

# LHC-LHeC Interference

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The work was mainly done by  
Y. Muttoni and J.-P. Corso

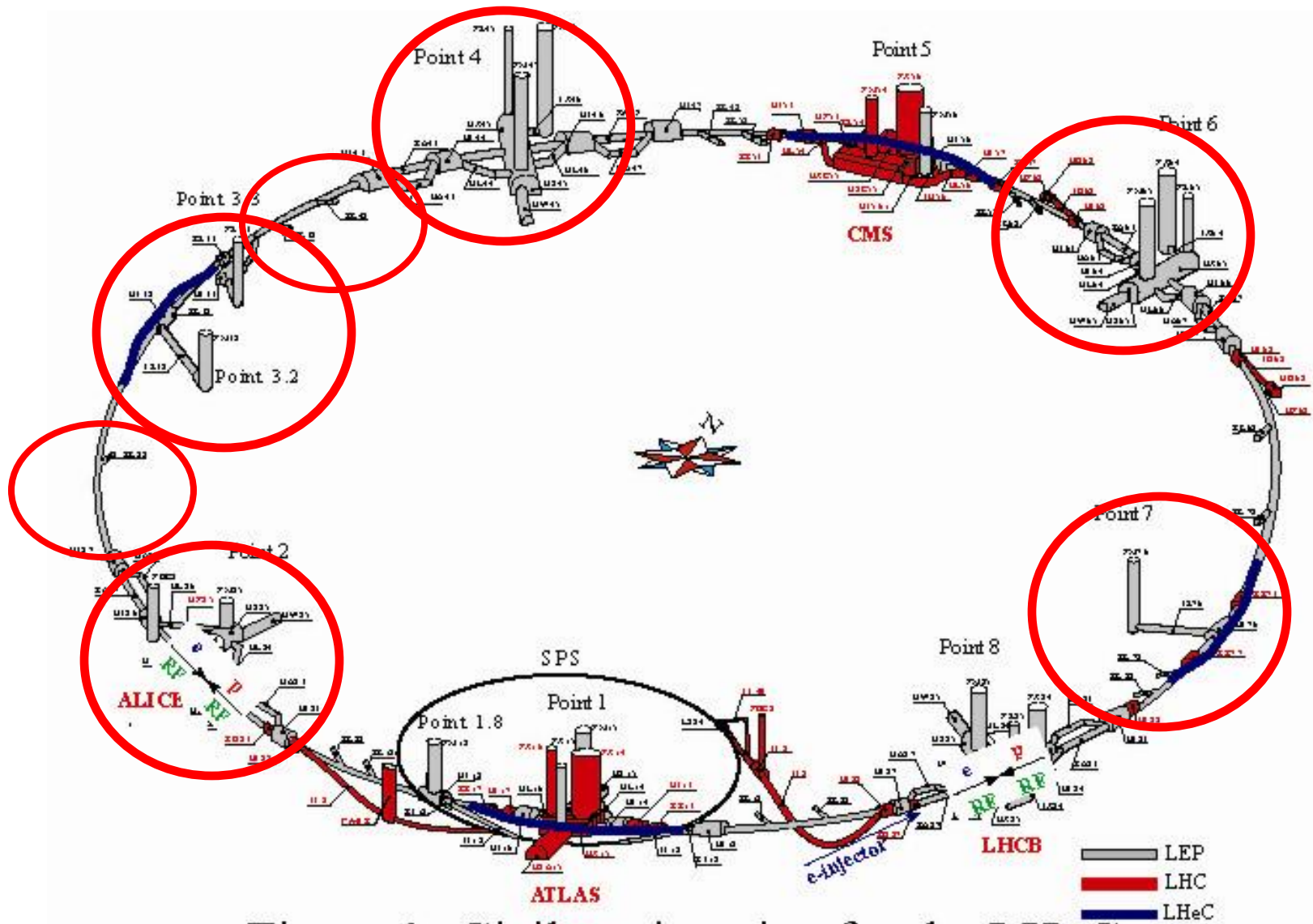


Figure 1: Civil engineering for the LHeC.

# Tunnel # section, empty

tunnel section  
tunnel nominale

ents

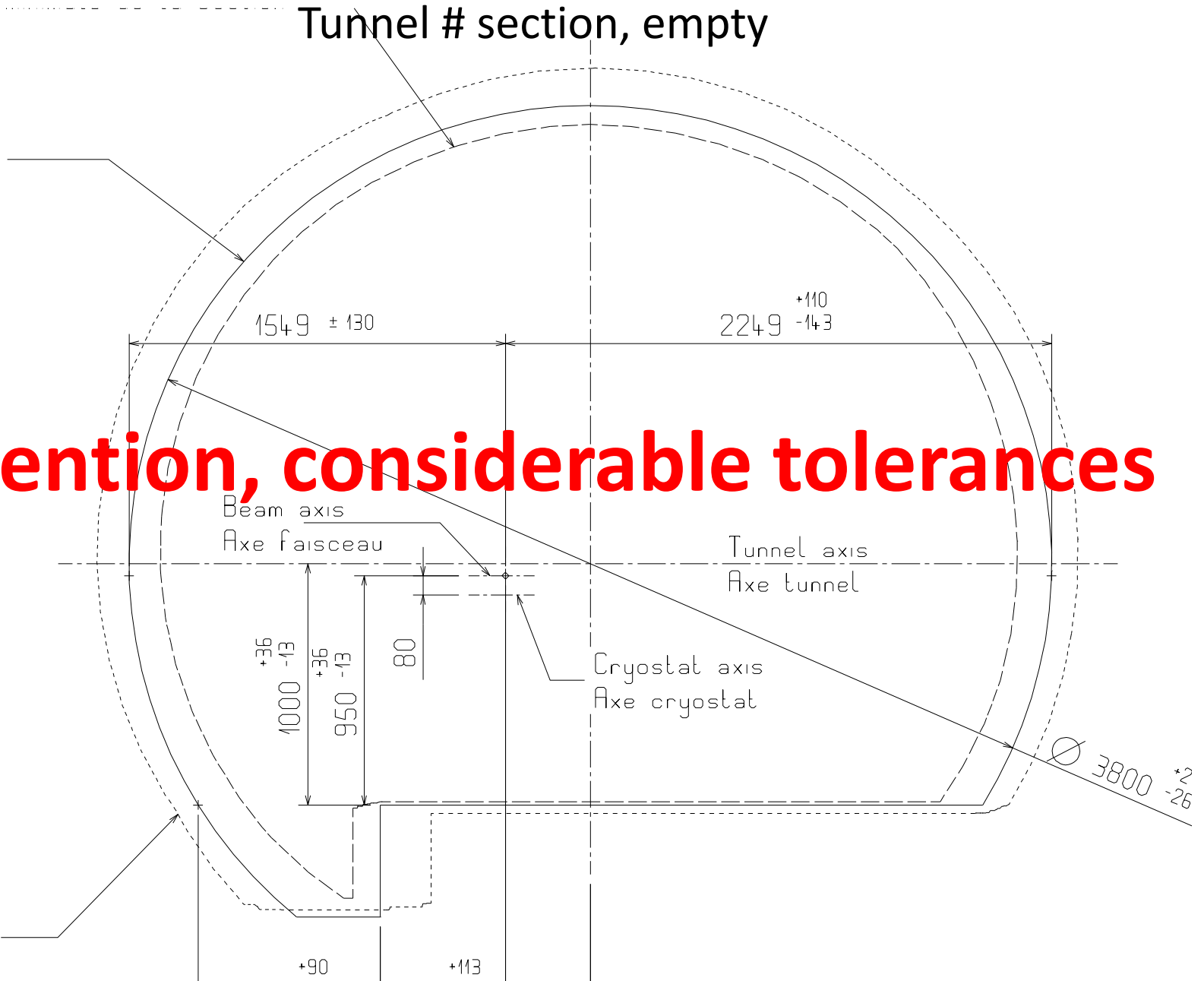
ite

2000.

