Thoughts about LDC Hall and Assembly

(Work is not finished yet. Sorry for confusing pictures)

- General
- LDC/TESLA detector assumption
- Moveable Shielding
- Questions: Hall Width
- Underground Hall Size
  - Beam Position
    - Question: Separating Shielding Wall
    - Question: Shielding Block Material
  - Garage Position
    - Question: Electronic Location
    - Question: Shaft Position
  - ~~Question: Orientation Surface to Underground Hall~~
- Surface Assembly

General

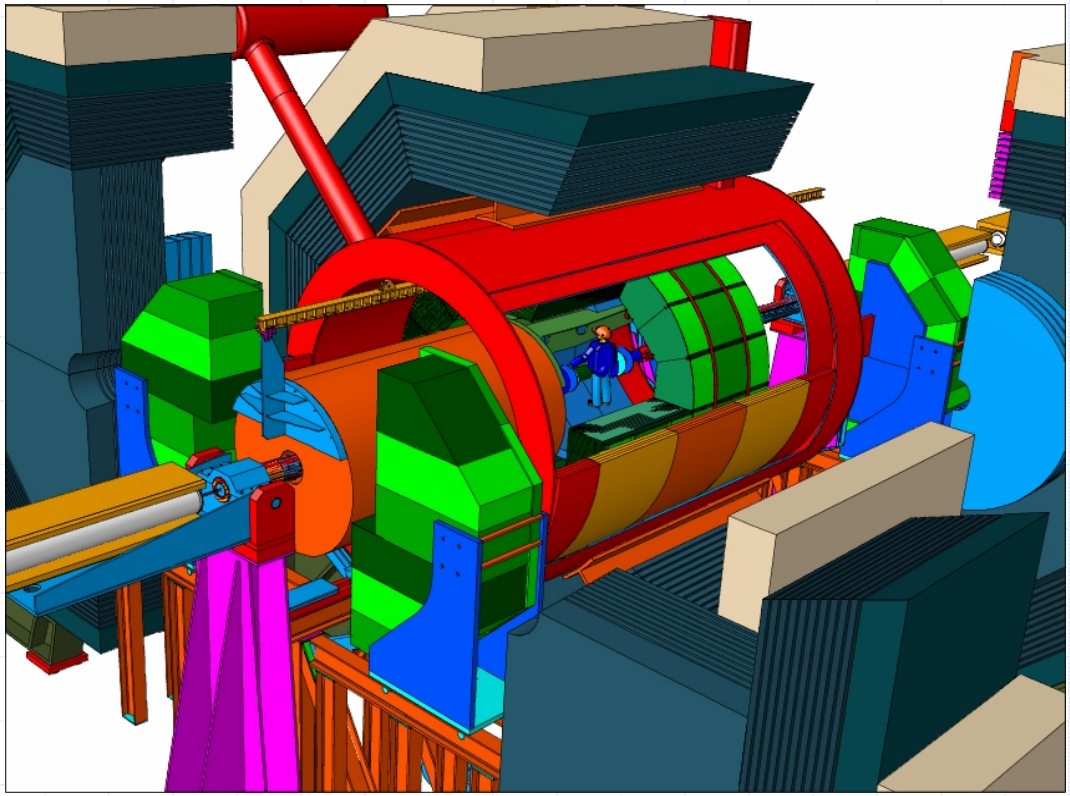
- 2000t parts are not easy to handle!

  CMS needs 1day to close one yoke ring! (Goal: ½ day)
- Do not forget:
  - Escape routes
  - Scaffolds, Lifts (scissor or cherry pickers)
  - Cables and other supply lines
    (to the detector and at the walls)
  - Supports

  I assumed 3m space arround the open detector!

