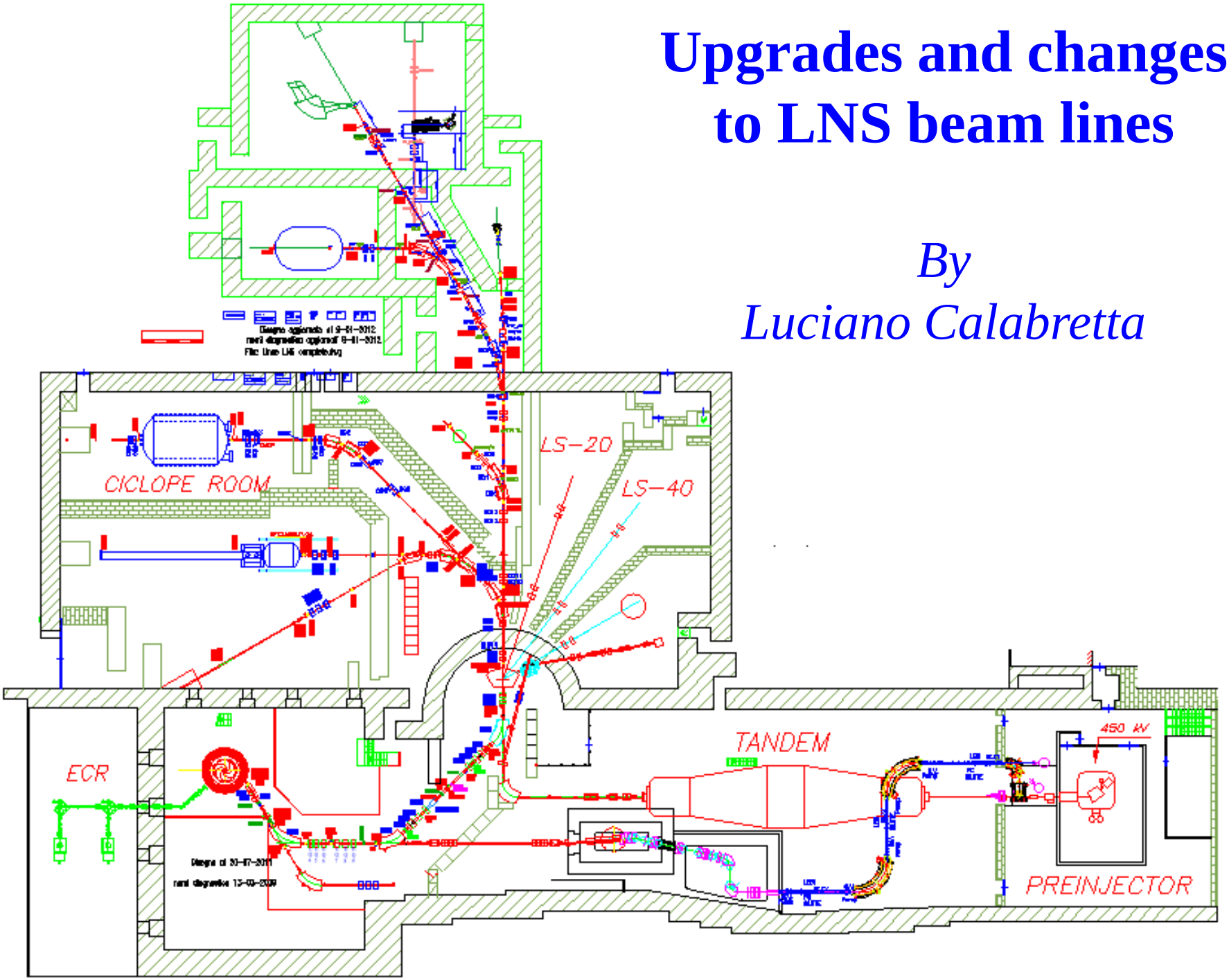
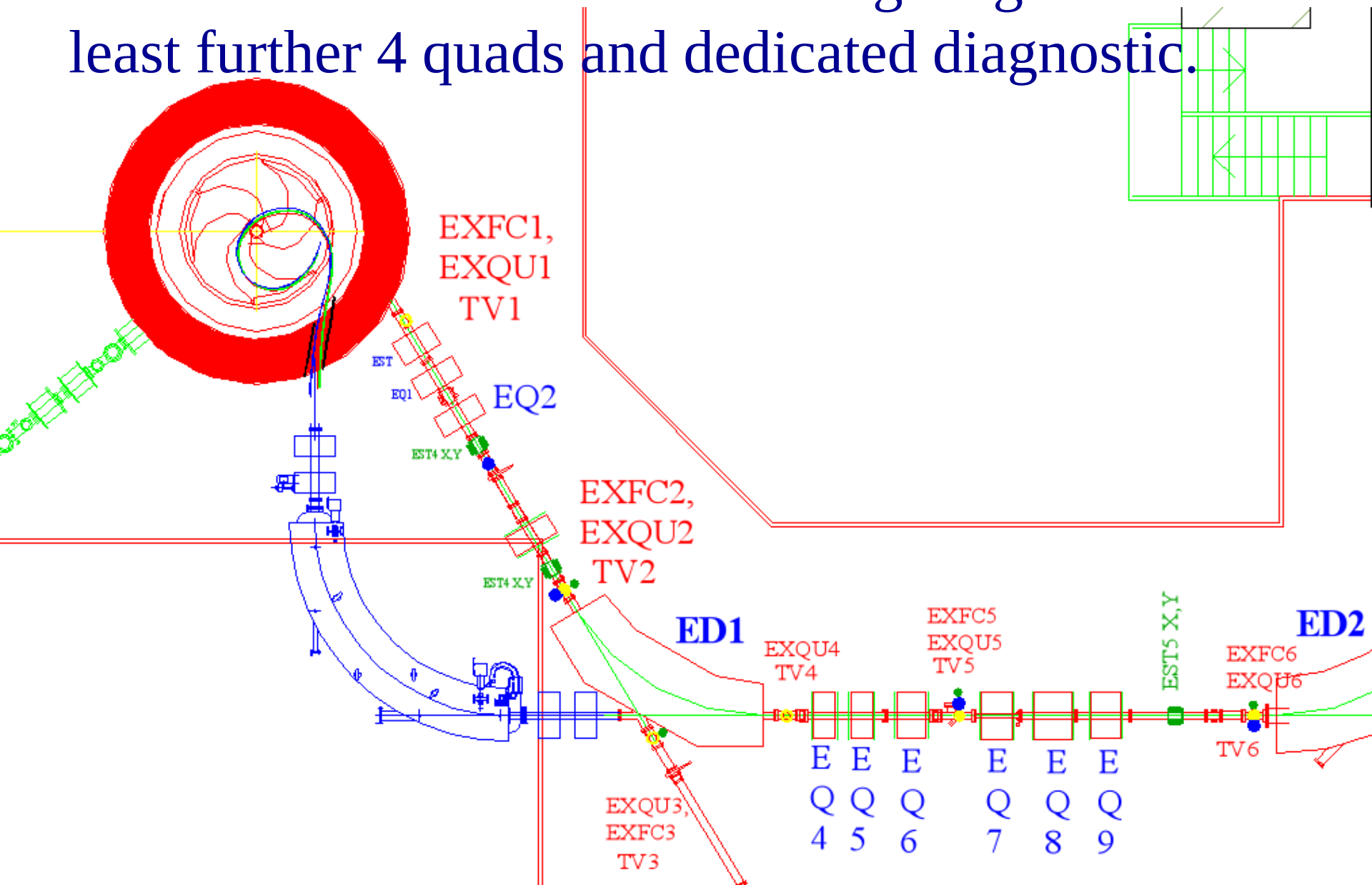
Upgrades and changes to LNS beam lines

By
Luciano Calabretta



To deliver the new high power beam to the existing beam lines we need a 90° bending magnet and at least further 4 quads and dedicated diagnostic.