doit etre

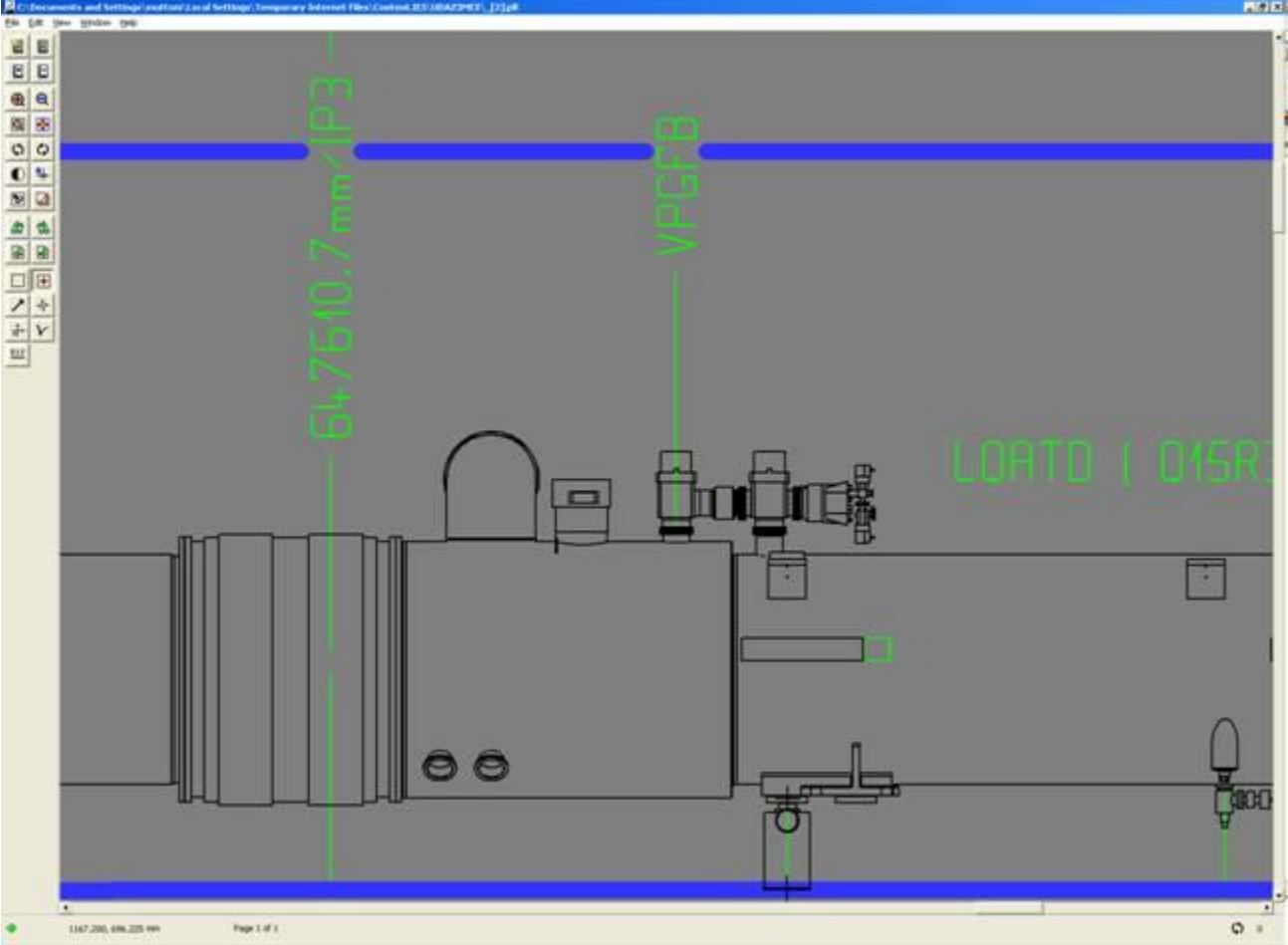
velope  
de la section

**Attention, considerable tolerances**



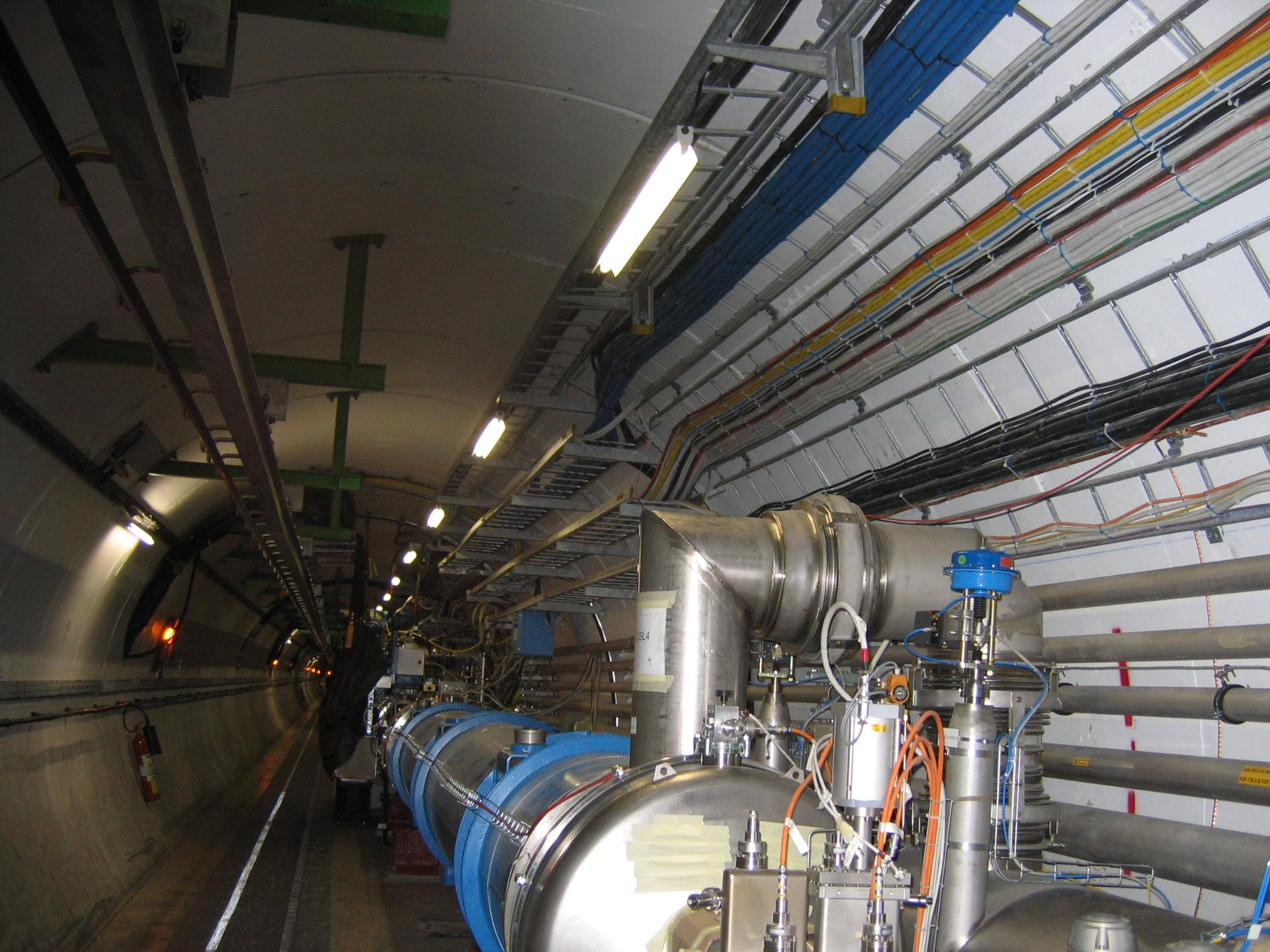


In the arcs we have at each odd SSS between C7 and C33 a „Jumper Connection“



No feets allowed in this area.





- Regular pattern of jumpers – can be avoided if the lattice is chosen properly

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An EXCEL file has been produced, which contains the position of all these „forbidden“ places.

Do not plan to place anything on the floor there.

Restrict the LHeC to a beam pipe there!



