







# Updated layout of Linac4 CCDTL

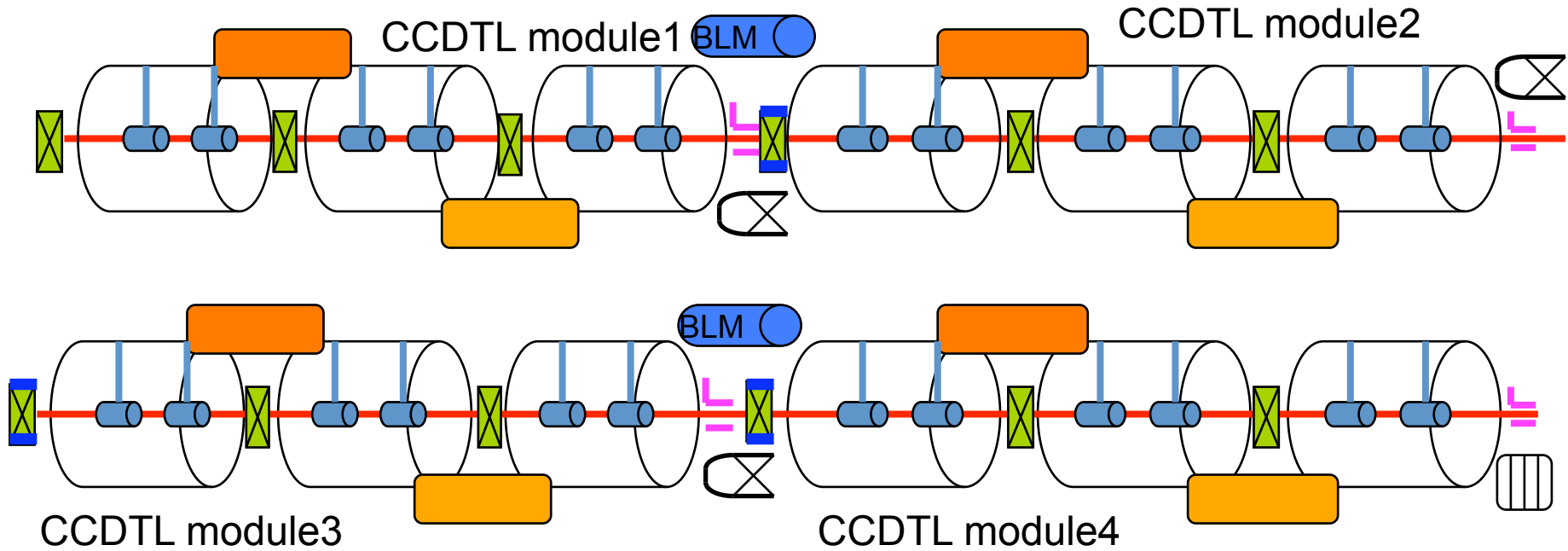
## Alessandra Lombardi

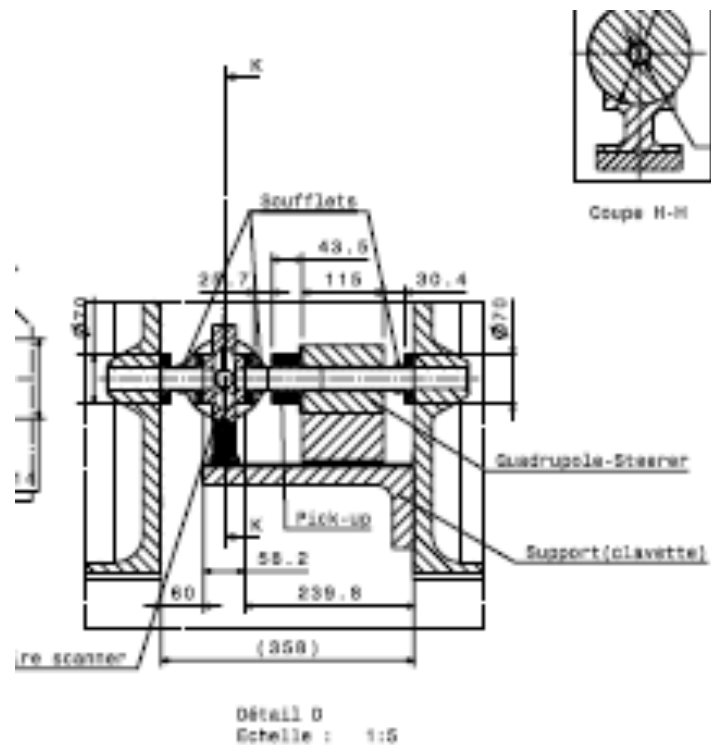
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# Sketch of the CCDTL- From K.Hanke presentation- CERN MAC

-  SEM grid
-  beam current transformer
-  beam loss monitor
-  wire scanner
-  position, intensity and phase pick-up
-  steerer