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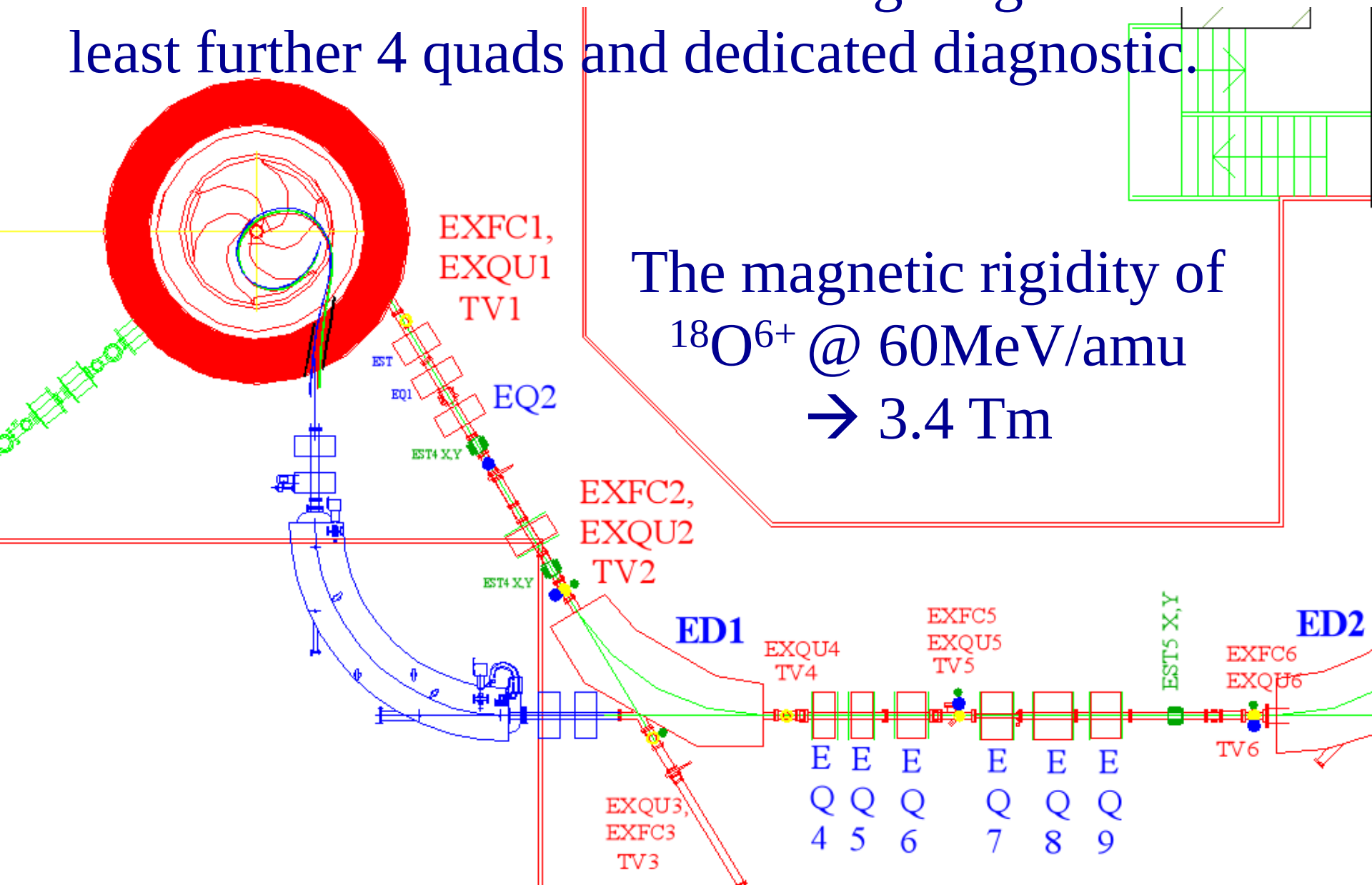
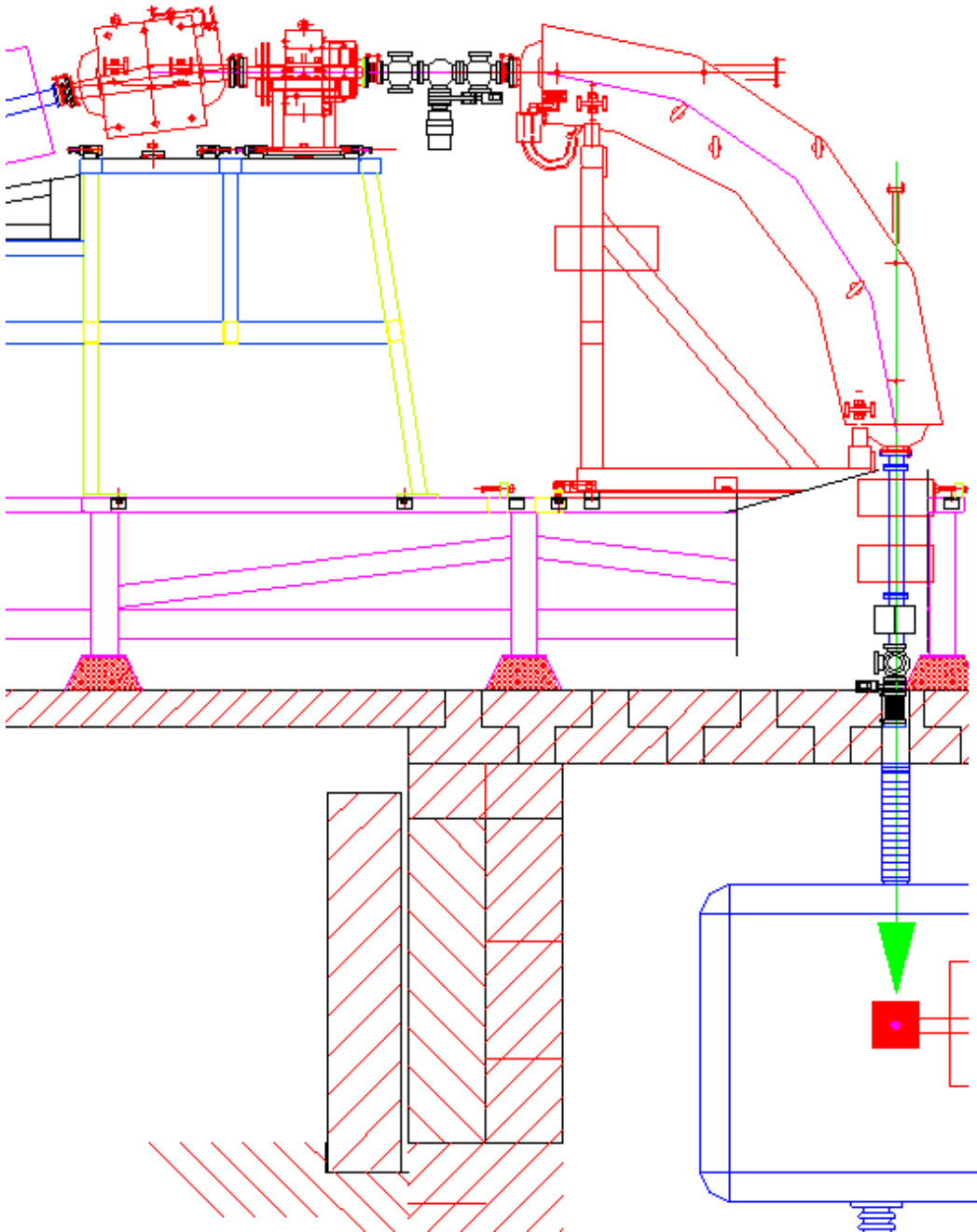


The magnetic rigidity of $^{18}O^{6+}$ @ 60MeV/amu
→ 3.4 Tm



We are looking if the features of the 90° bending magnet of the EXCYT primary beam line match the request of the new extraction line!