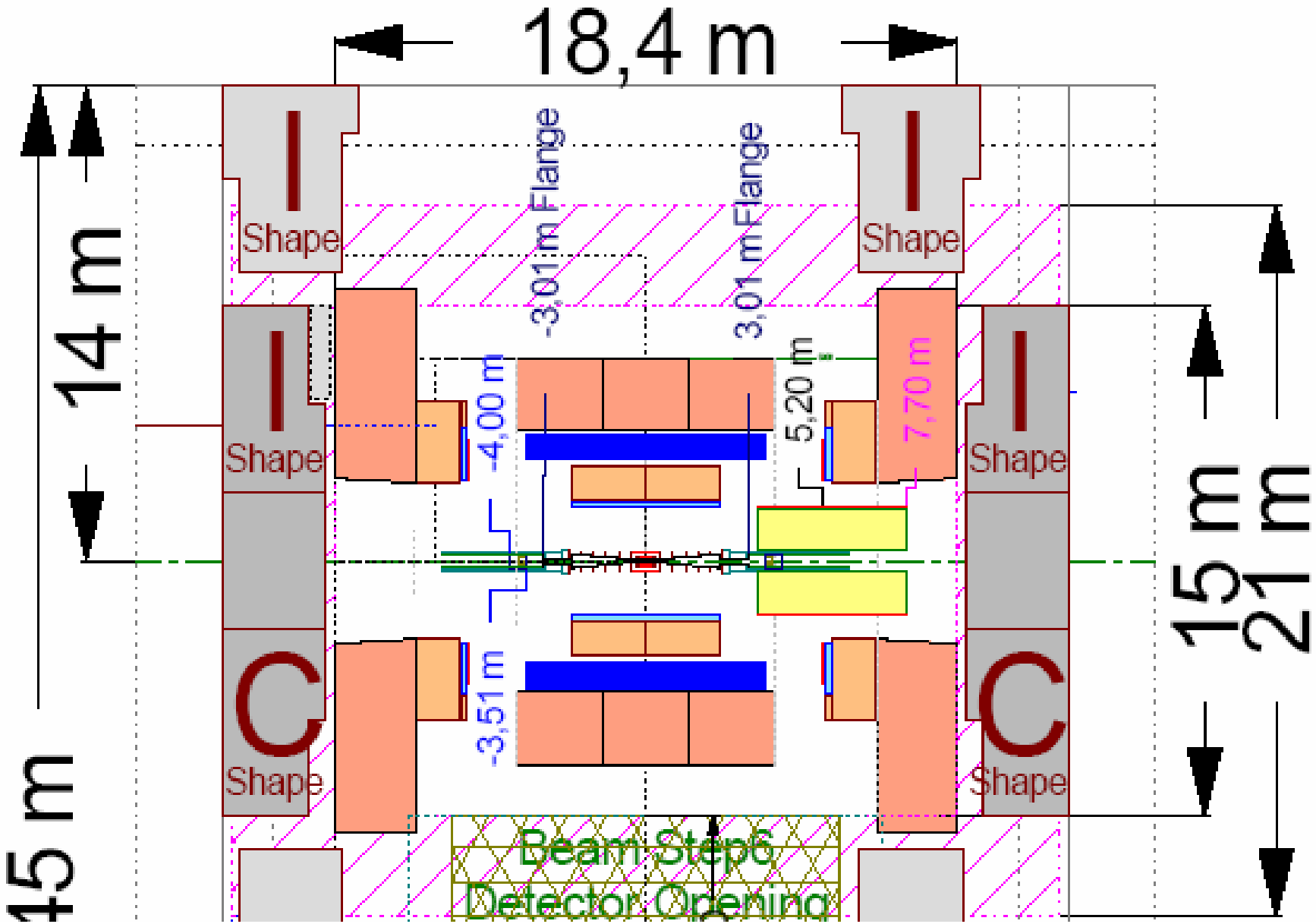
LDC/TESLA detector assumptions

- Reasonable fast access to the inner detector
- Access to the vertex detector without breaking the machine vaccum



Picture from
"Mechanical Concept of the TESLA Detector"
(LC-DET-2001-045)

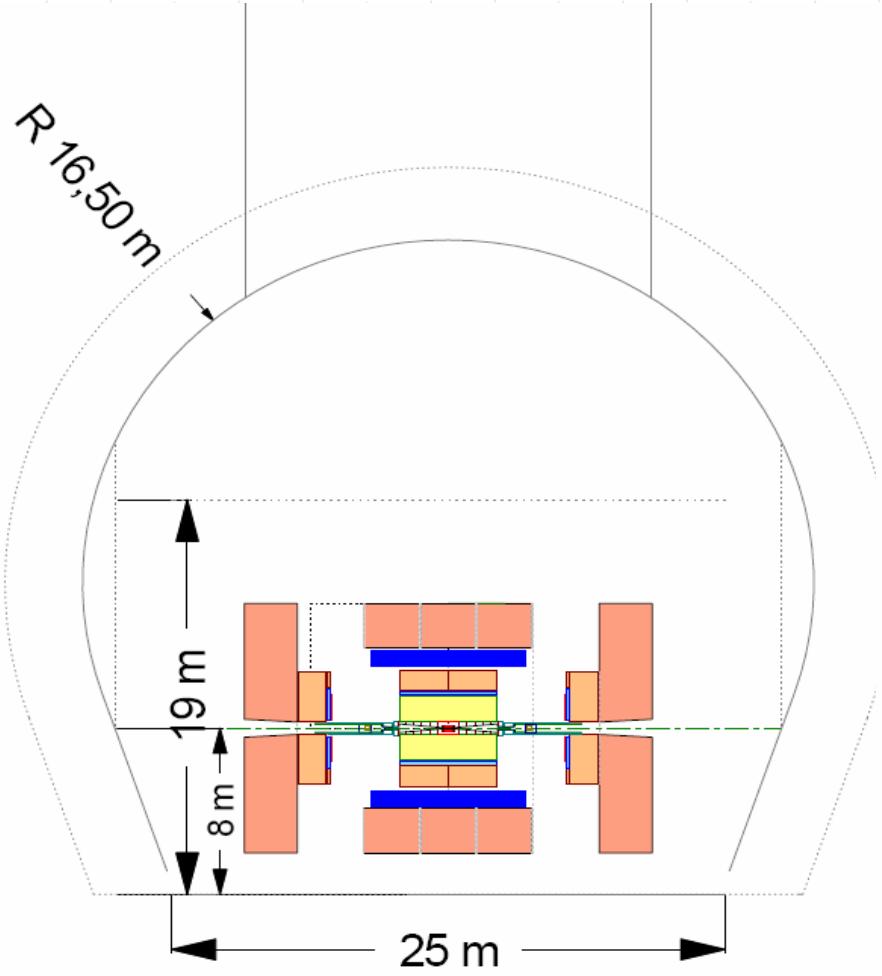
LDC fully open (Beam Pipe Exchange)

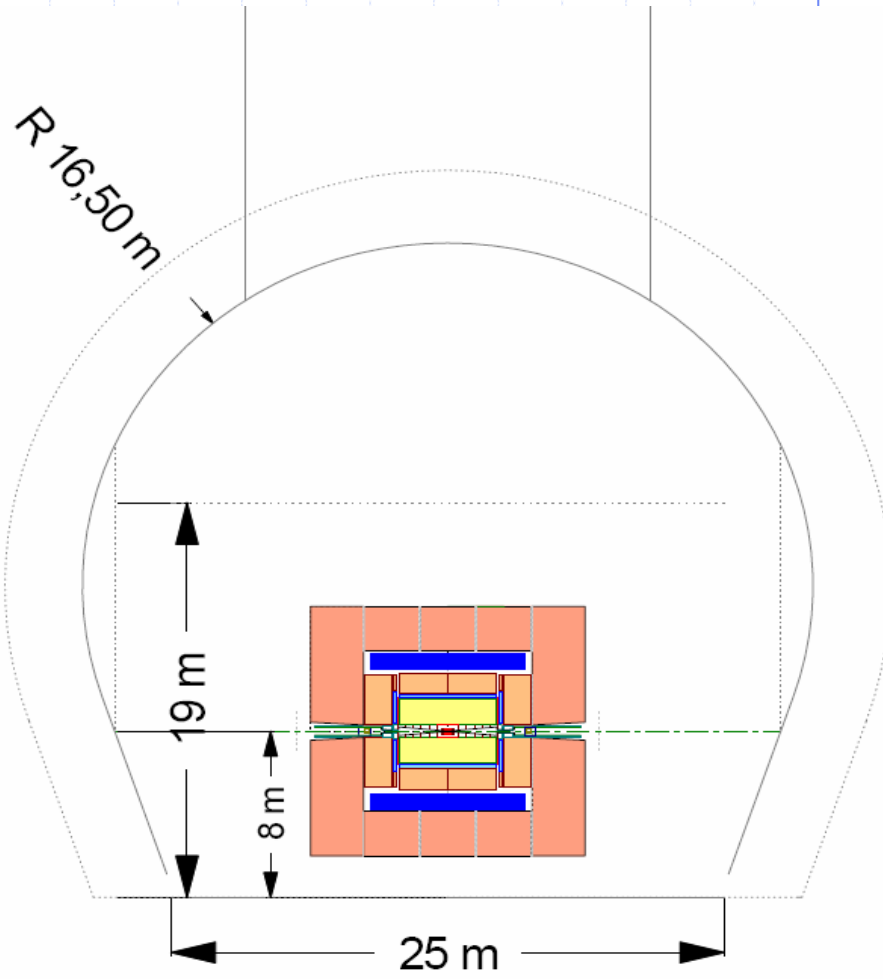


Q: Hall Width ?