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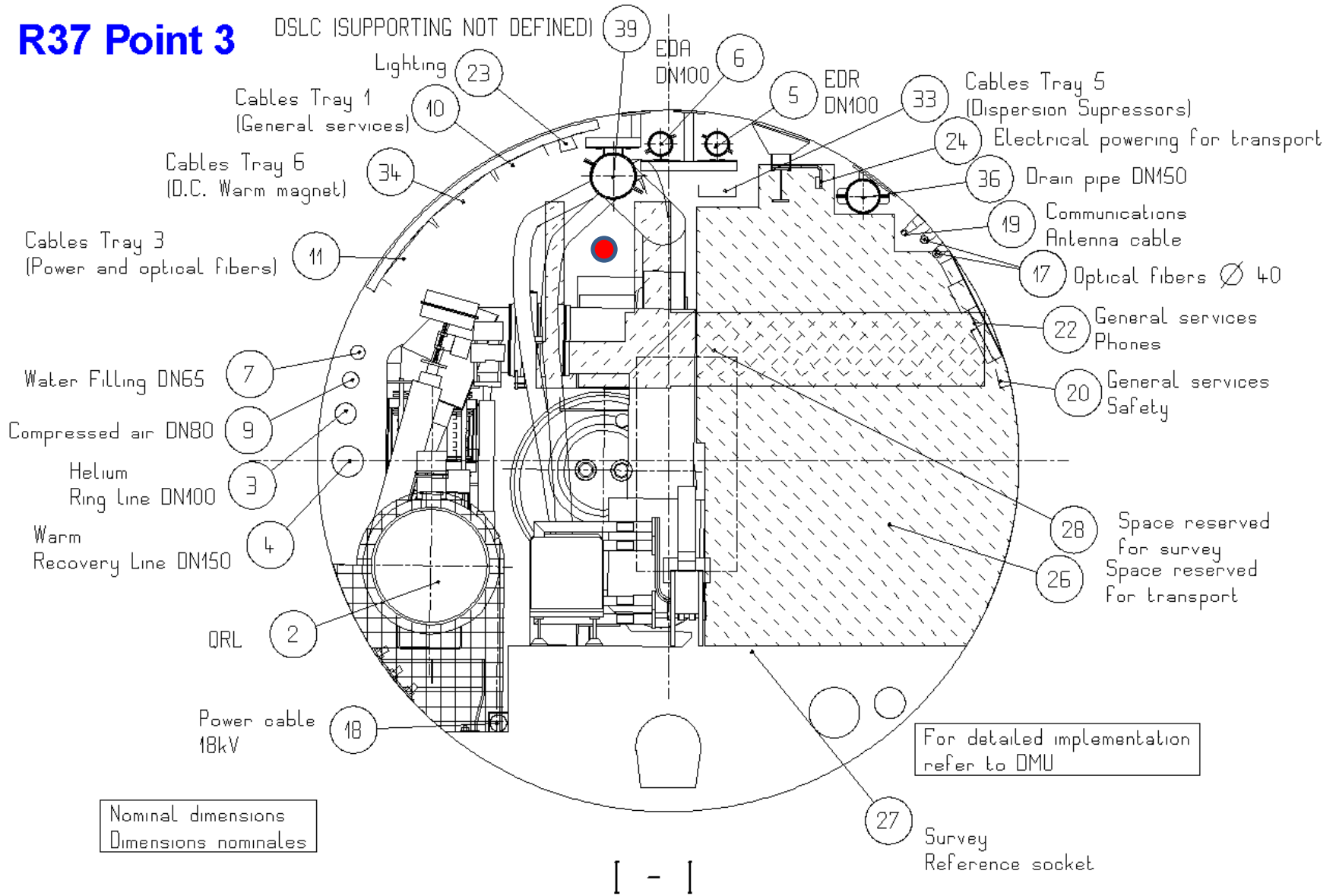
Restrict the LHeC to a beam pipe there!

But that is not all.

We have special cases:

# R37 Point 3

DSL (SUPPORTING NOT DEFINED)

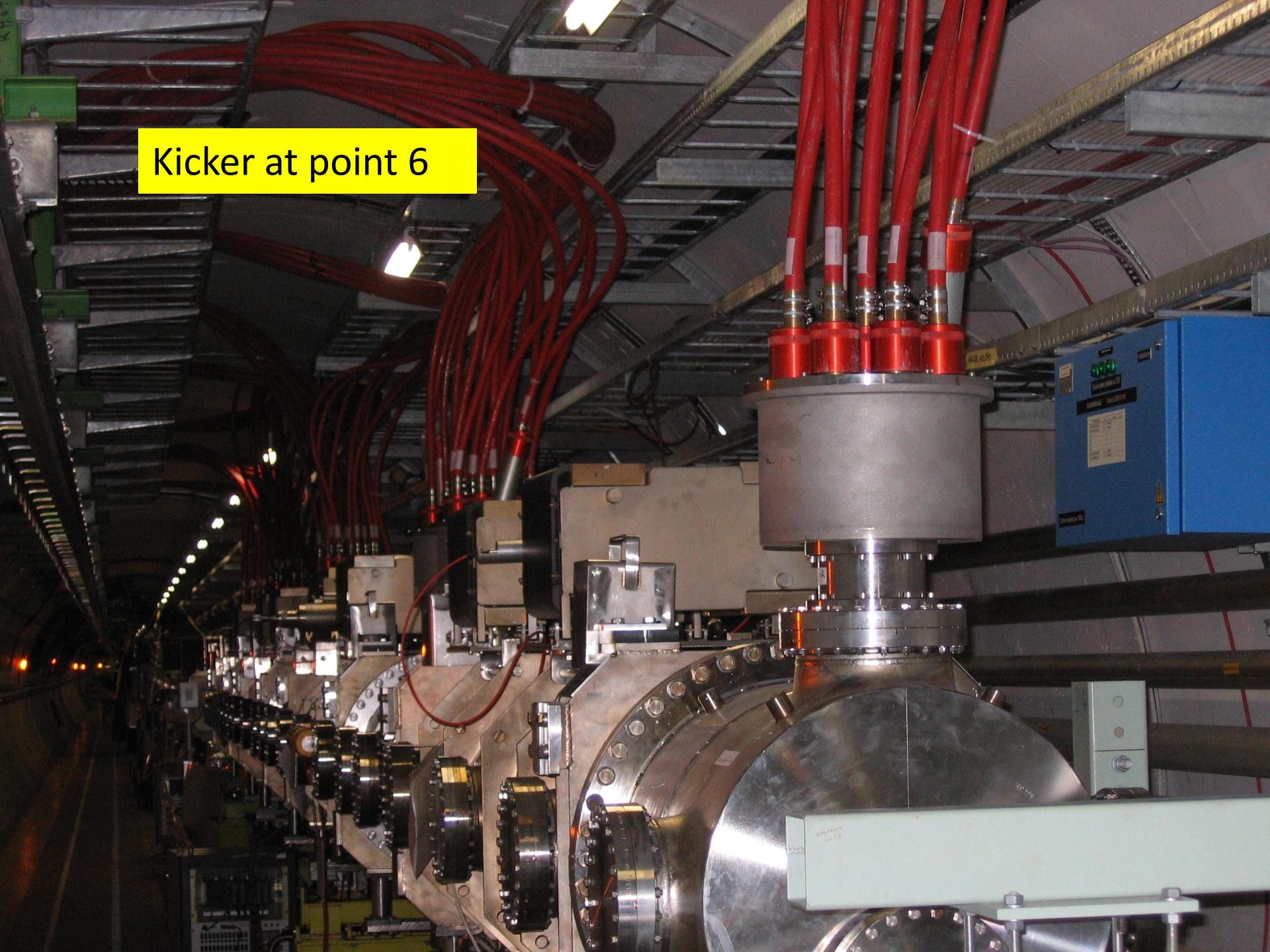


- Regular pattern of jumpers – can be avoided if the lattice is chosen properly
- Point 3 – very tight, needs attention