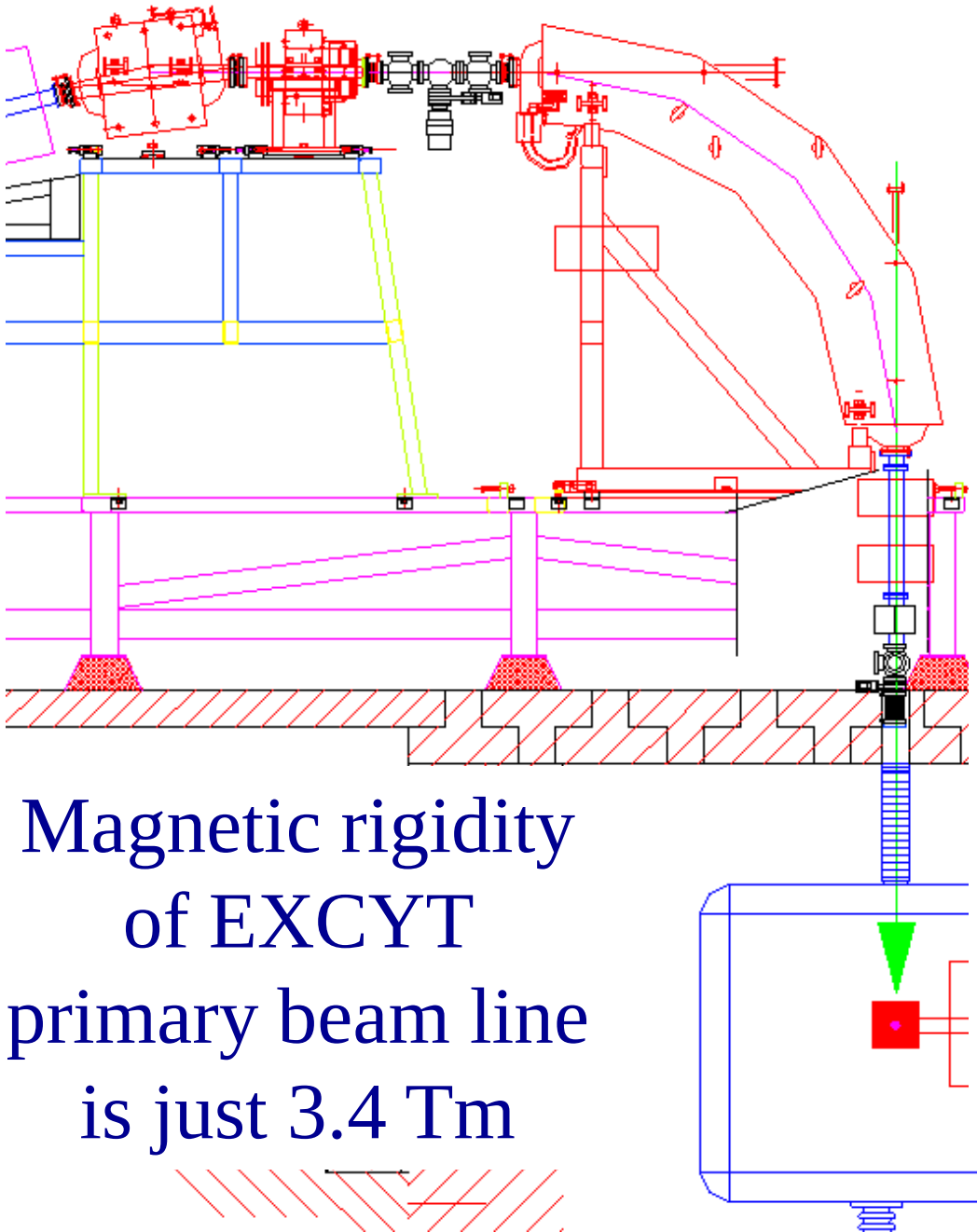
Vacuum chamber

Free vertical gap

40 mm,

radial width 90 mm,

Pole width 200 mm



Magnetic rigidity of EXCYT primary beam line is just 3.4 Tm

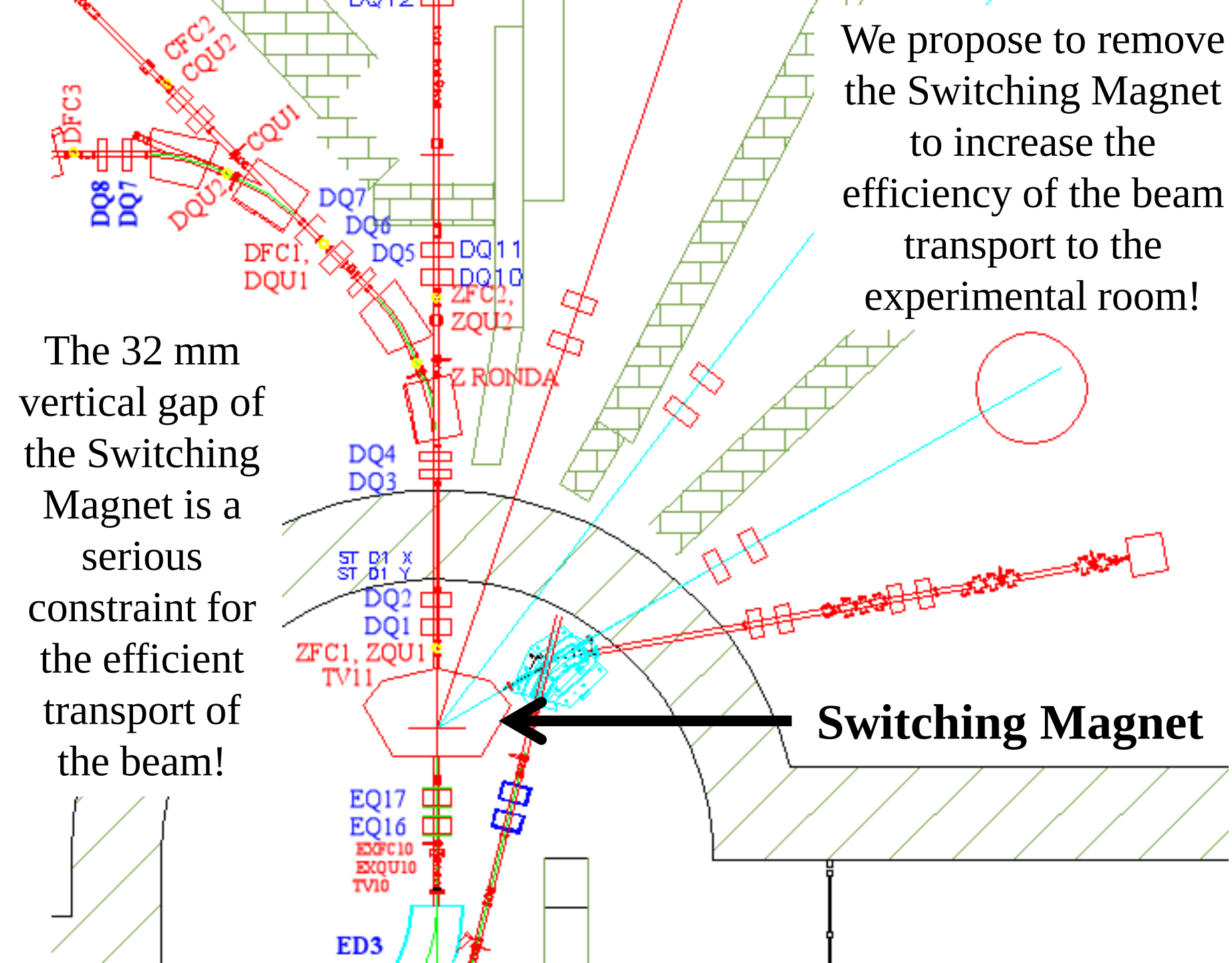
We are looking if the features of the 90° bending magnet of the EXCYT primary beam line match the request of the new extraction line!