Not rectangular shape!

25m seemed to be okay!



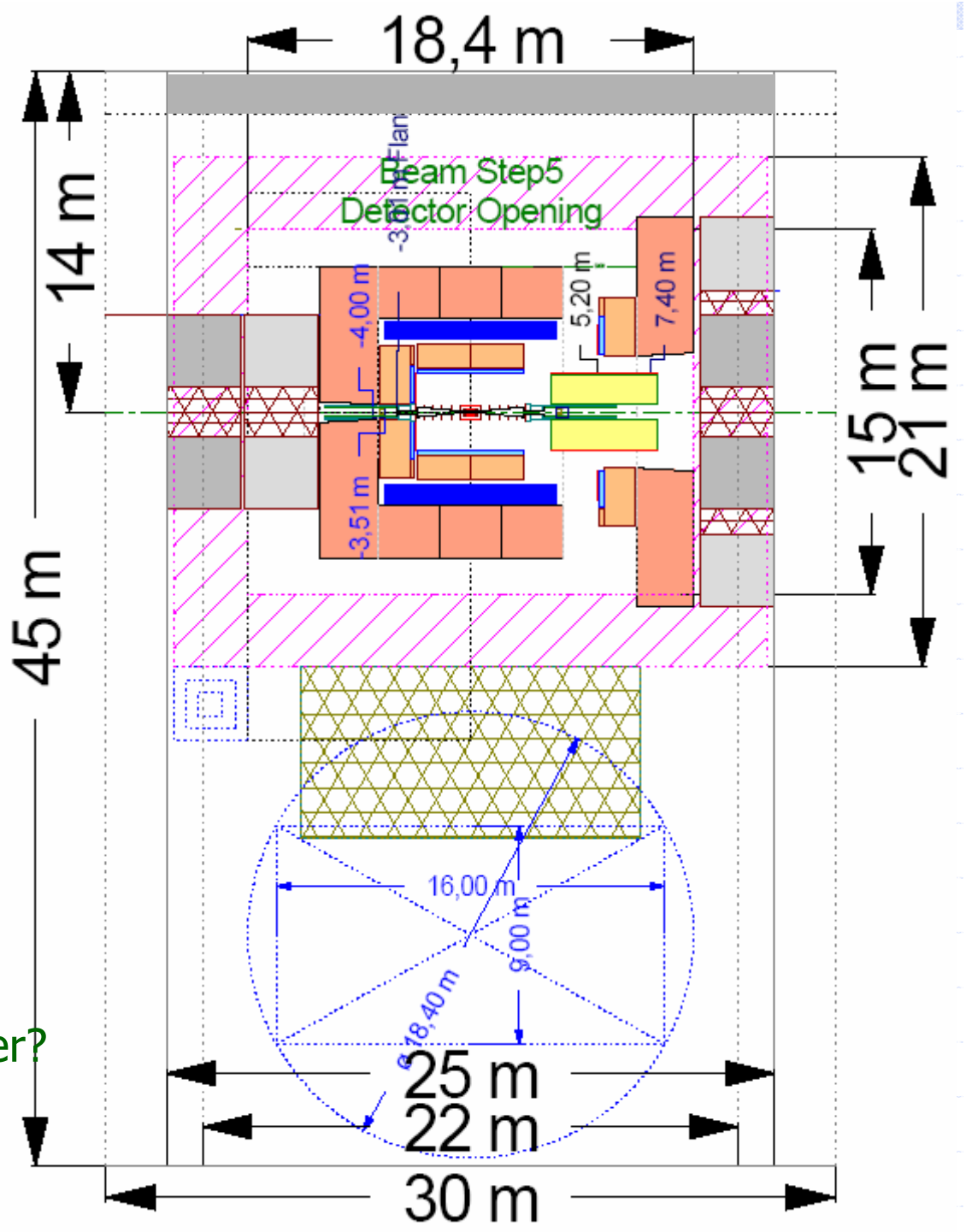


Detector in Beam Position

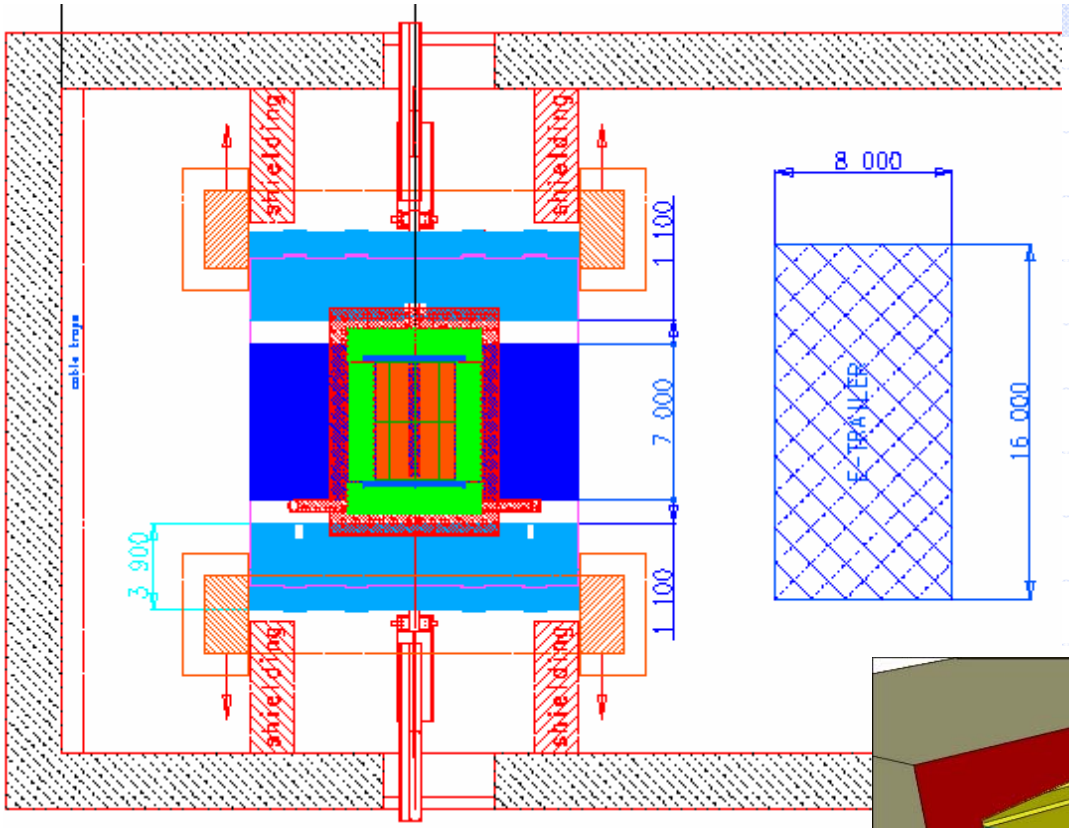
Q: Shielding Wall ?

