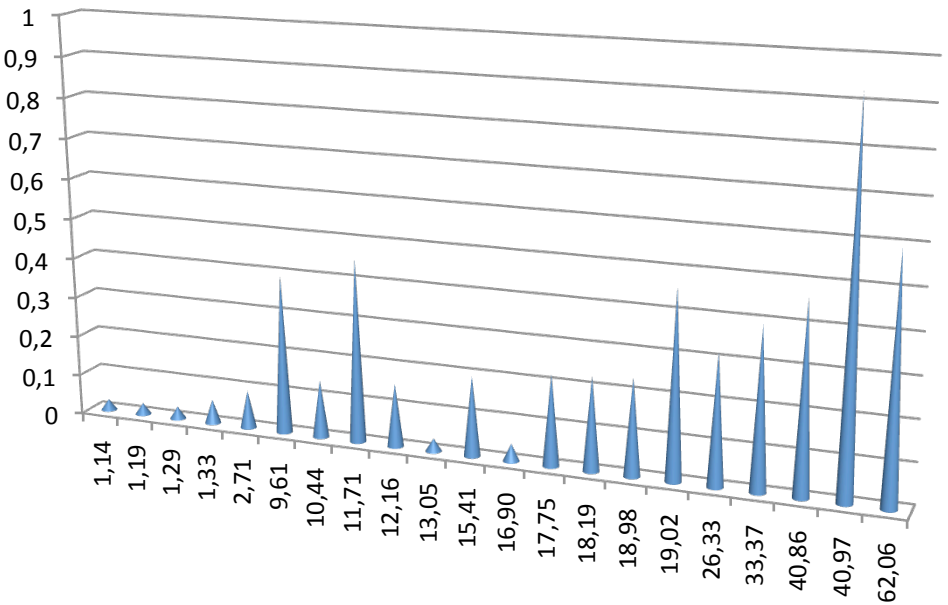
Changes in 2008:

1) CCDTL from 50 to 100 MeV
2) Reconsider the magnet variety and try to reduce the number of LINAC quadrupole families
3) Look for a solution to avoid quadrupole + steerer combined

Decision to make all the LINAC quadrupoles the same
Bore radius : 20 mm , length 115 mm, int grad = 1.6 Tesla
Simpler and cheaper (just one set of drawing)
More aperture available in the CCDTL , therefore less steerers needed

Power lost (watt) vs z (m),

40 mA, 6% duty cycle, worst case, steerers on
quad alignment 0.1 mm 1sigma gaussian, beam error 0.3mm 0.3mrad gaussian

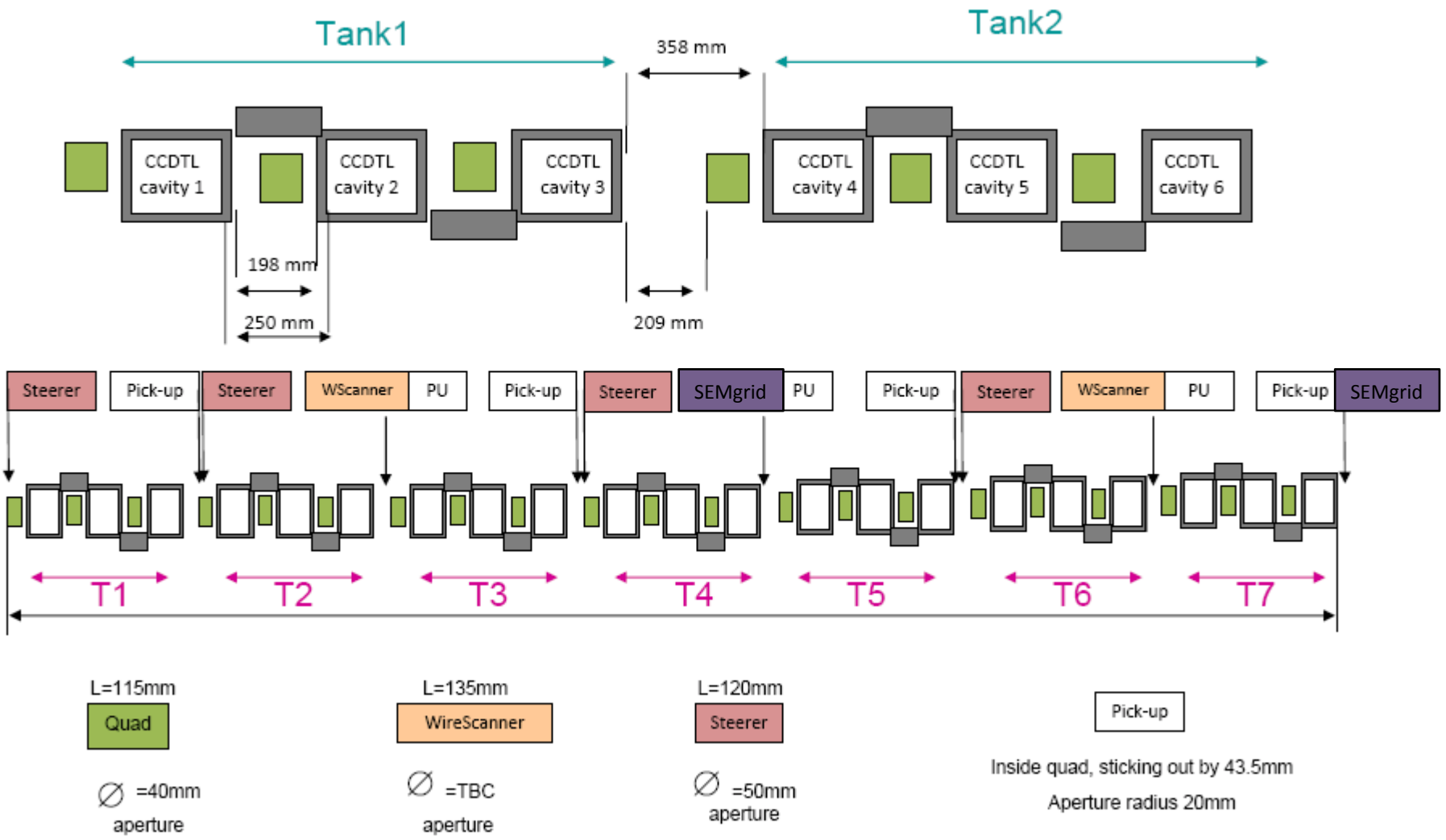


Z=0 beginning of DTL

CCDTL begins at z=20 m , ends at z=40 m

Error studies results – 4 steerers and 4 wirescanners

Losses can be controlled to 1 W/m at SPL duty cycle.



Layout with a total of 4 steeres and 4 wirescanners

Conclusions

- Before
  - 7 steerers, 5 wire scanners and 2 SEMgrids
  - Intertank bore aperture radius 14 mm
  - Quadrupole combined with steerer. Technical solution not validated
  - 4 LINAC quadrupole families
  - Can measure the beam profile every 3 meters (1.5 focusing period)
- After
  - 4 steerers, 2 wire scanners and 2 SEMgrids
  - Intertank bore aperture radius 20 mm
  - Quadrupole and steerer are two separate elements
  - 1 LINAC quadrupole type
  - Can measure beam profile every 6-7 meters (3 focusing periods)

Nominal envelopes in CCDTL