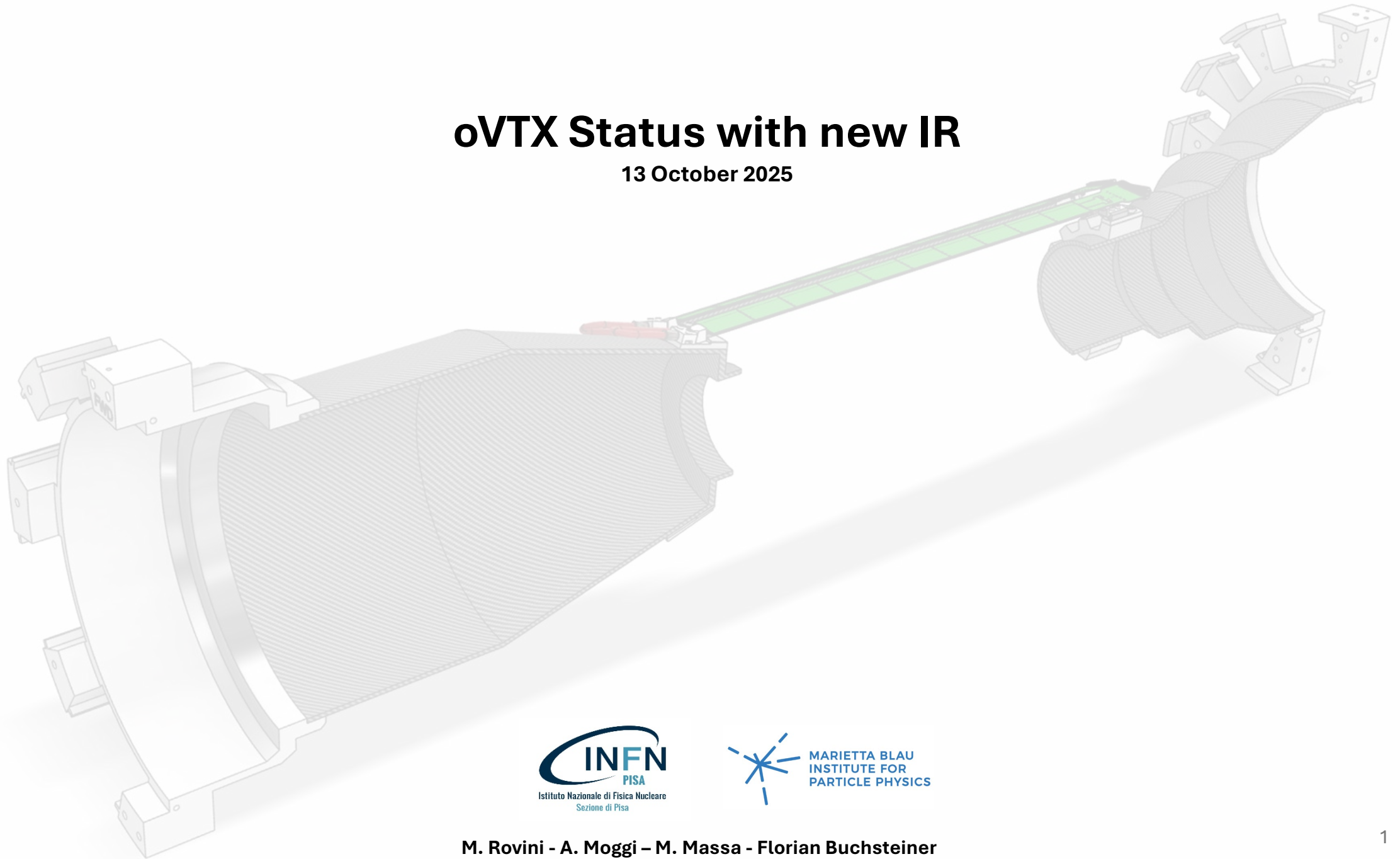


oVTX Status with new IR

13 October 2025



Ladder's "active" length

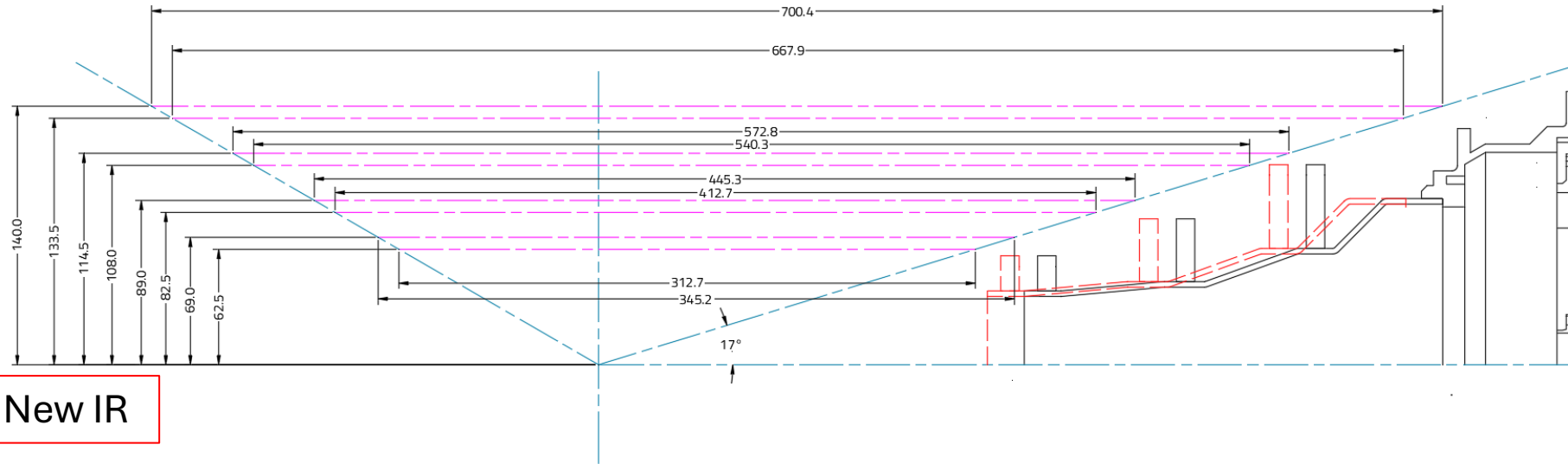
The FWD cone of the new IR has a sloped