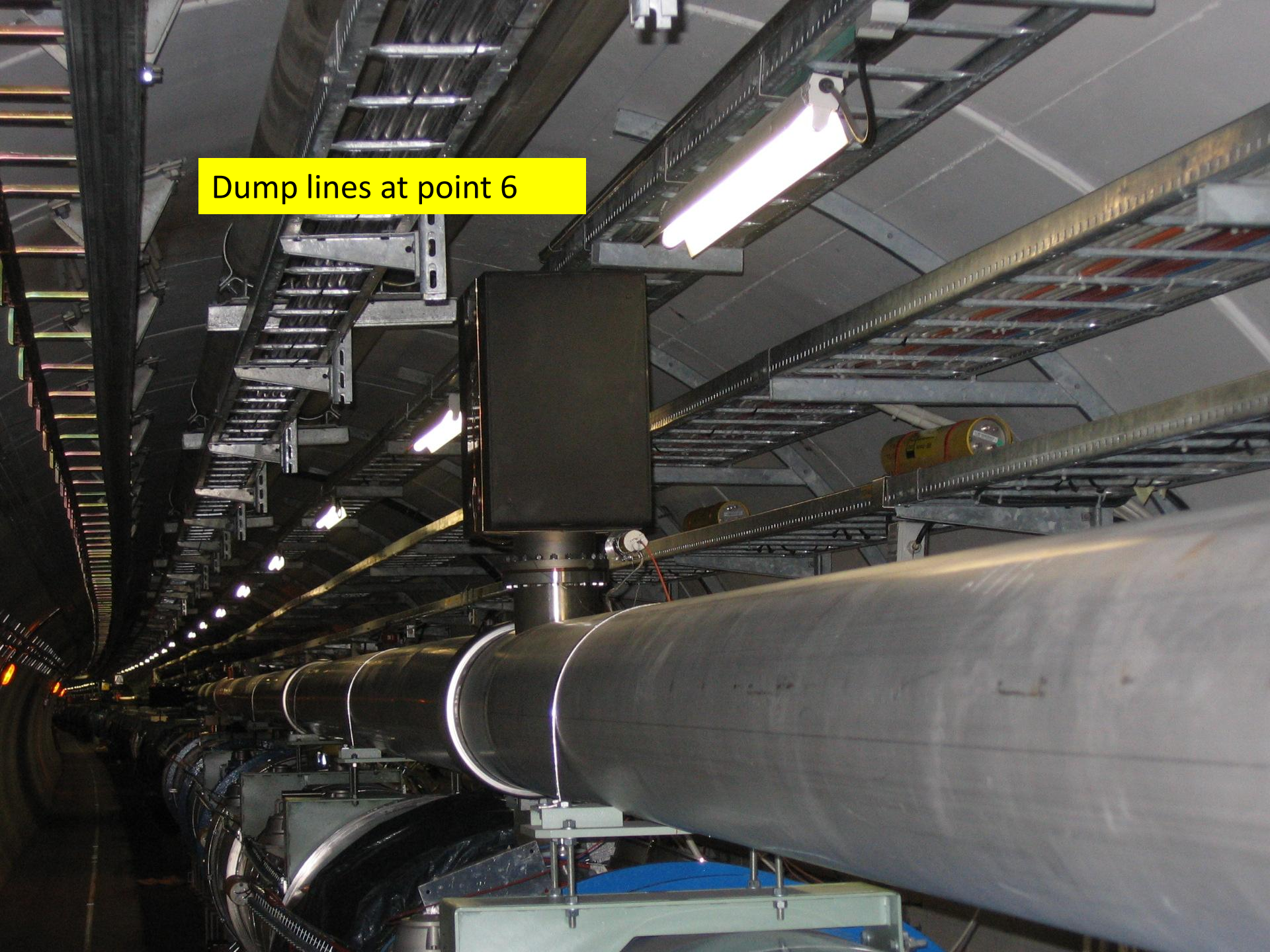


Kicker at point 6



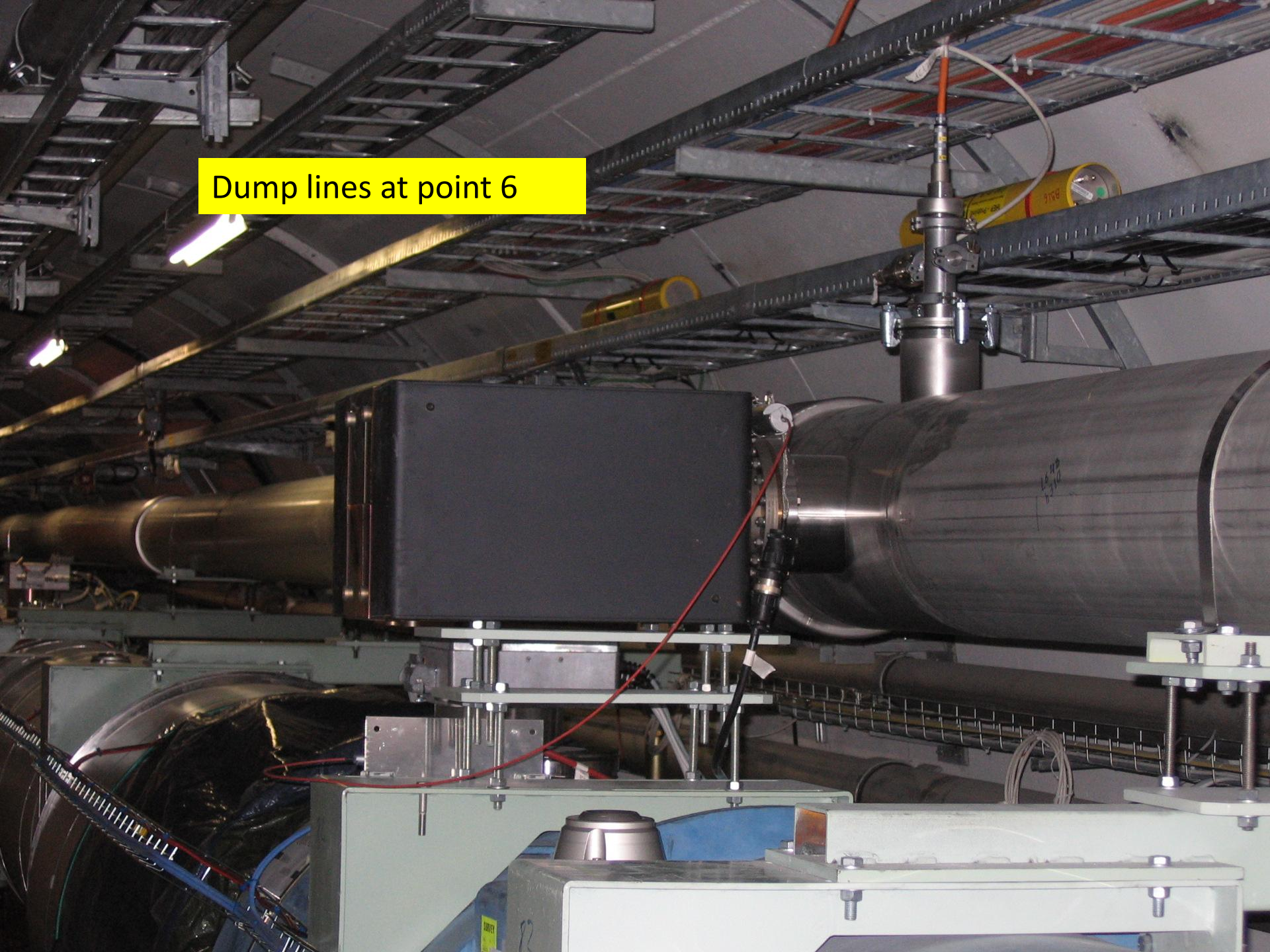


Dump lines at point 6

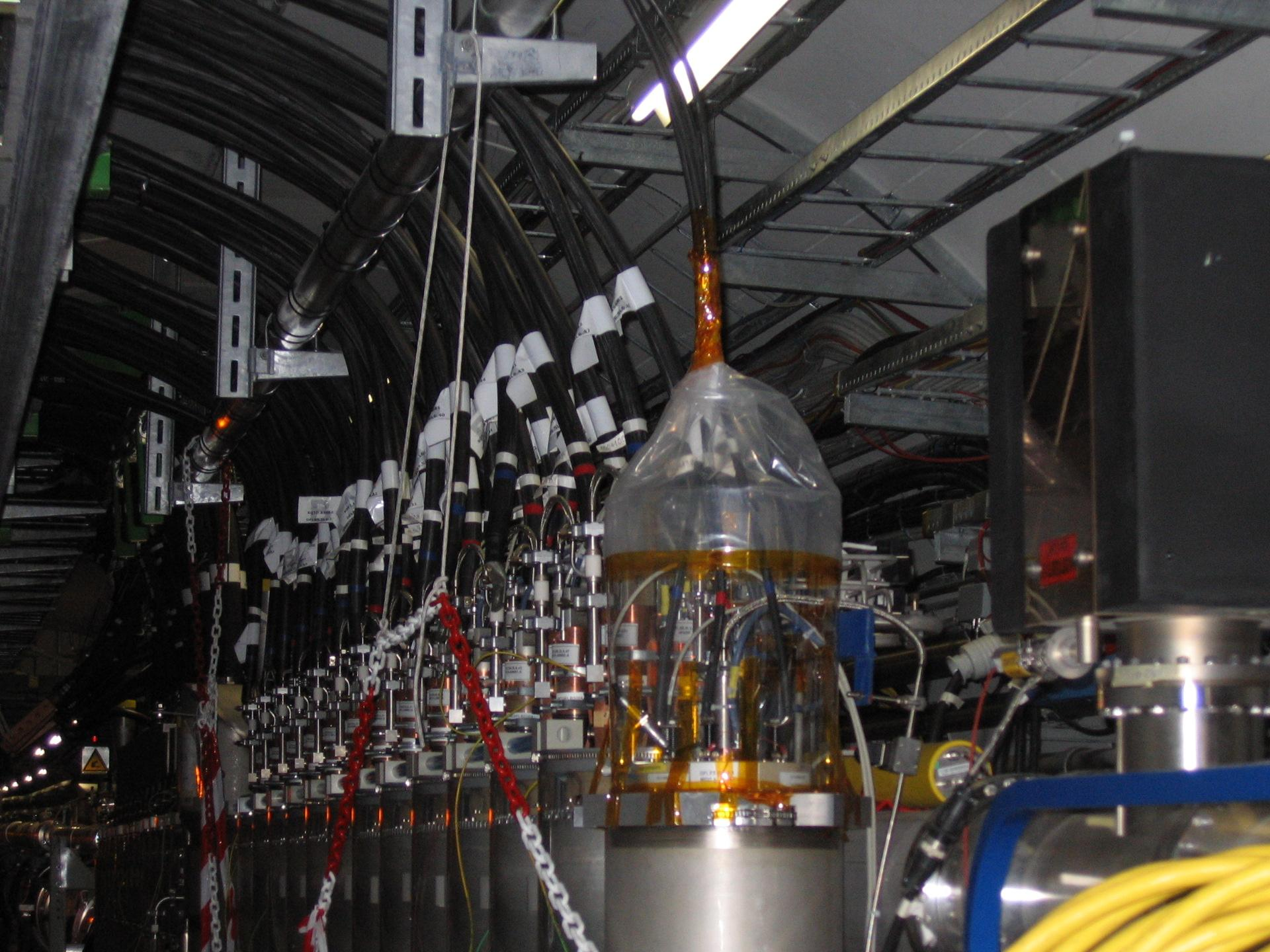




Dump lines at point 6

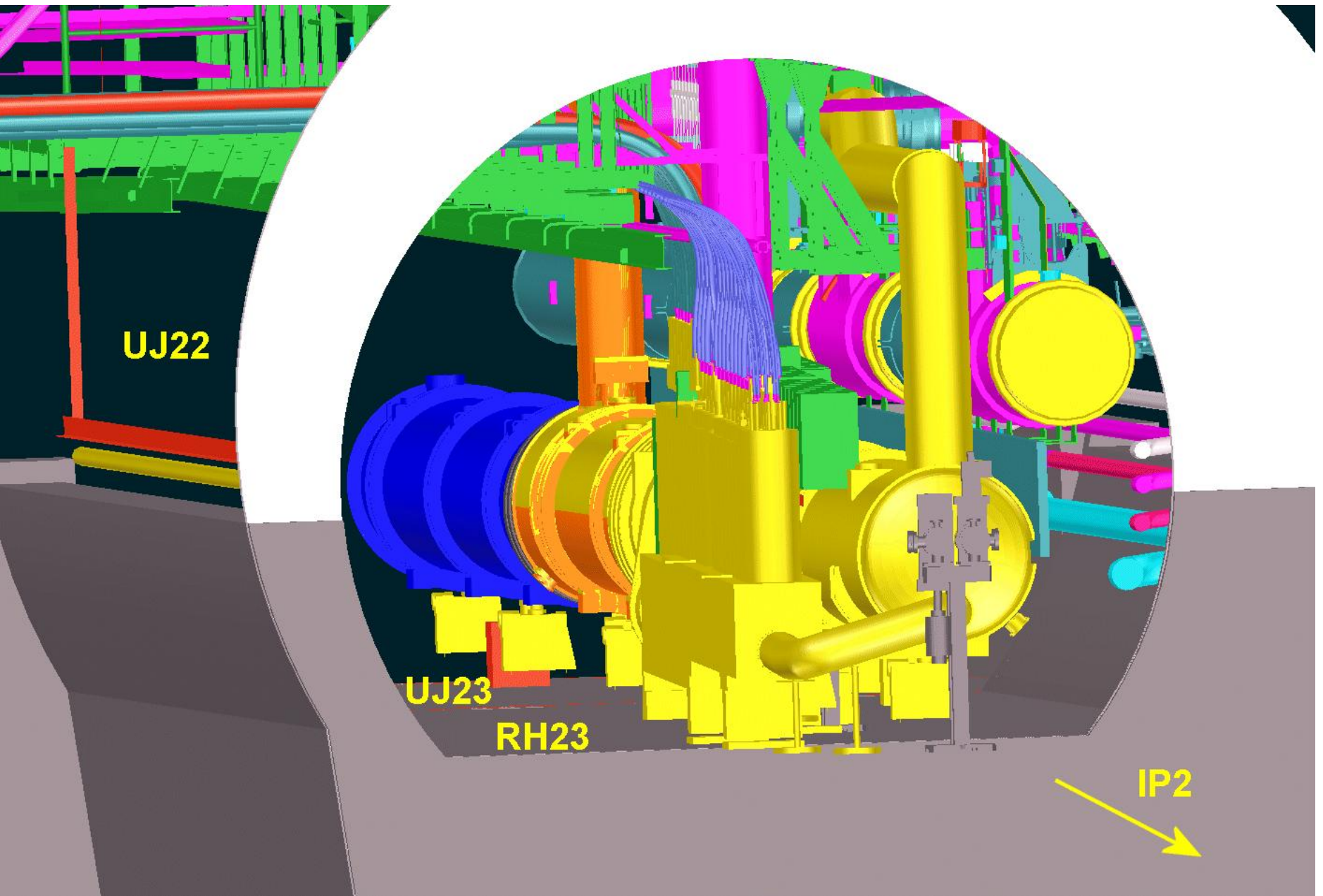