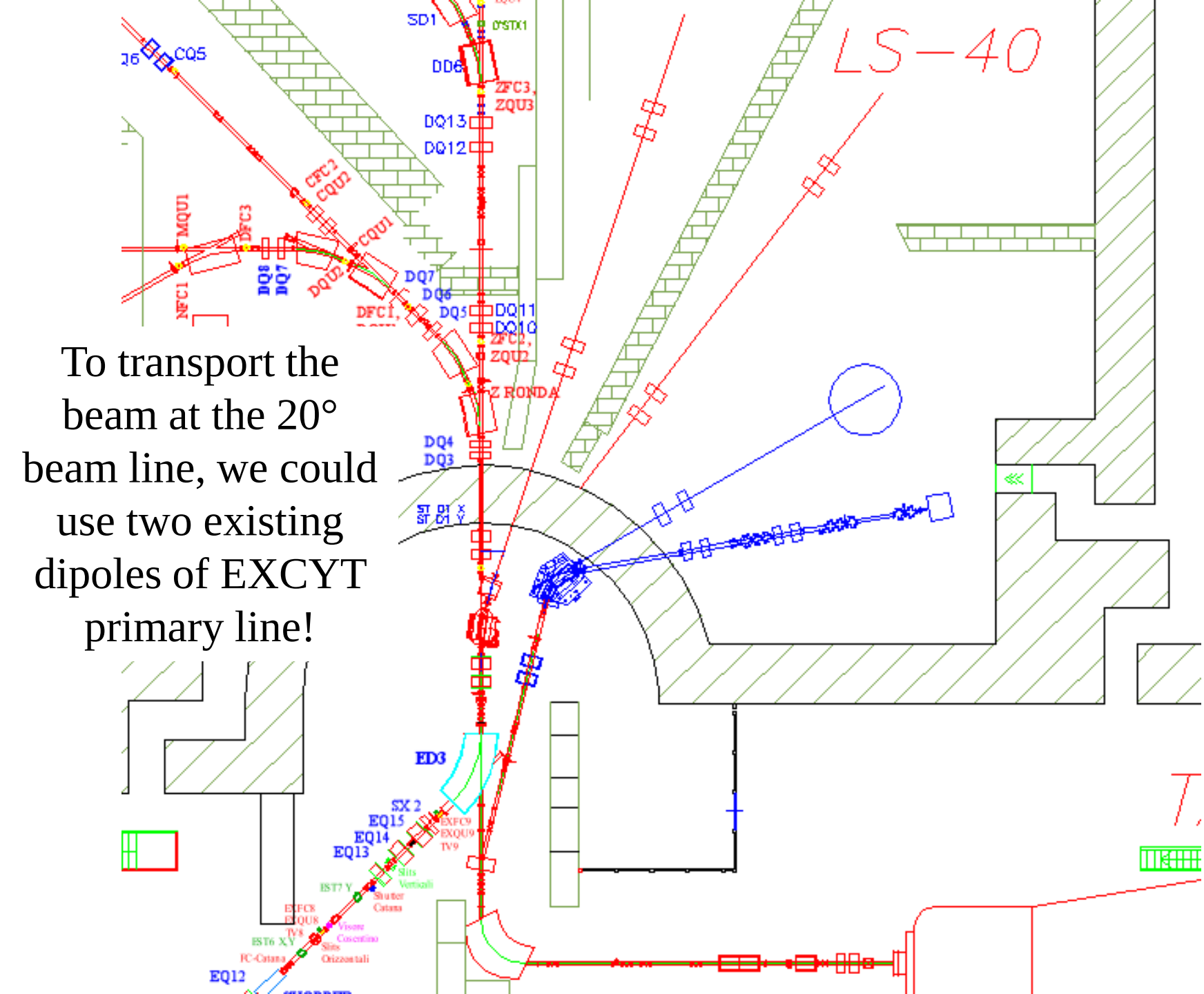
Vacuum chamber

Free vertical gap 40 mm,

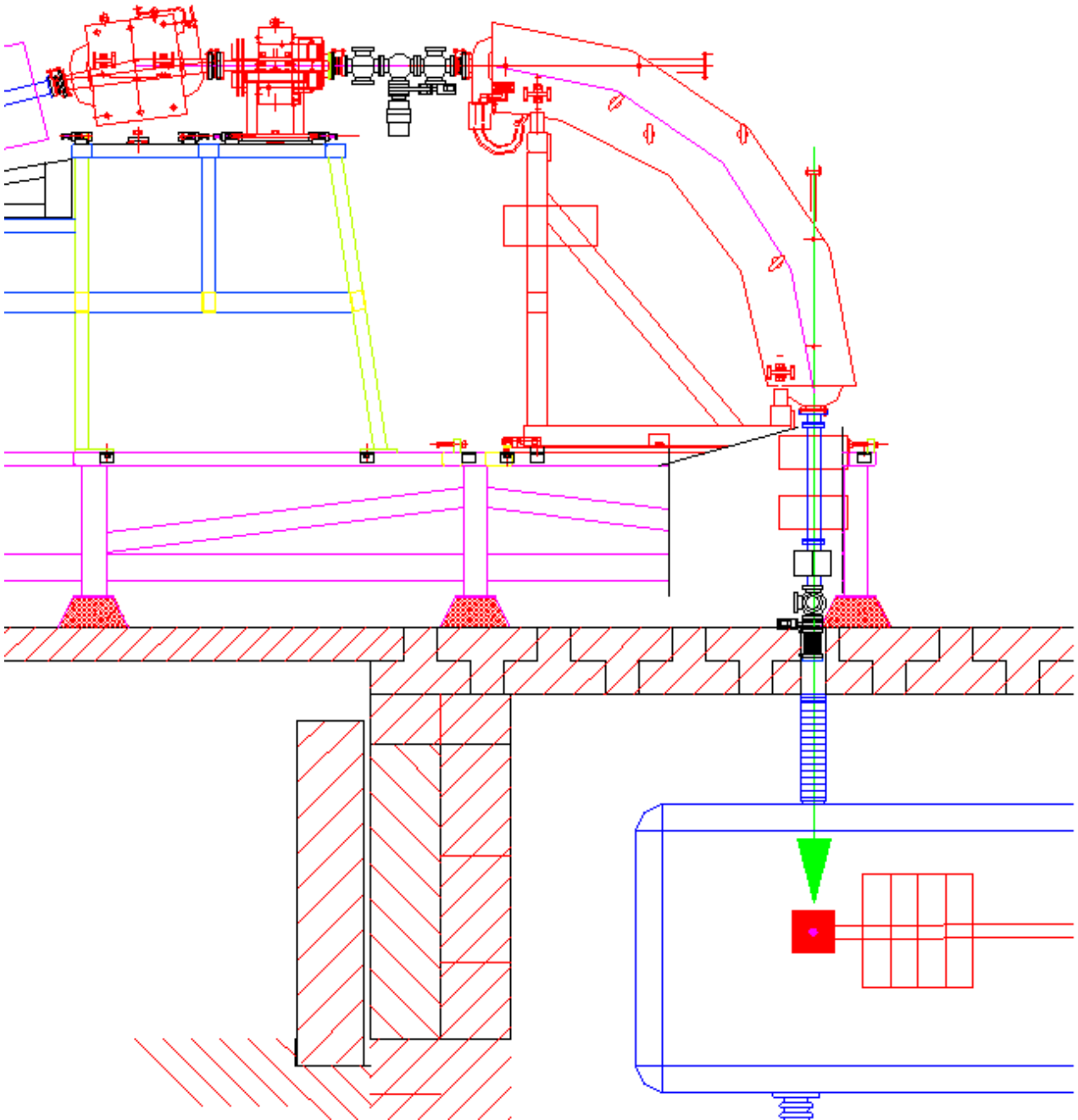
radial width 90 mm,

Pole width 200 mm

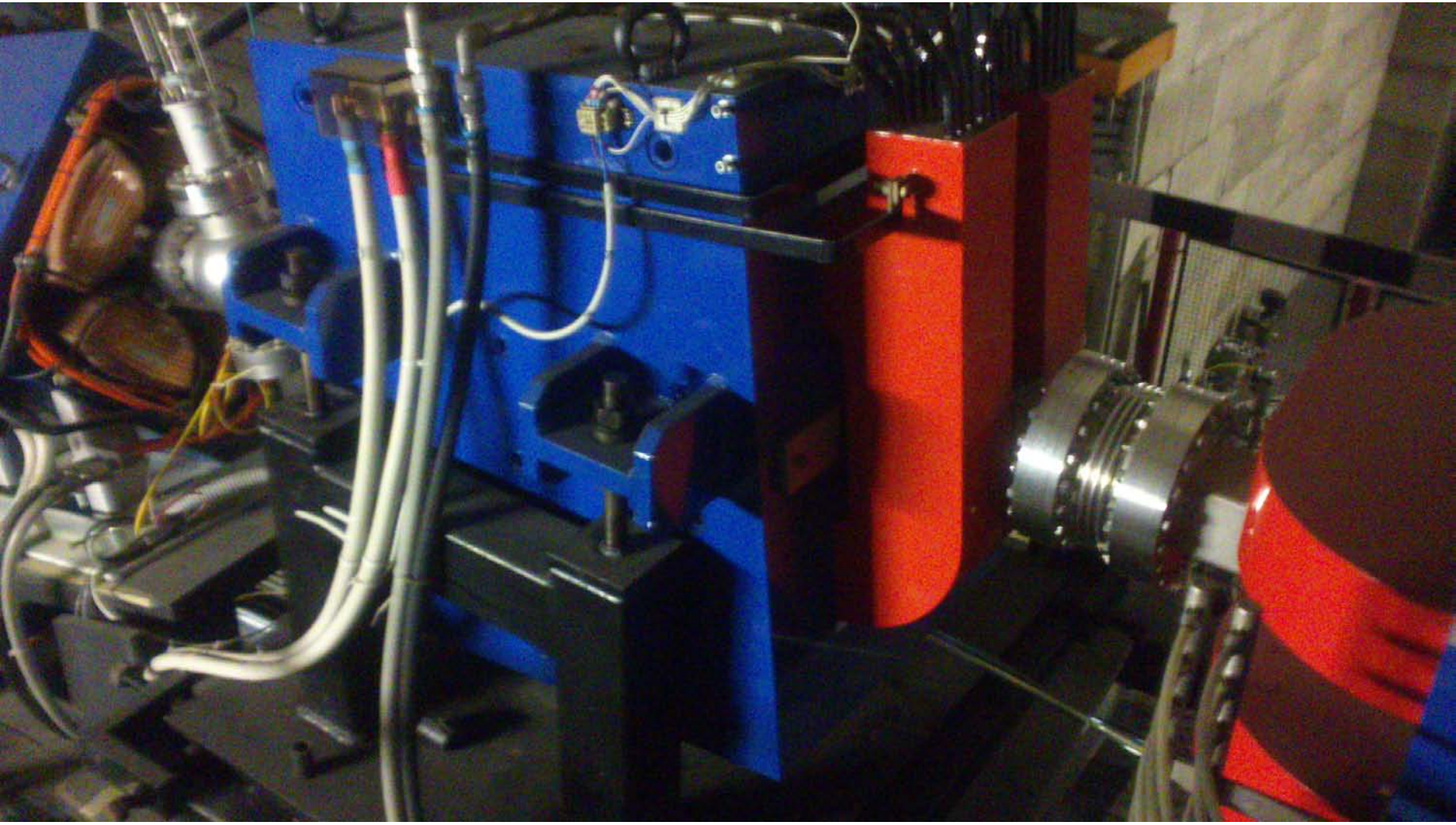

We propose to remove the Switching Magnet to increase the efficiency of the beam transport to the experimental room!
The 32 mm vertical gap of the Switching Magnet is a serious constraint for the efficient transport of the beam!