- Shielding Wall
  - 3,5m separating the detector hall
  - Gap at the top
  - Why is it necessary?
  - Do we have access to the hall with the beam on or not?
  - Do we have two categories of worker:
    * radition worker
    * non radiation worker?

(Only 2m for the machine, but could be changes!)



Moveable Shielding

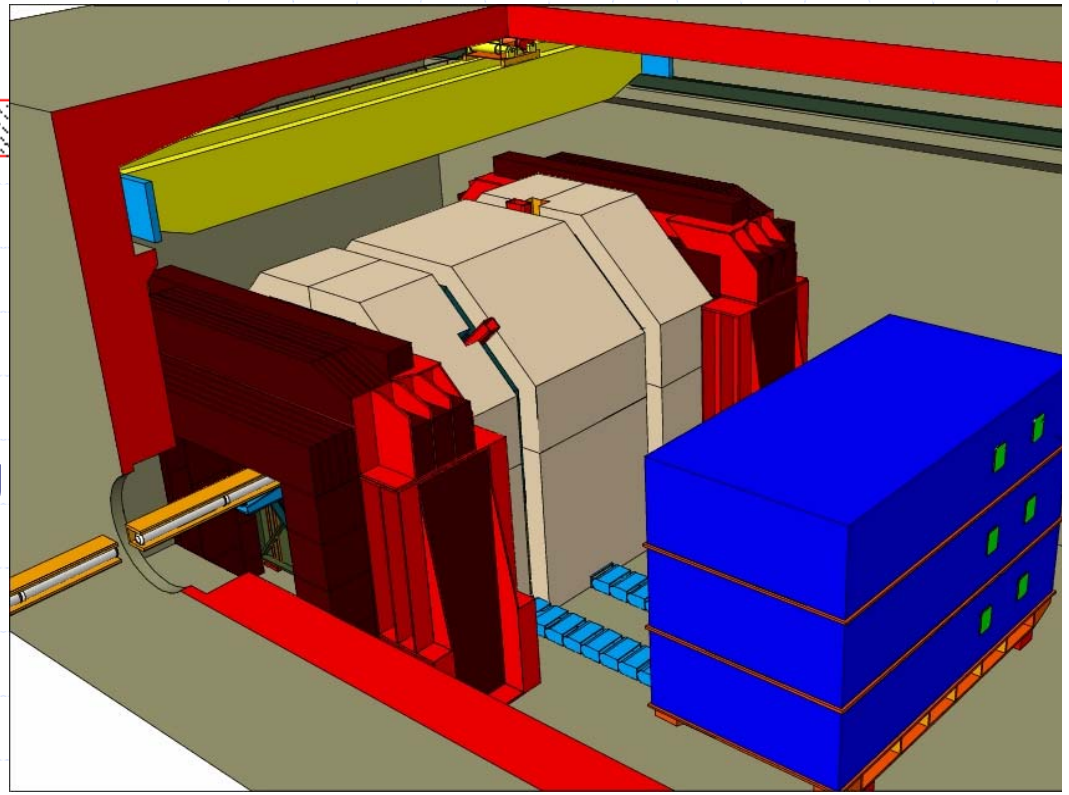


At TESLA at thickness of the shielding of 2m was required.

The gap between the detector and the fixed shielding was closed with a huge portal.

- Shielding Portals are impossible with the thicknesses (≥3m) demanded at the moment.

➔ C-shape movable shielding (or C-I-shape) and move transverse



Norbert Meyners, MEA

Detector in Beam Position

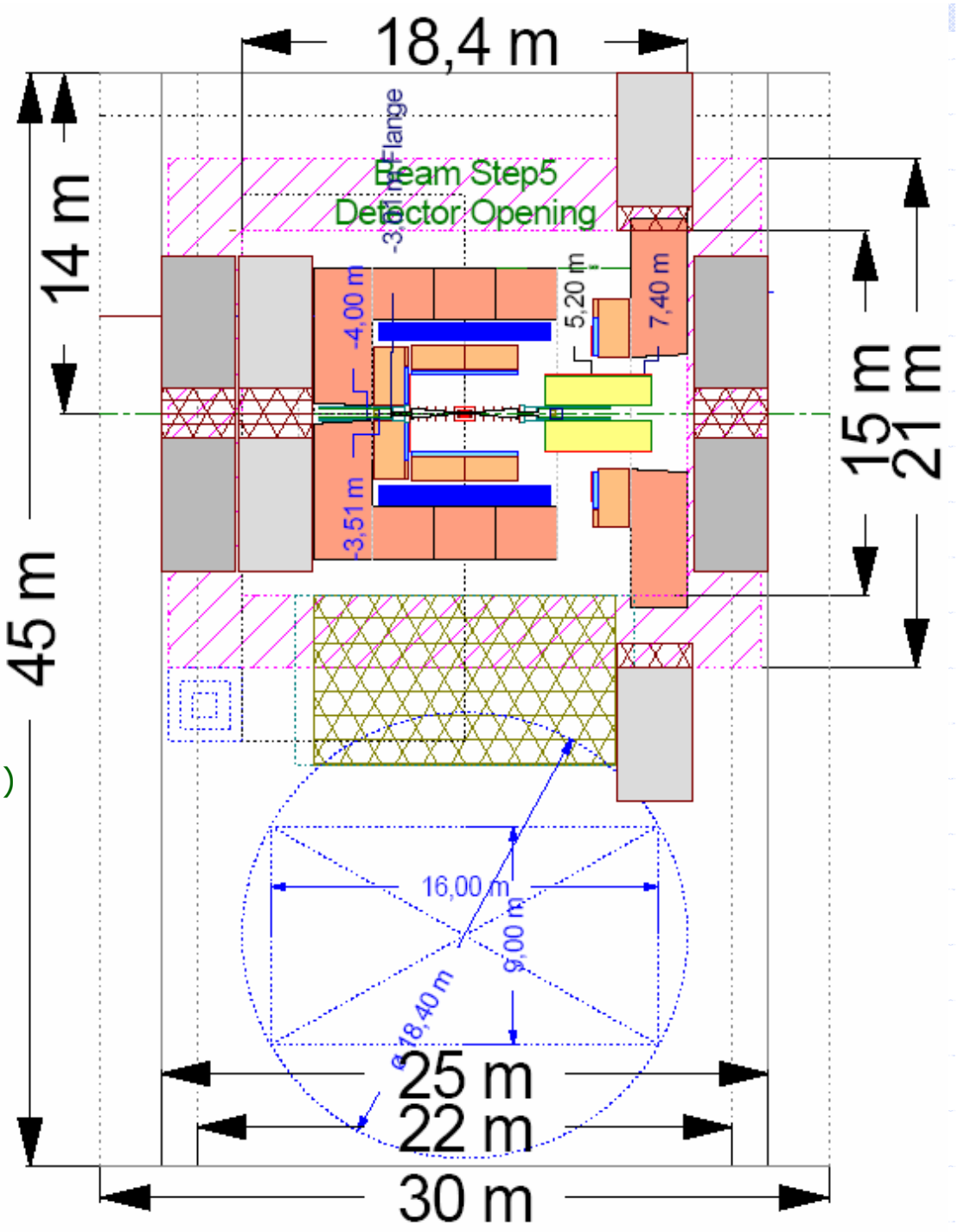
Q: Shielding Wall ?