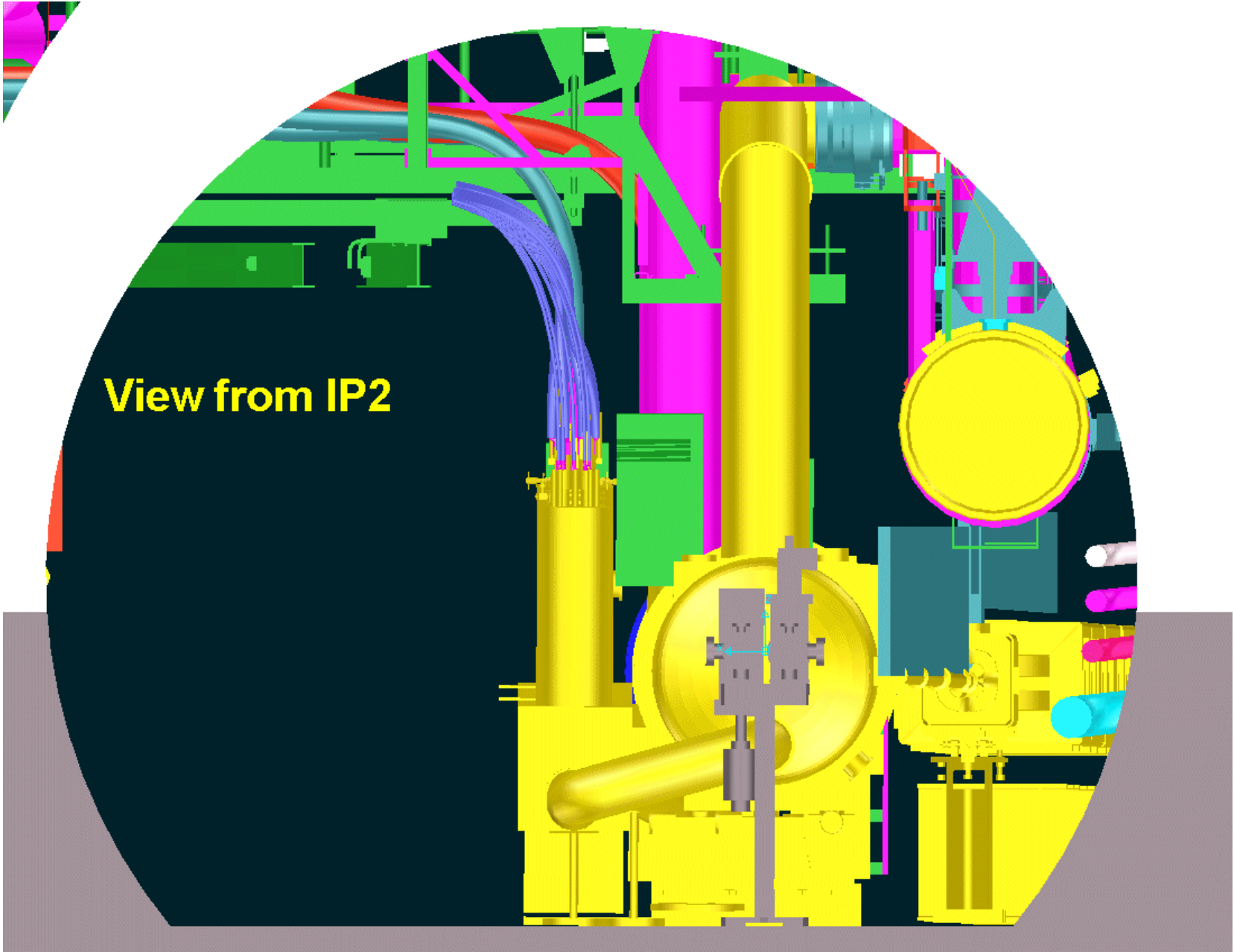
- Regular pattern of jumpers – can be avoided if the lattice is chosen properly
- Point 3 – very tight, needs attention
- Point 6 – How to deal with the dump lines, the kickers...?