Switching Magnet
CFC2
CQU2
DFC3
CQU1
DQ8
DQ7
DQU2
DQ7
DQ6
DFC1,
DQU1
DQ5
DQ11
DQ10
ZFC2,
ZQU2
Z RONDA
DQ4
DQ3
ST D1 X
ST D1 Y
DQ2
DQ1
ZFC1, ZQU1
TV11
EQ17
EQ16
EXFC10
EXQU10
TV10
ED3



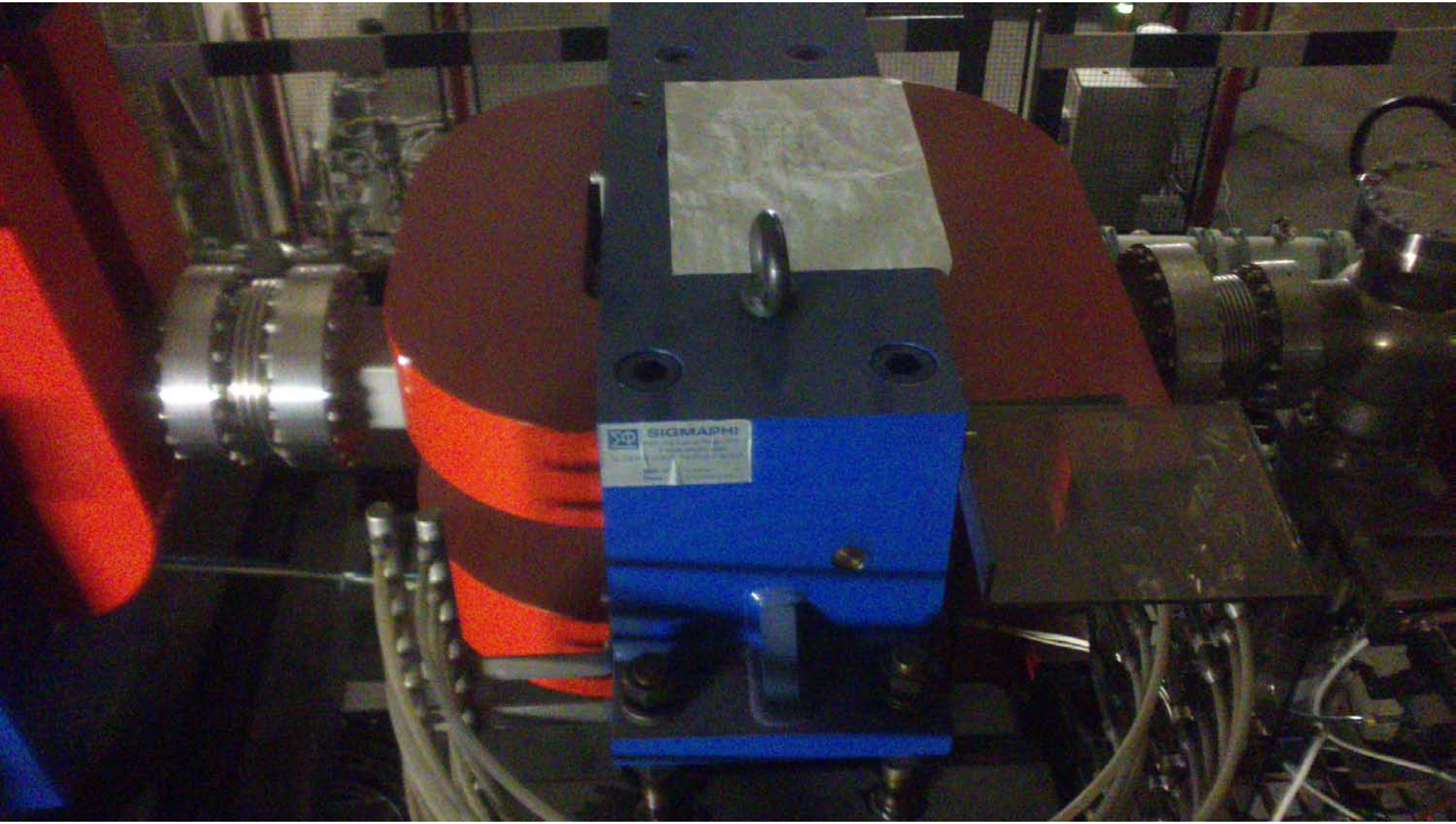
To transport the beam at the 20° beam line, we could use two existing dipoles of EXCYT primary line!