- No Shielding Wall
  But 5.5m Shielding
  (Mistake: 3+3.5=6.5)

➔Shielding Material (?)

- Heavy Concrete (3.7t/m³) insteed of Normal (2.35t/m³) saves 20% thickness at HERA (~90º to the beam)
  6.5m*0.8=5.2m

(Only 2m for the machine, but could be changes!)



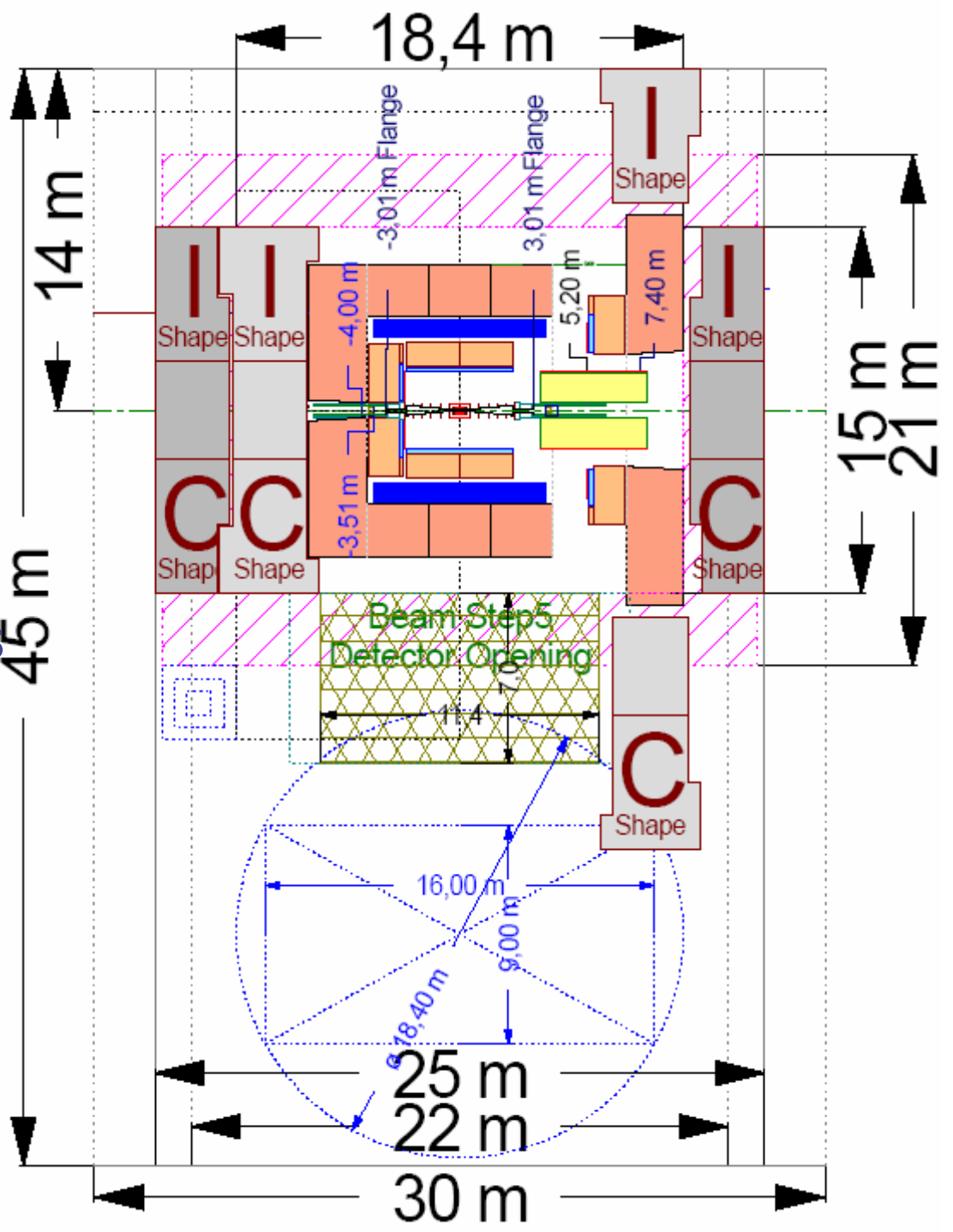
Detector in Beam Position

Shielding modifed

(Similar picture)

- 4m for Machine
- C- and I-Shape
- Overlaps at the Gaps

➔ E-Trailer smaller



Detector in Garage Position

(It was a surprise for me!)