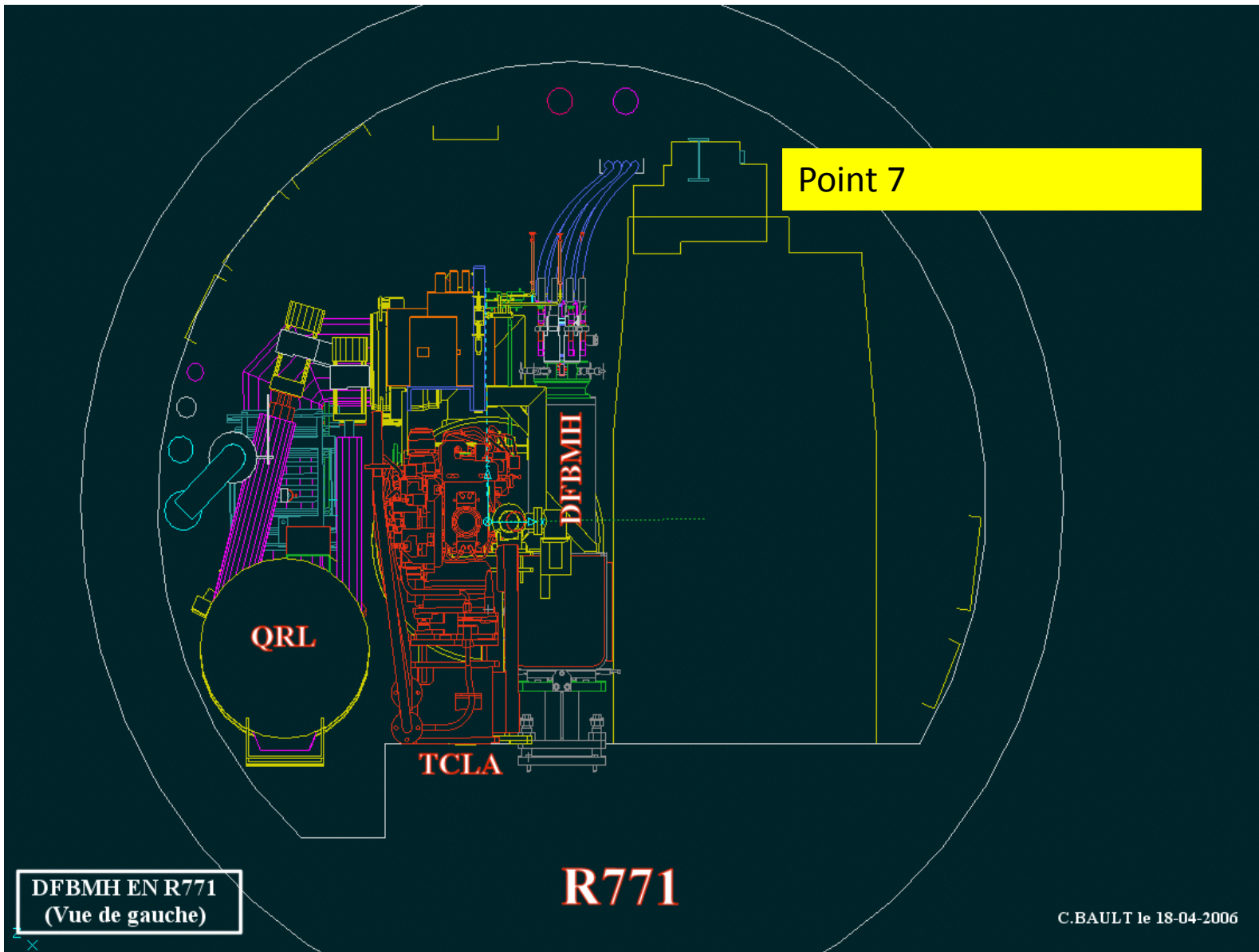




**View from IP2**



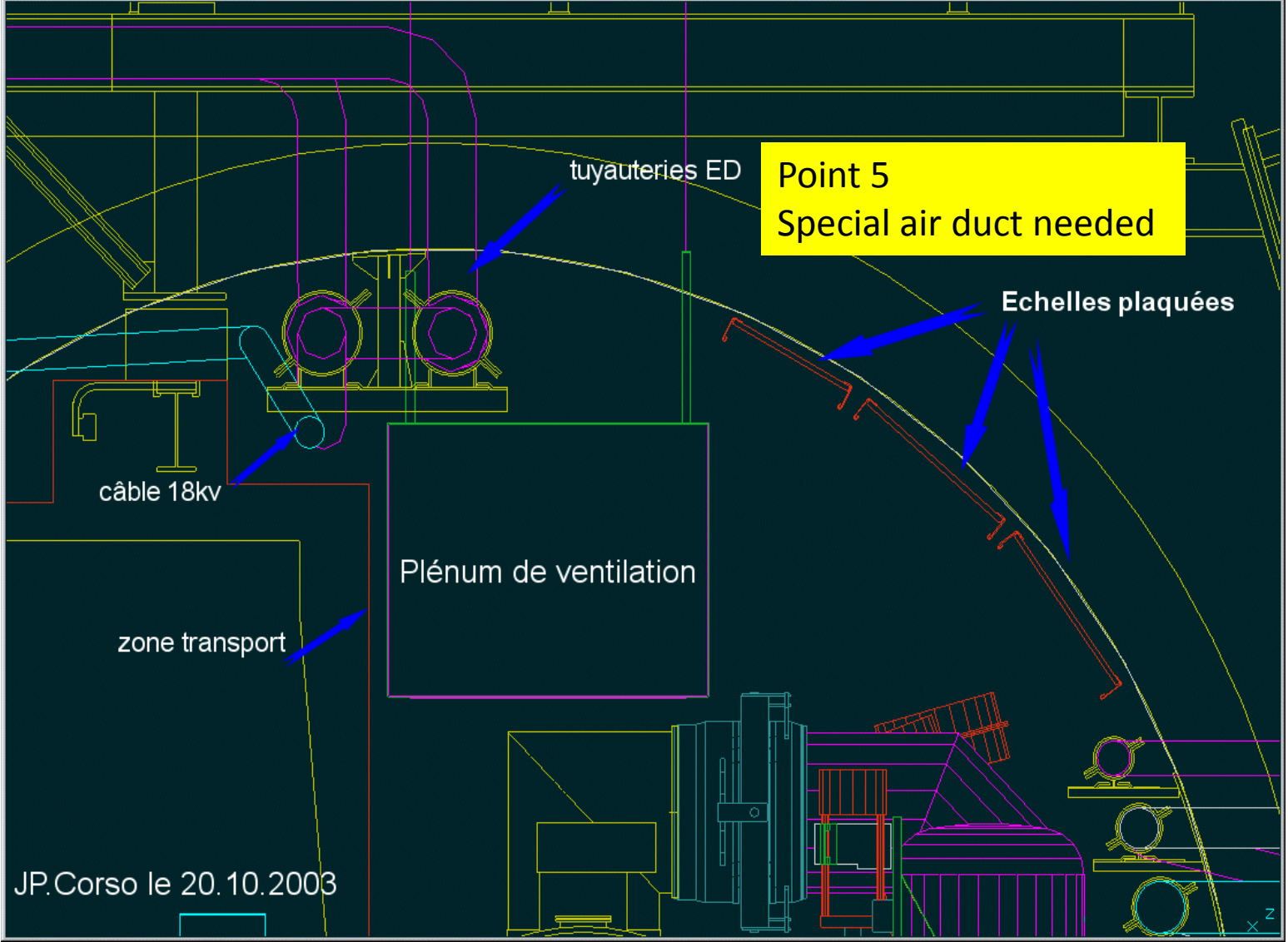
- Regular pattern of jumpers – can be avoided if the lattice is chosen properly
- Point 3 – very tight, needs attention
- Point 6 – How to deal with the dump lines, the kickers...?
- Point 2 - A challenge for the interaction region design !!!