surface of 17°, and part of it lies within the active volume.

We need space to accommodate the fixation points of all the layers

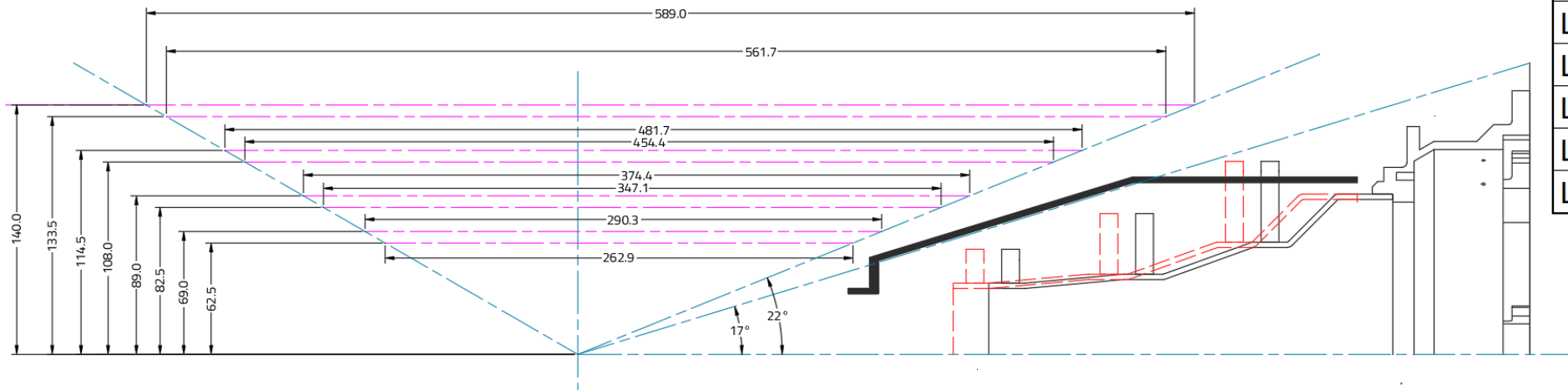
Working Hypothesis:

- **FWD acceptance → 22°**
- **BWD acceptance → 30°**

Current IR



New IR

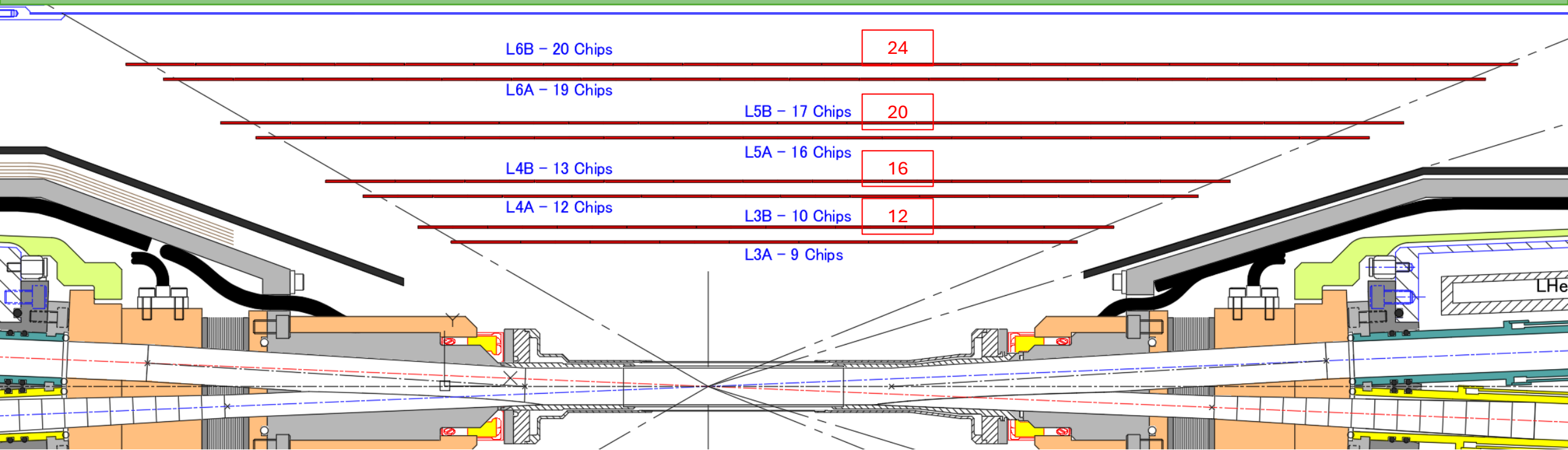


Lengths of the beam on the active volume [mm]

	Current IR	New IR
Layer 6 - A	667.9	561.7
Layer 6 - B	700.4	589
Layer 5 - A	540.3	454.4
Layer 5 - B	572.8	481.7
Layer 4 - A	412.7	347.1
Layer 4 - B	445.3	374.4
Layer 3 - A	312.7	262.9
Layer 3 - B	345.2	290.3

Length reduction (around 16%)