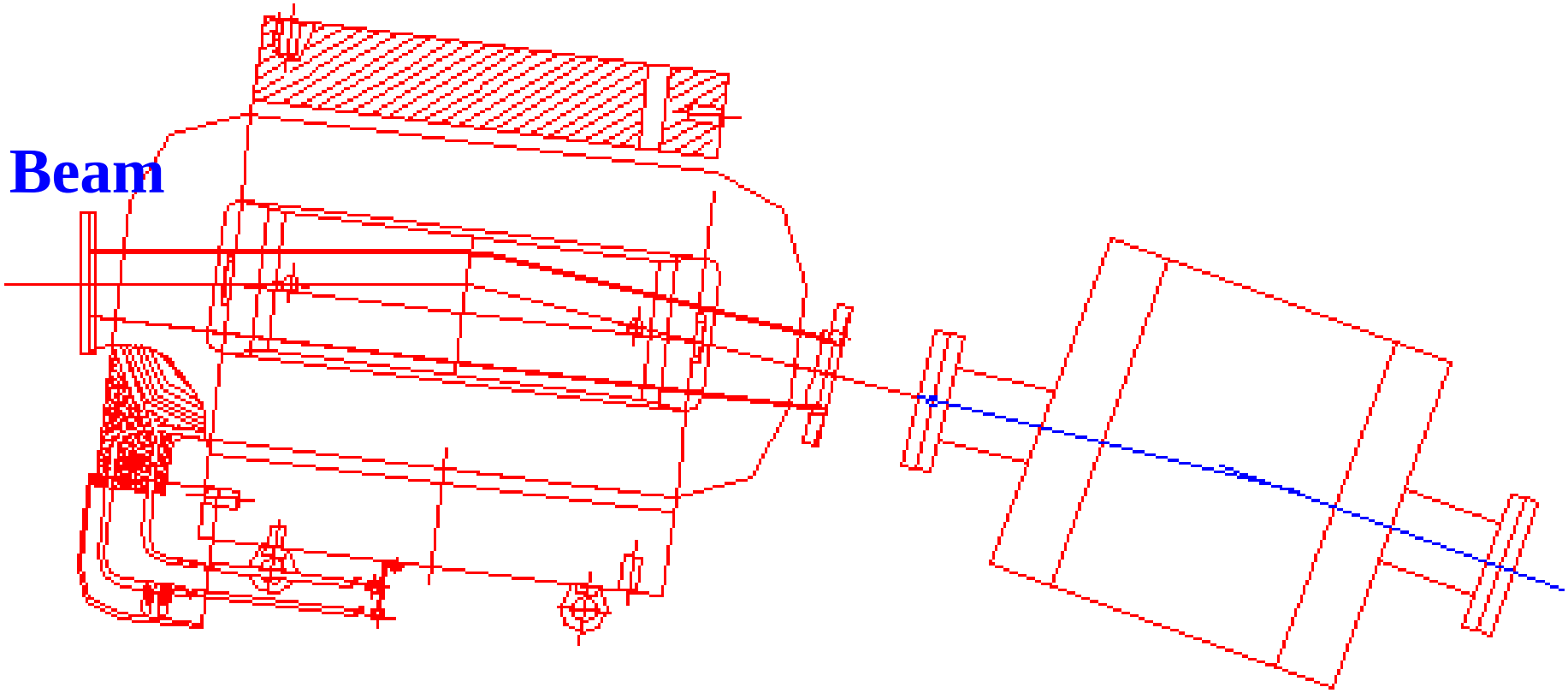
Bending magnet PD2 of EXCYT primary beam line: Vertical gap 50 mm, Deflection angle 13.8°



Bending magnet PD3 of EXCYT primary beam line: Vertical gap 70 mm, Deflection angle 5°



Vertical gap 50 mm
Deflection angle 13.8° →15°

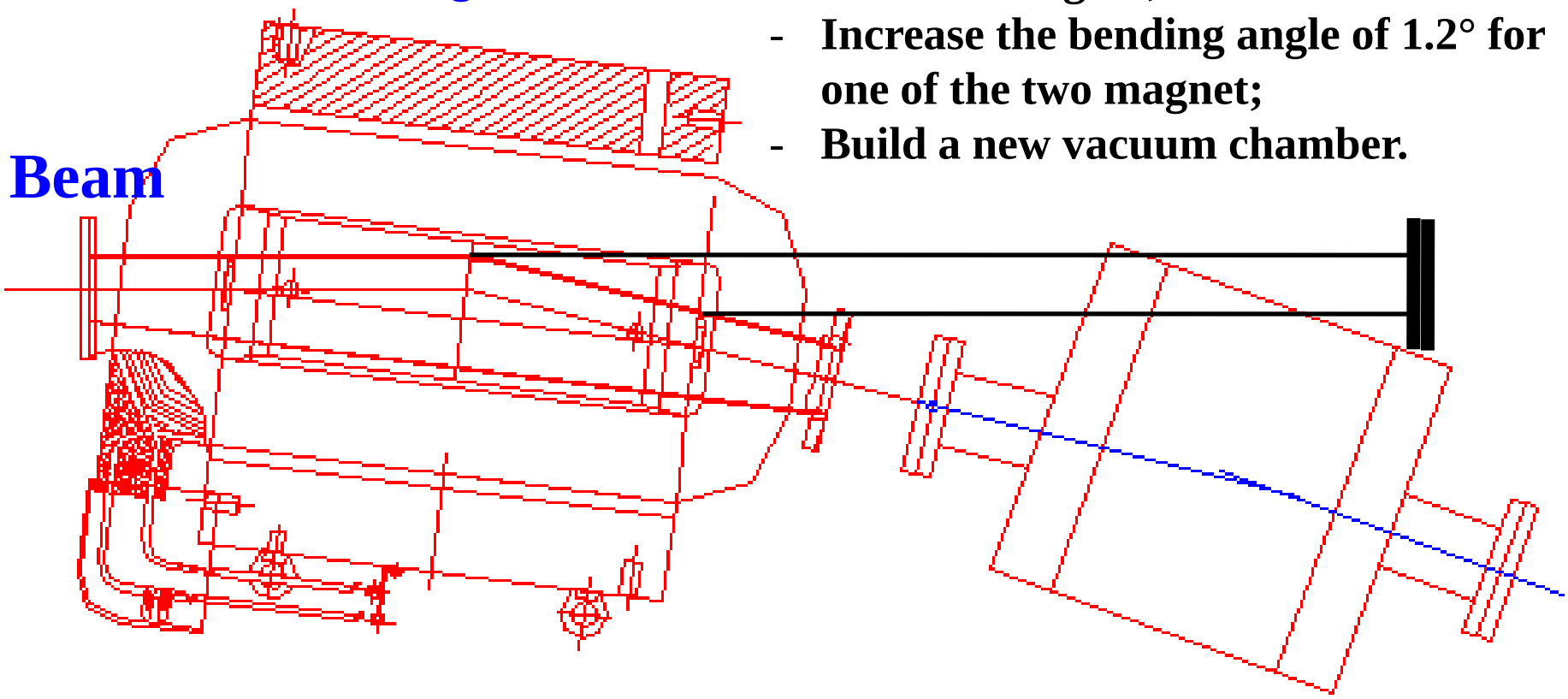


Vertical gap 70 mm
Deflection angle 5°

we need change:

- The bending plane from vertical to horizontal plane and the support of the 13.8° magnet;
- Increase the bending angle of 1.2° for one of the two magnet;
- Build a new vacuum chamber.