DFBMH EN R771  
(Vue de gauche)

**R771**

- Regular pattern of jumpers – can be avoided if the lattice is chosen properly
- Point 3 – very tight, needs attention
- Point 6 – How to deal with the dump lines, the kickers...?
- Point 2 - A challenge for the interaction region design !!!
- Point 7 – very tight, no way to go

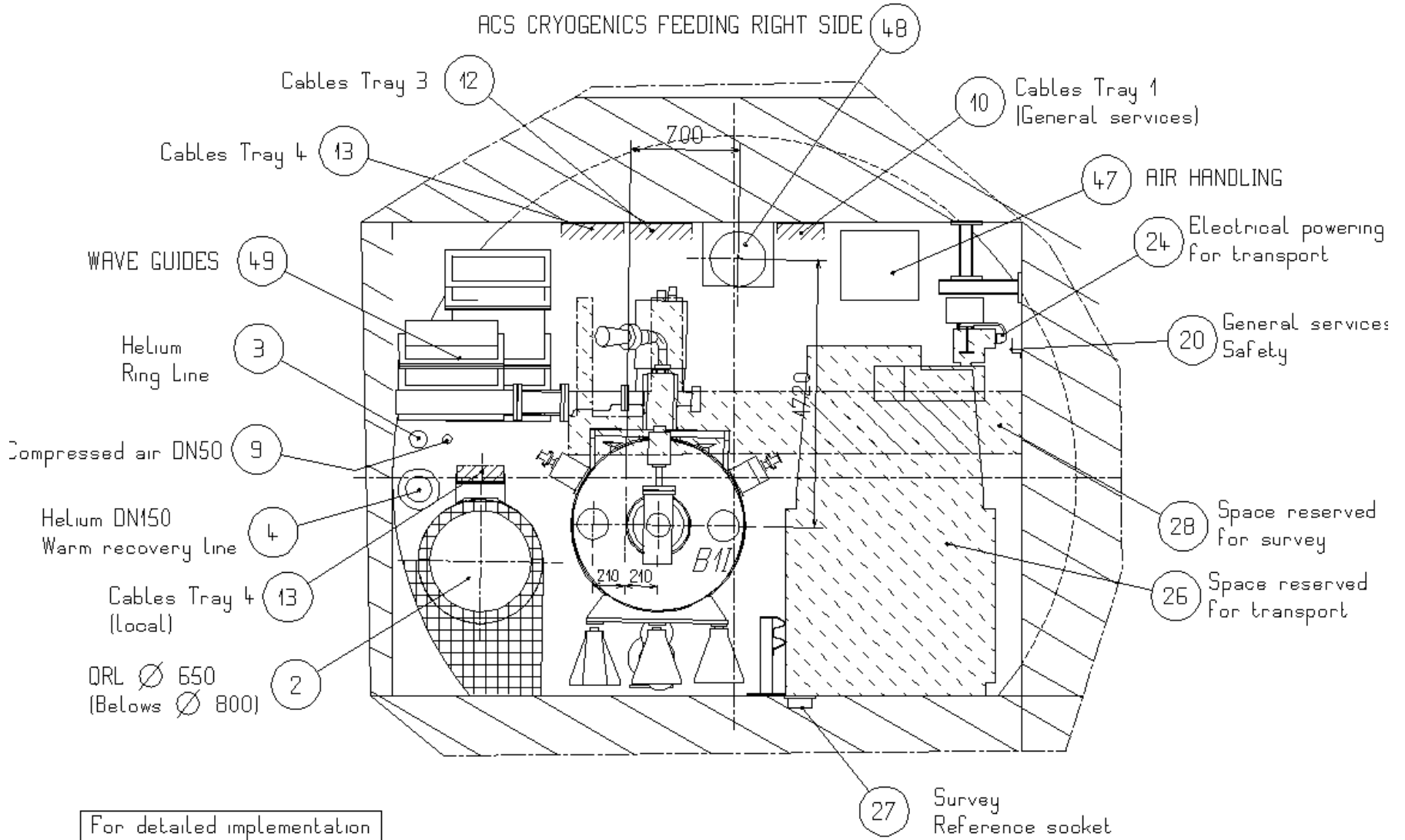




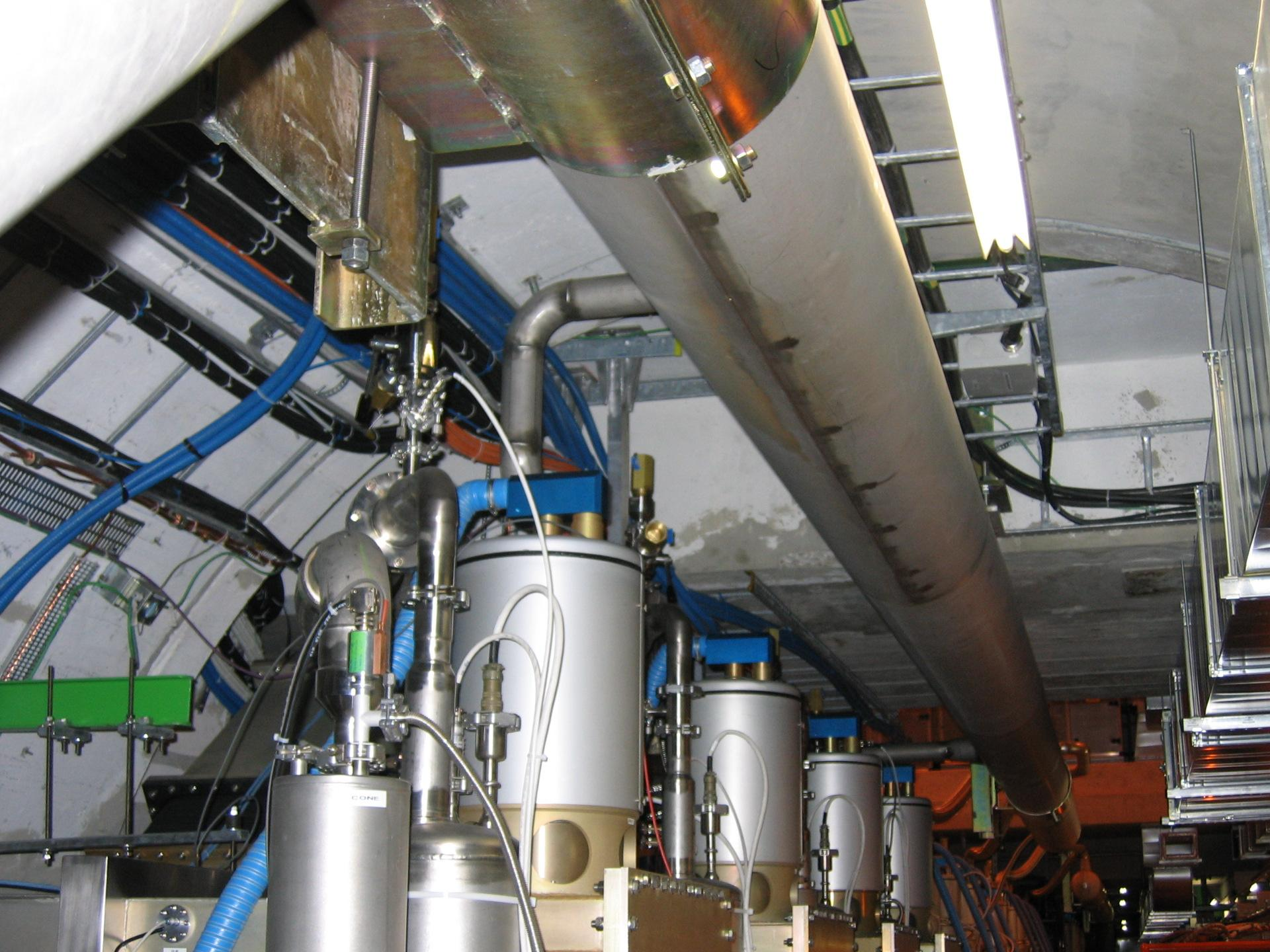
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- Point 3 – very tight, needs attention
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- Air conditioning to keep radioactive air in the tunnel (decay time)