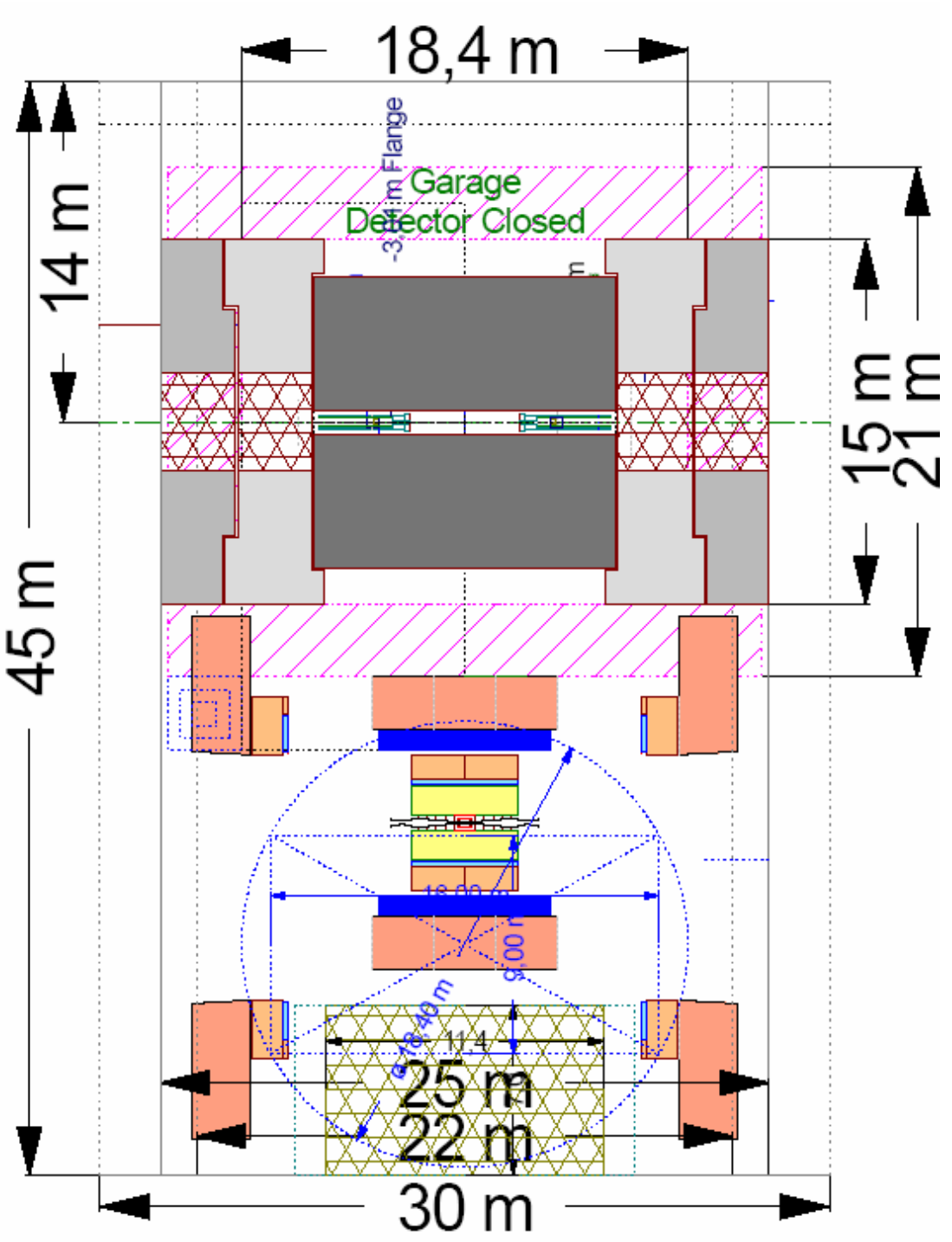
Q: E-Trailer ?

- It is in way!
- Alternativies:
  - Split it
  - Electronic Cavern
  - At the yoke

Q: Allowed cable length?
(Detector to Electronic)

Q: Necessary space for electronic?

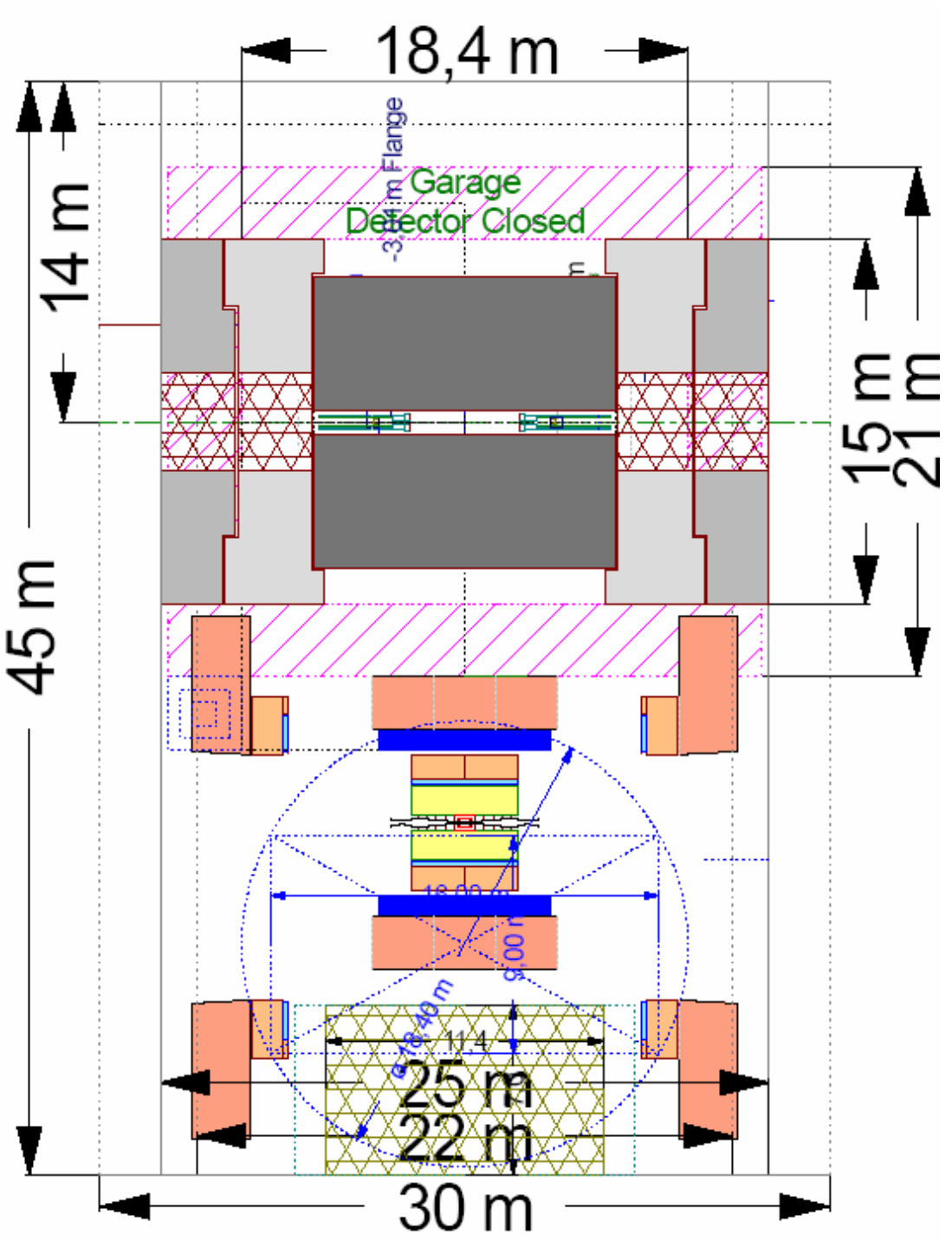
Q: Cable route for the inner detectors?
(Along the support tube?)