Vertical gap 50 mm
Deflection angle 13.8° →15°



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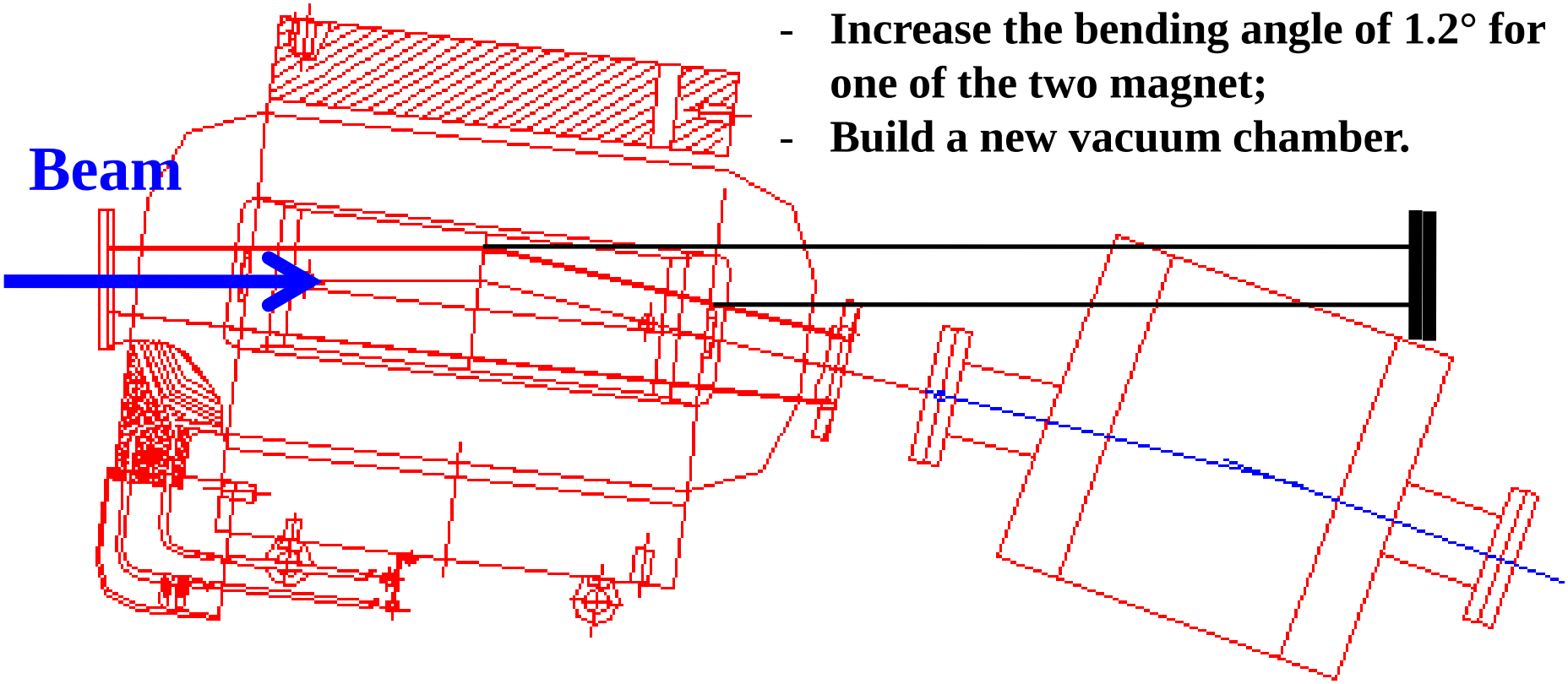

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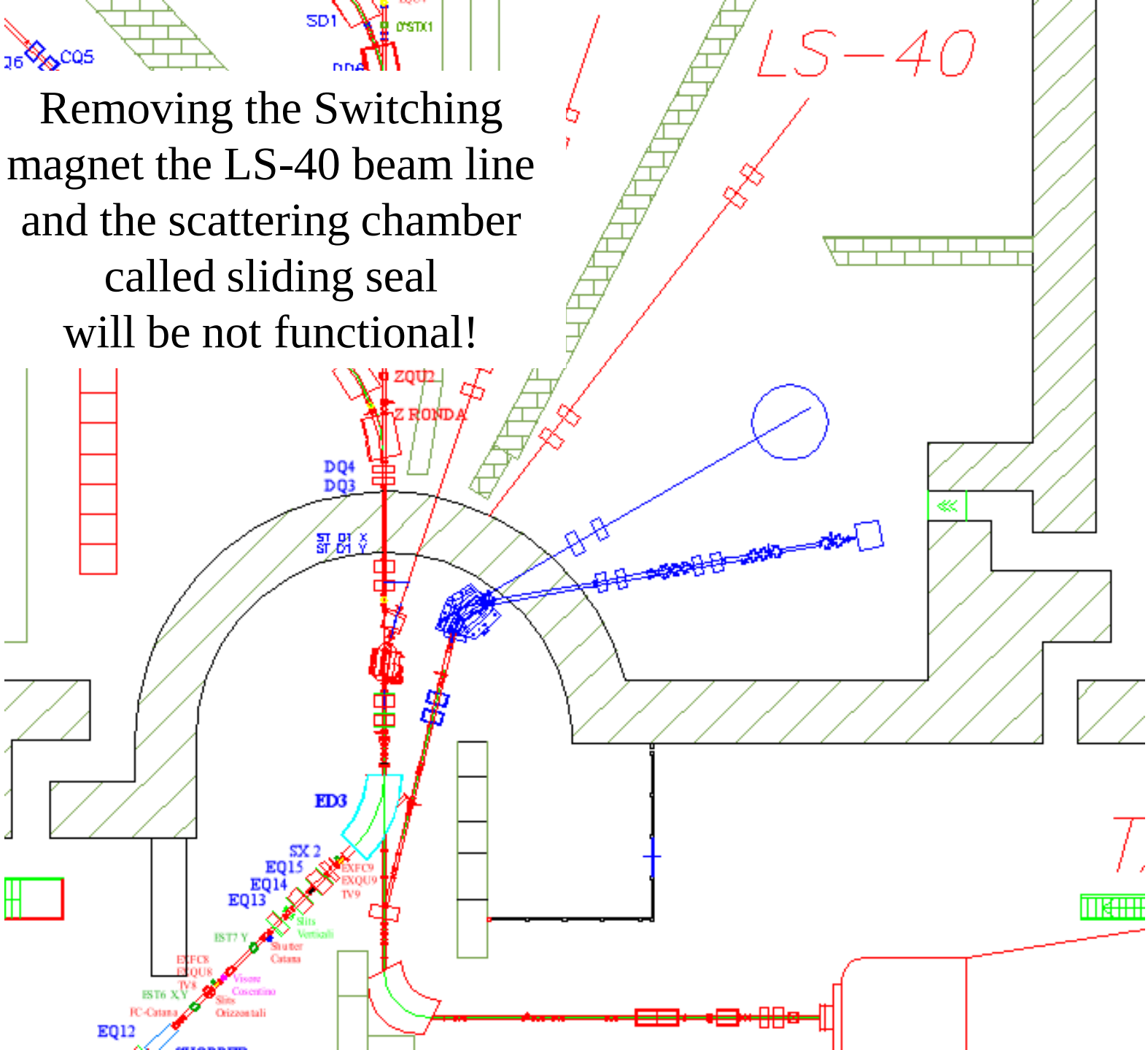
Removing the Switching magnet the LS-40 beam line and the scattering chamber called sliding seal will be not functional!
LS-40
SD1
CQS
ZQU2
Z RONDA
DQ4
DQ3
ED3
SX 2
EQ15
EQ14
EQ13
EQ12