## 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

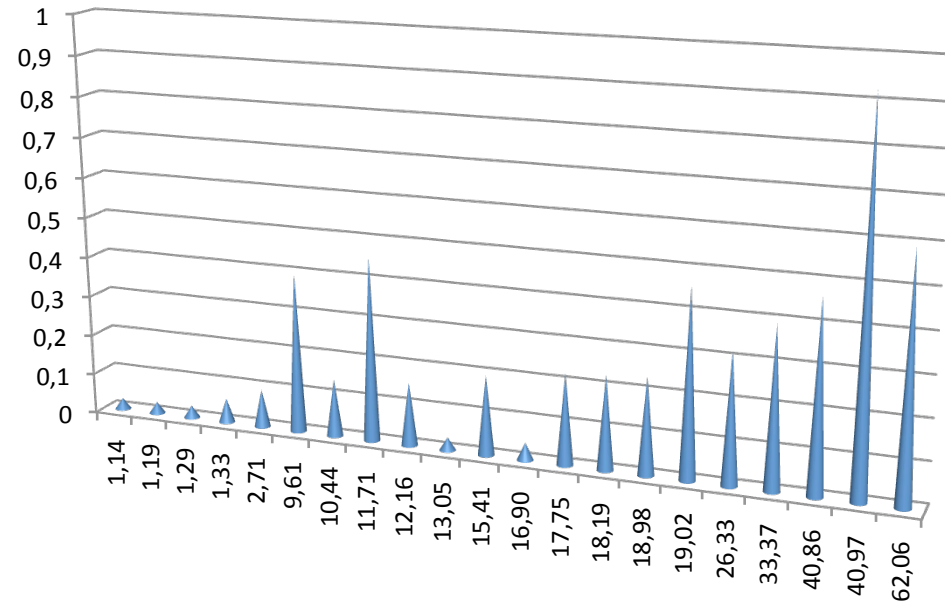
Bore radius : 20 mm , length 115 mm, int grad = 1.6 Tesla

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

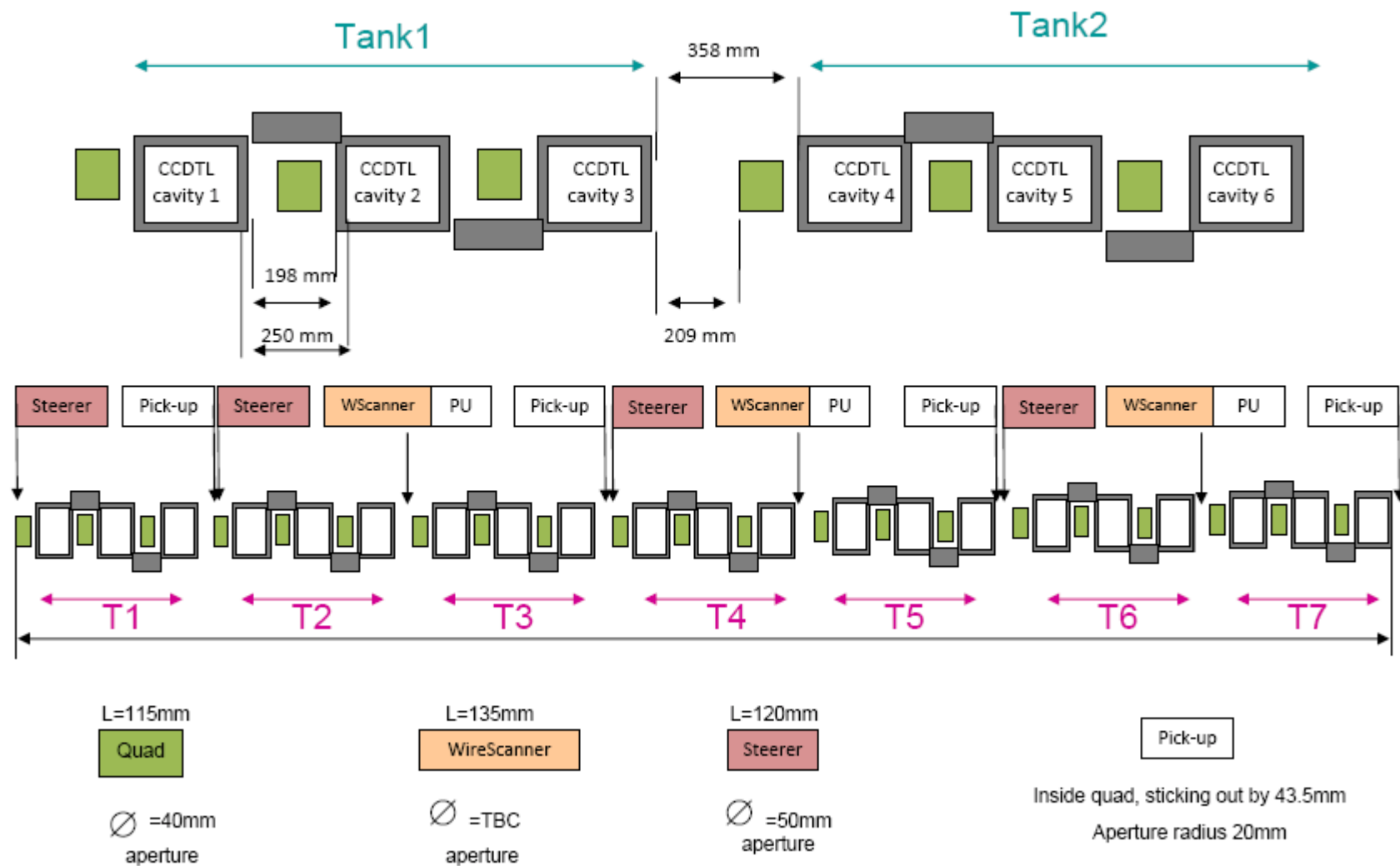


Z=0 beginning of  
DTL

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

## Error studies results – 4 steerers and 4 wire scanners

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



**Layout with a total of 4 steerers and 4 wirescanners**

# Conclusions

- Before
  - 7 steerers and 7 wire scanners
  - 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 and 4 wire scanners
  - 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