Detector in Garage Position

Q: Shaft Position ?

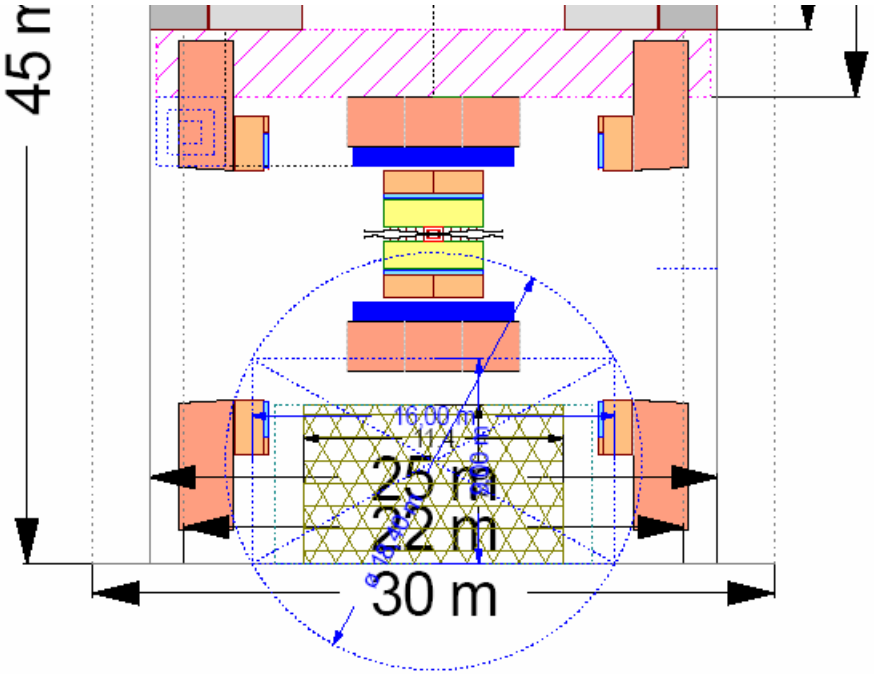
NO!

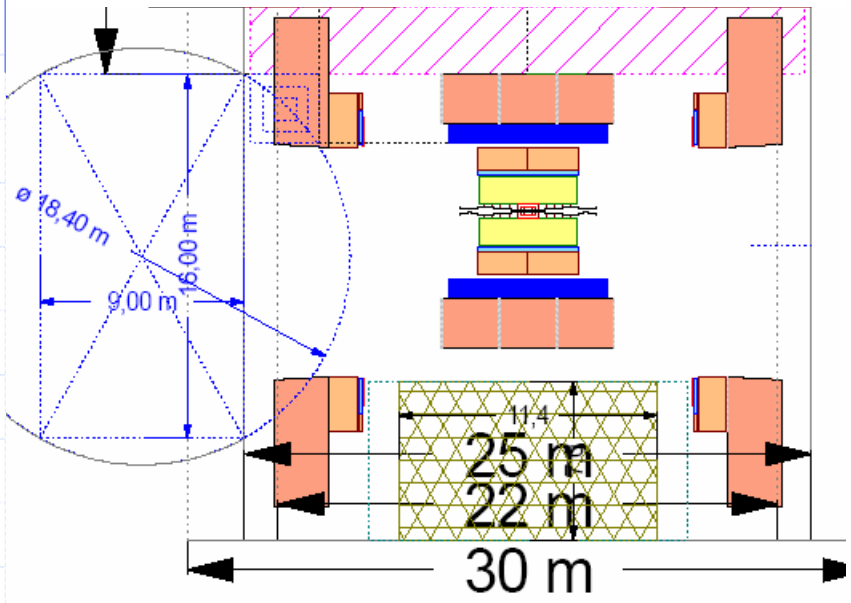


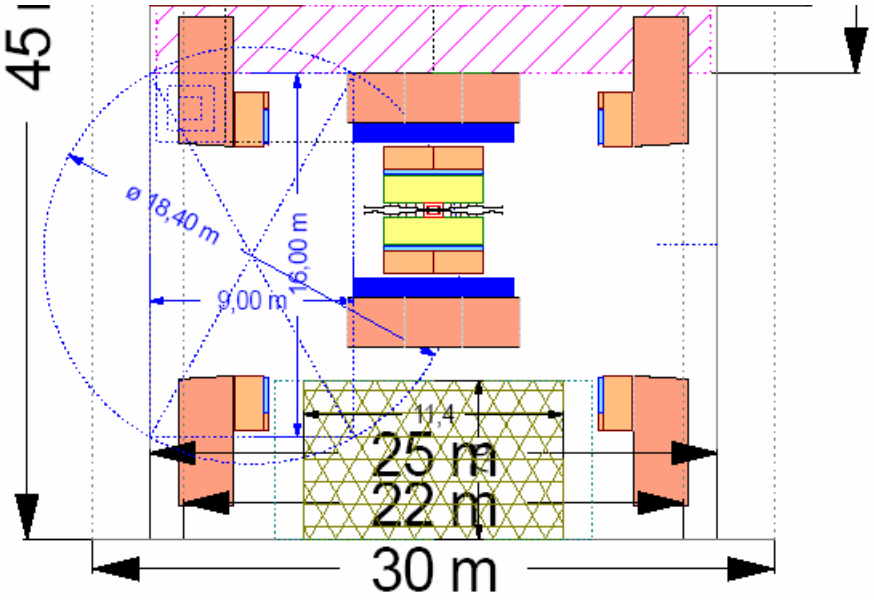
Detector in Garage Position

Q: Shaft Position ?

Move it around!