Chips per ladder



Electrical services

One flex could serve up to 12 chips

One flex → L3A; L3B; L4A

Two flexes → L4B; L5A; L5B; L6A; L6B

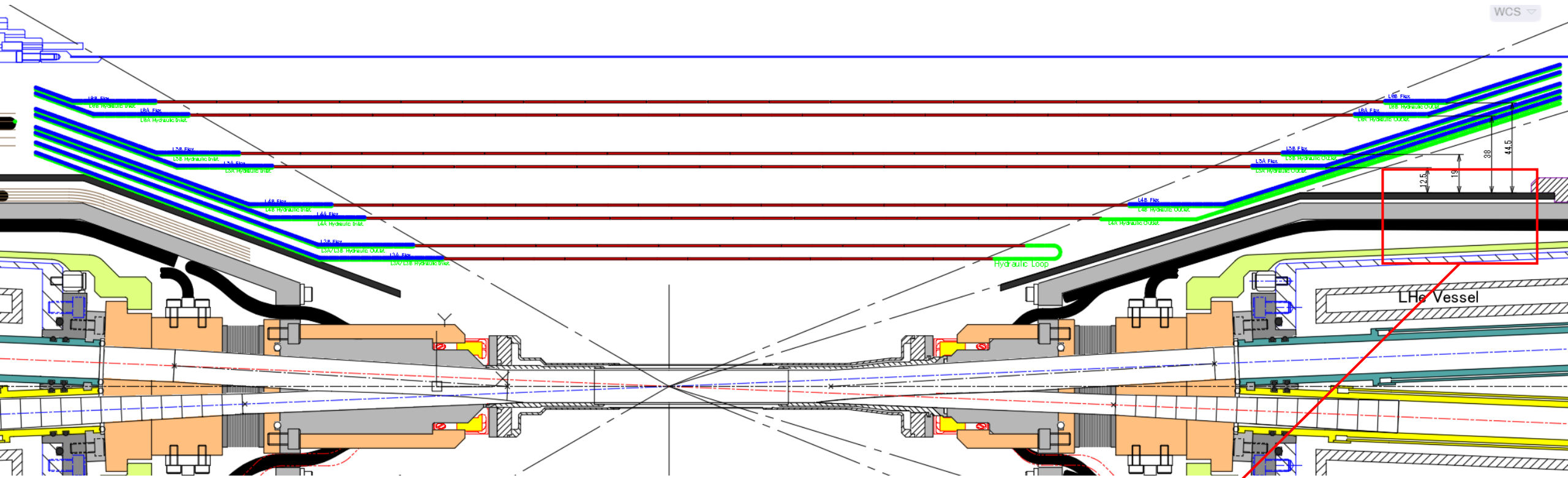
Hydraulic services

Maximum length already tested in lab: 730 mm

One cooling loop for two ladders → L3*
*To validate by test

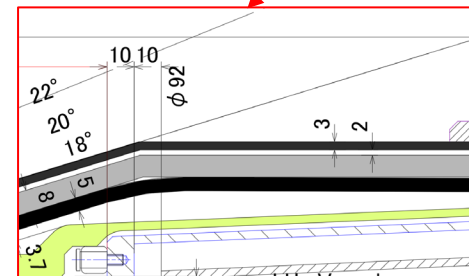
One cooling loop for each ladder → L4; L5; L6

Overview of oVTX services



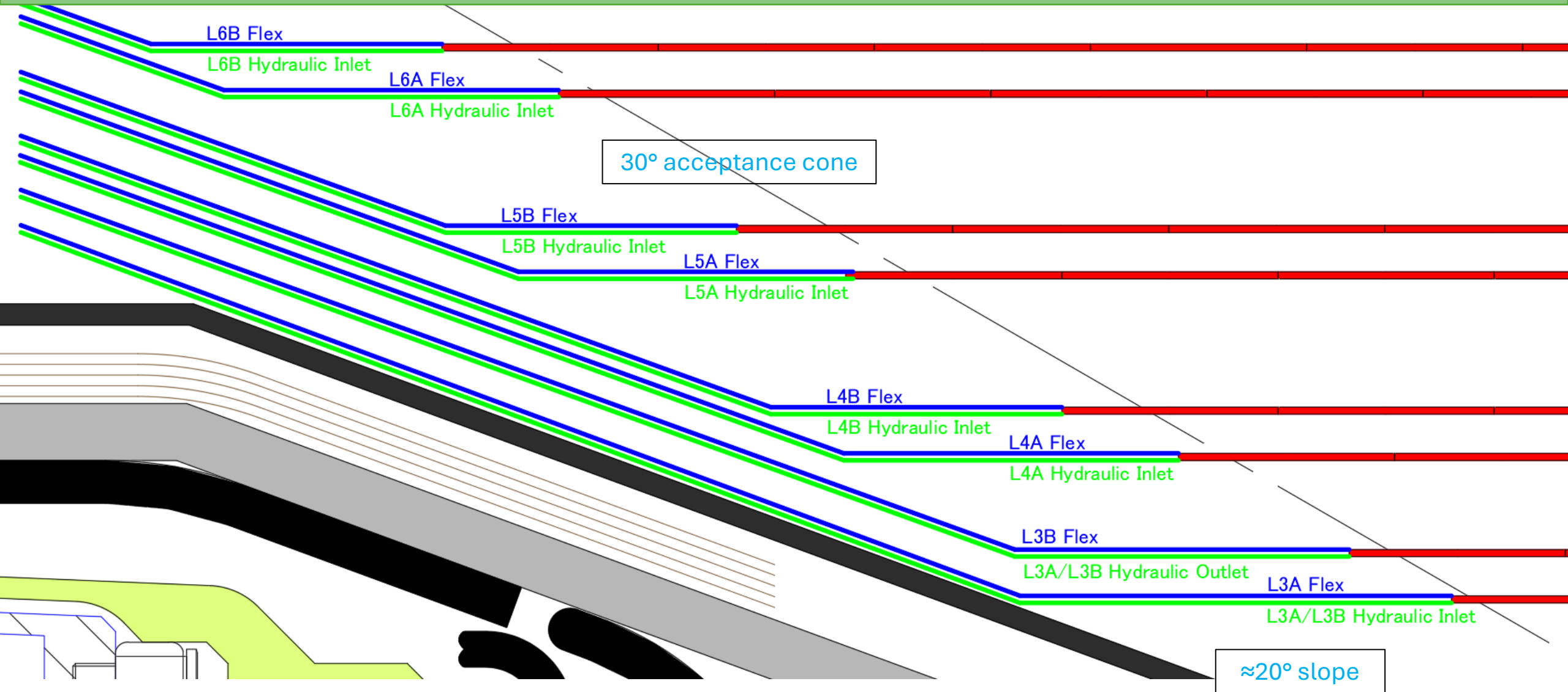
Blue lines: Electrical services
Green lines: Hydraulic services