# RUX45 Point 4

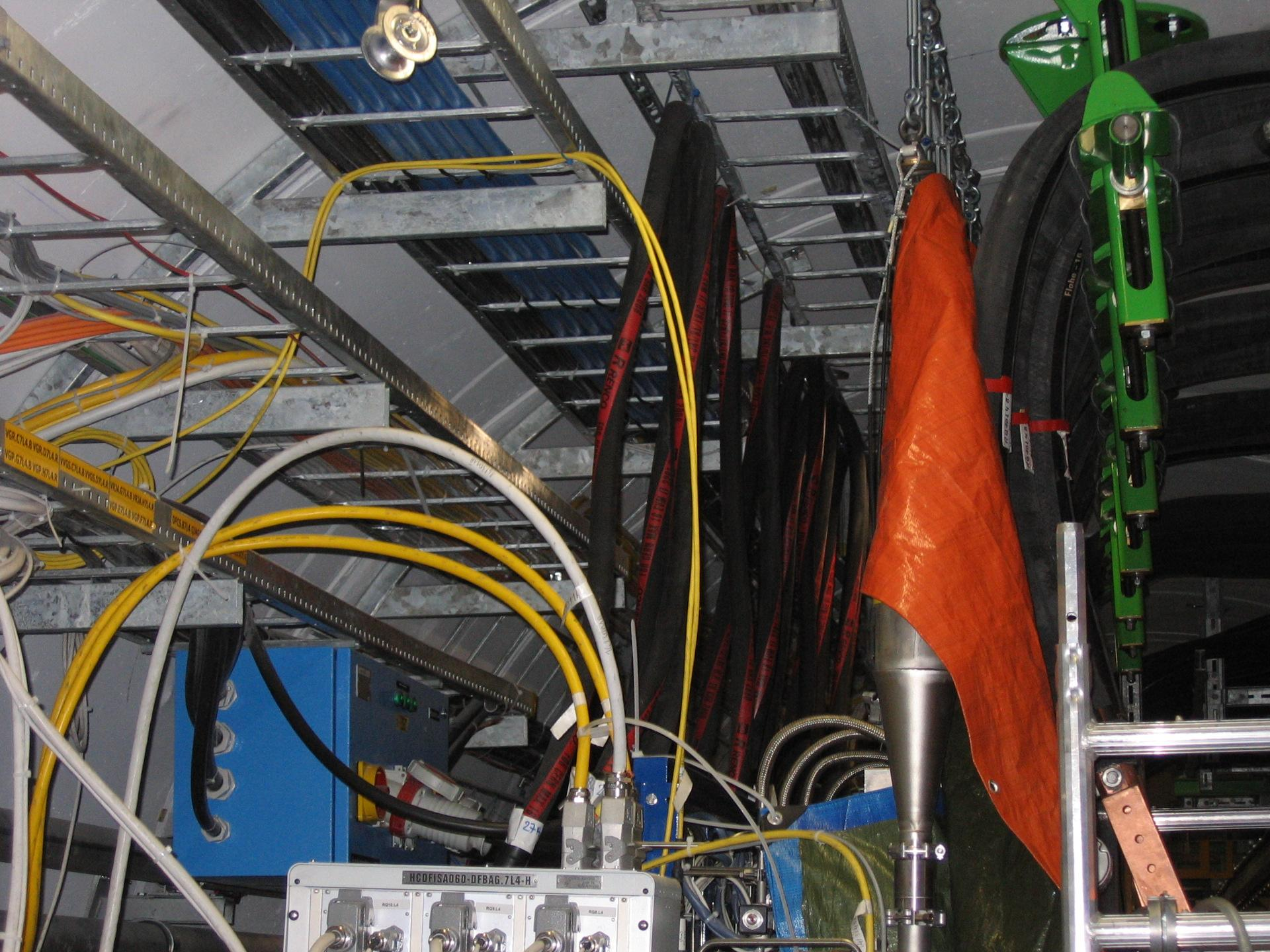
E - E



For detailed implementation refer to DMU







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- Point 3 – very tight, needs attention
- Point 6 – How to deal with the dump lines, the kickers...?
- Point 2 - A challenge for the interaction region design !!!
- Point 7 – very tight, no way to go
- Air conditioning to keep radioactive air in the tunnel (decay time)
- RF cavities

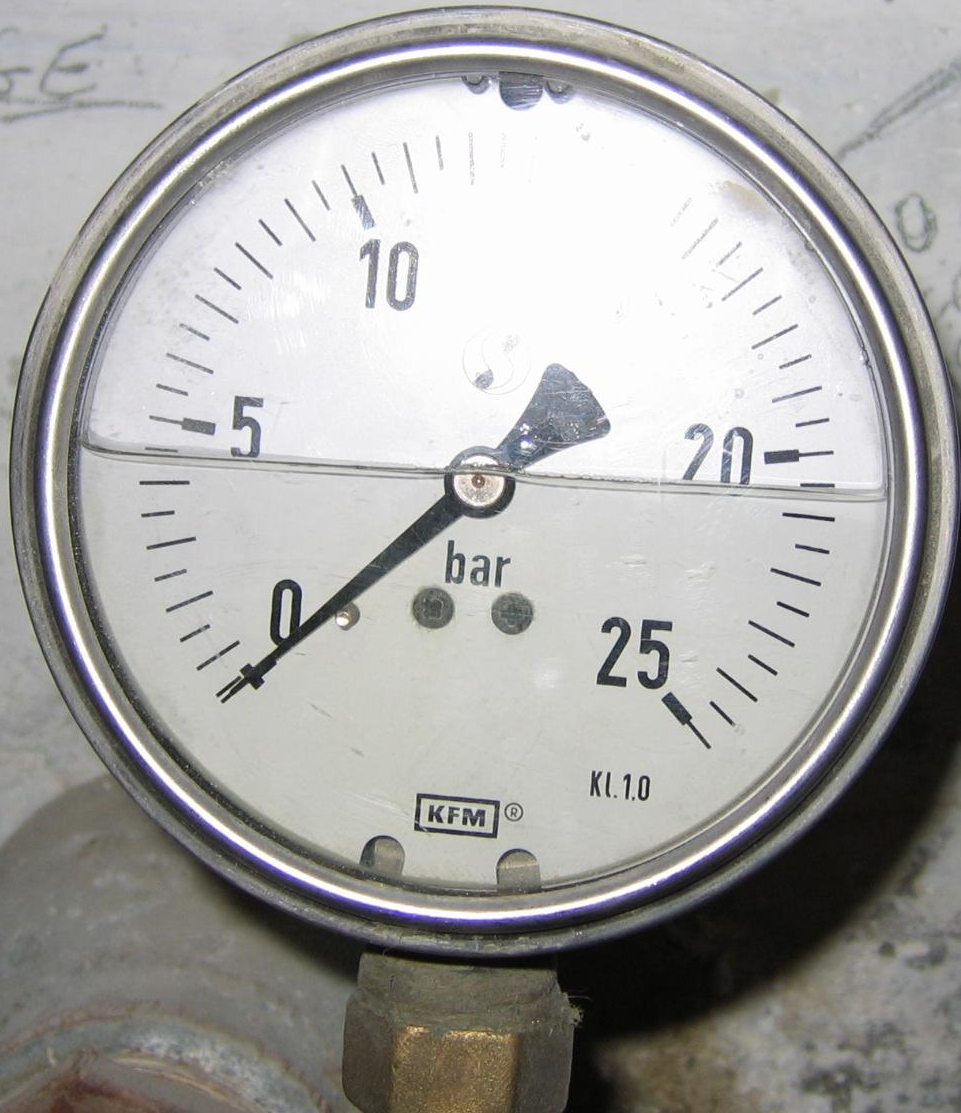
The state of the tunnel, in particular between point 2 and 4 forbids any load > 100 kg/m on the ceiling.





BENOLPRESS

TUNNEL  
PURGE



0-20/10/99









W 3  
A 16 21 B1A  
03 06 04

L16A EB

L16A EB





Stalagmites forming









# Summary

About 350 places to be avoided for e-magnets.

Some areas very difficult. Solutions will be looked for, once a solution for the other ~350 obstacles has been found.

Note: The experiments 1 and 5 are passed on the outside. That increases the overall length.

We have to cross the transport region to compensate the overlength\*). This is almost impossible, because it would make any accelerator repair even more difficult.

\*)  $dl=2\pi dr$ ,  $dr \ll 1\text{m}$