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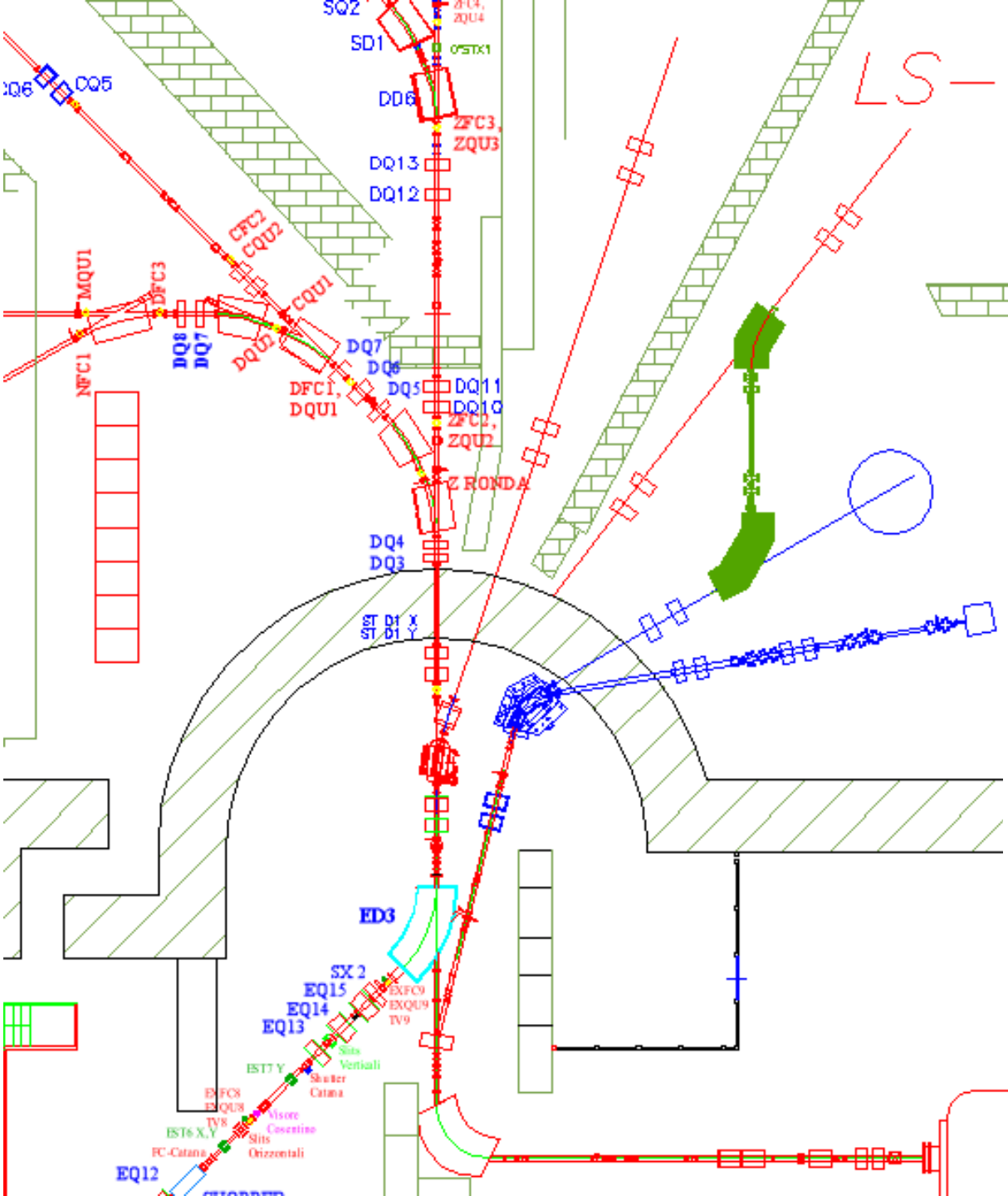
The scattering chamber called Sliding Seal



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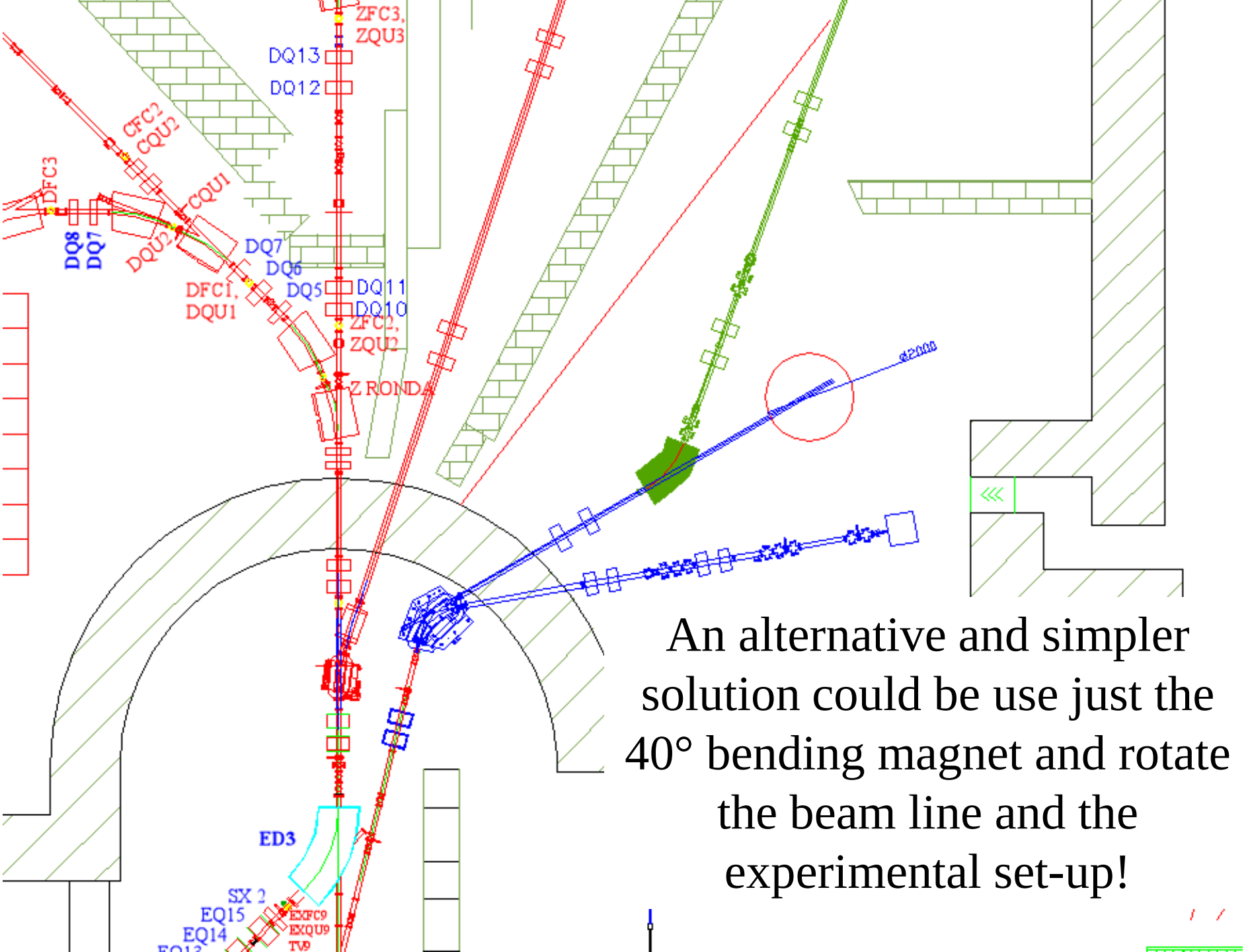

An alternative and simpler solution could be use just the 40° bending magnet and rotate the beam line and the experimental set-up!

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