N.B: Optical fibres and hydraulic manifolds are not considered



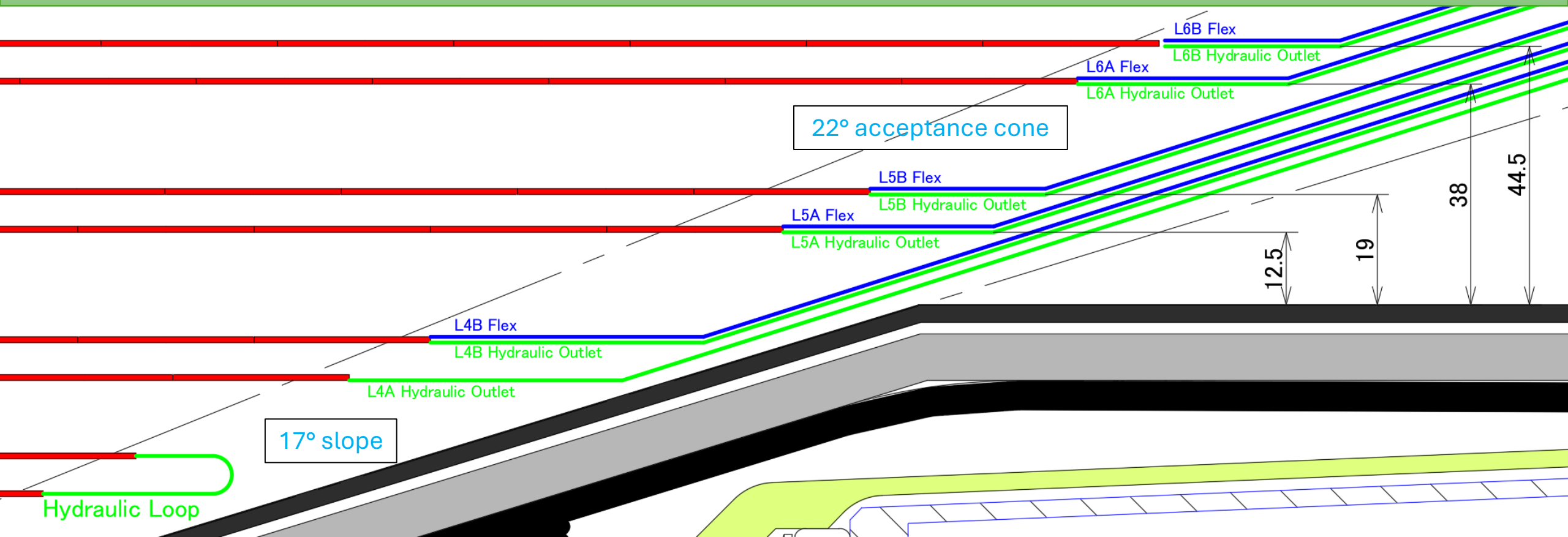
Important remark: The CAD drawing of the new IR is **NOT** yet updated. The drawing will be updated after the next meeting with the machine group. Now there are only 2 mm between CFRP cone and QCS, this clearance is too small to cope with quenching effects. A conservative estimate - increasing the 2 mm clearance - will be provided by machine people → further reduction of space for oVTX clamping and services

oVTX Services – BWD side



In the BWD side each ladder has one pipe and one flex (and of course optical fibres)

oVTX Services – FWD side



With this non-conservative layout, we have only 12.5 mm available to accommodate the L5 end ring. The end ring must be hollowed to allow the passage of the hydraulic services of L4A, as well as the hydraulic and electrical services of L4B, L5A, and L6A/B. The available space is extremely limited, making the service routing very challenging.

Two possible solutions:

1. Increase the radii of L5 and L6 (*the maximum length of the ladder must be 24 chips equivalent max, around 730 mm – two flexes*)
2. Reduce the number of layers from four to three, removing L5 and redistributing all oVTX layers accordingly.

However, both options should be evaluated from the physics point of view.