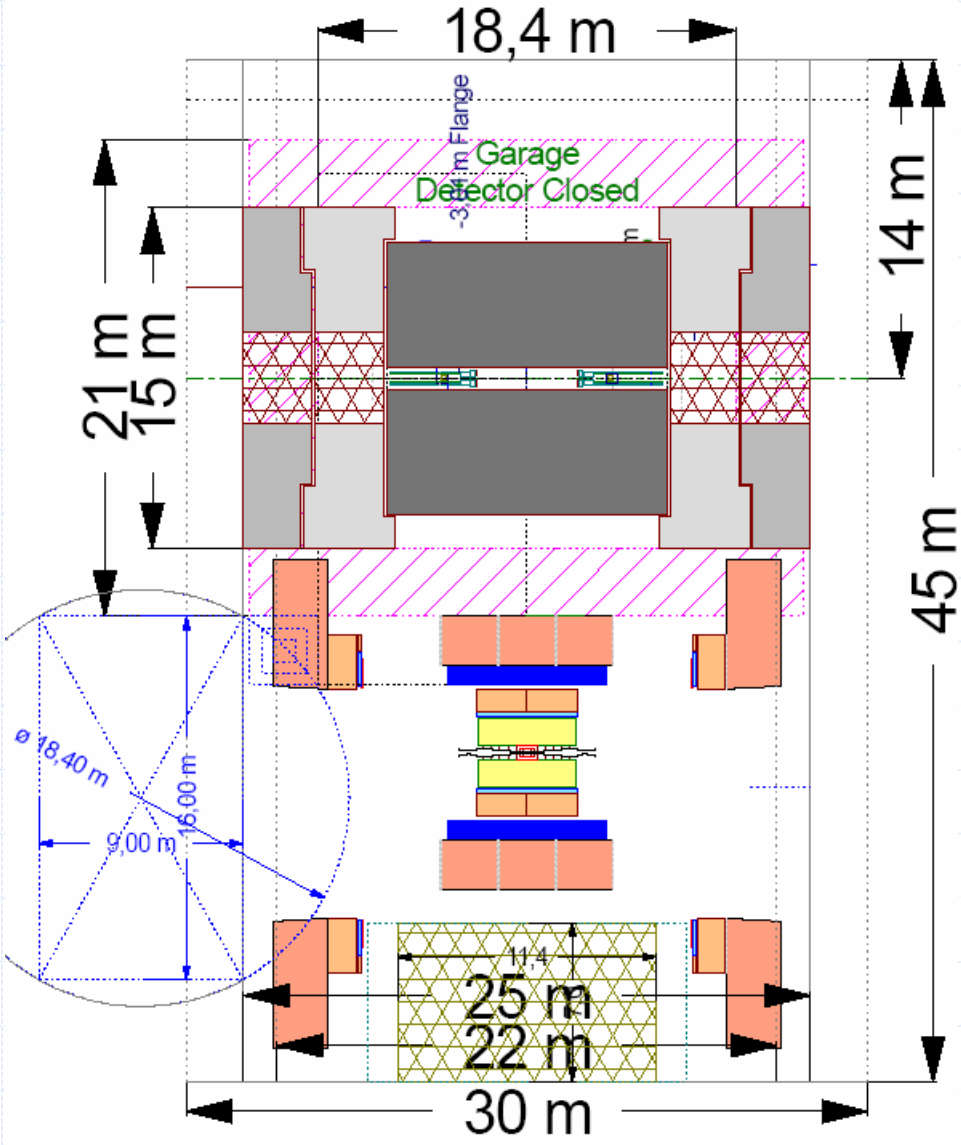




Detector in Garage Position

Q: Shaft Position ?

Best position with E-Trailer! (?)

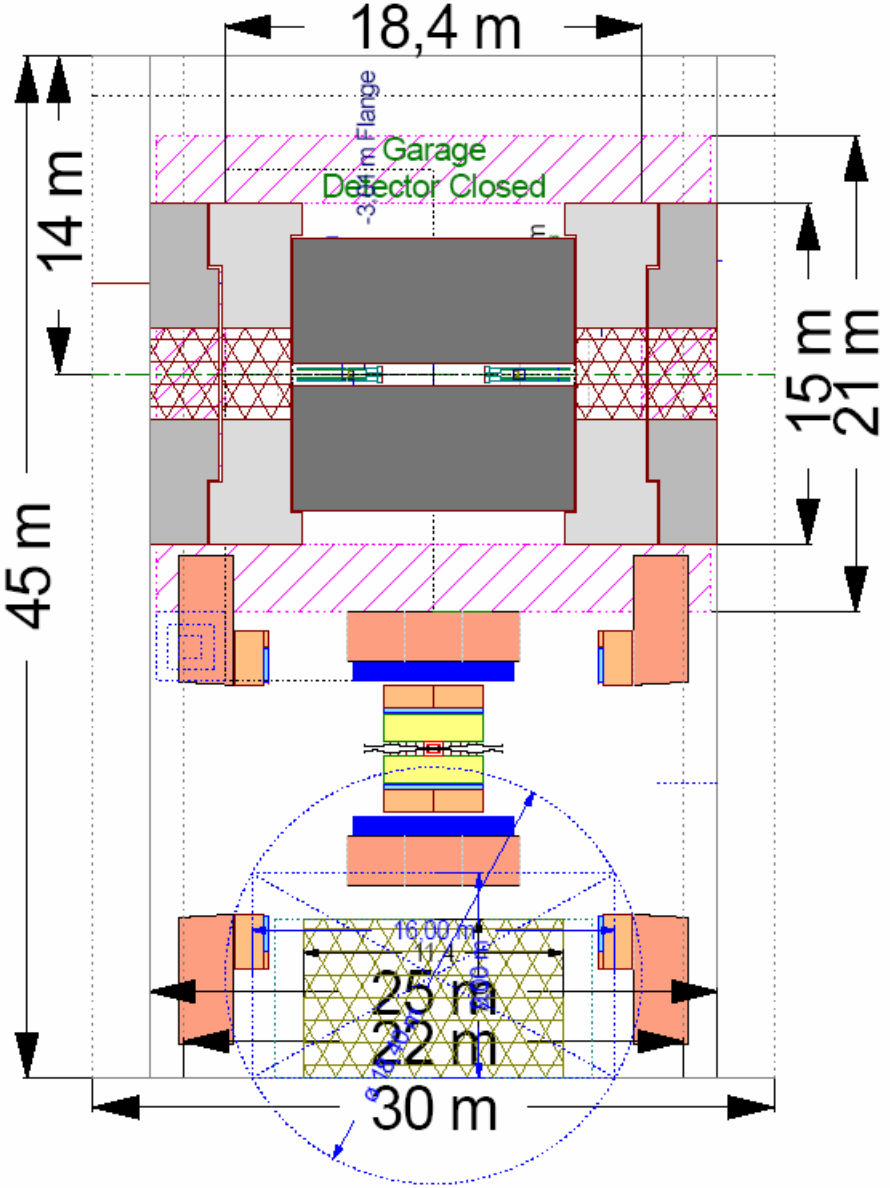


Detector in Garage Position

Q: Shaft Position ?

Nearly best position without trailer! (?)

➔ 5-10m more length



Detector in Garage Position

Q: Shaft Position ?

Best shaft position without trailer! (?)

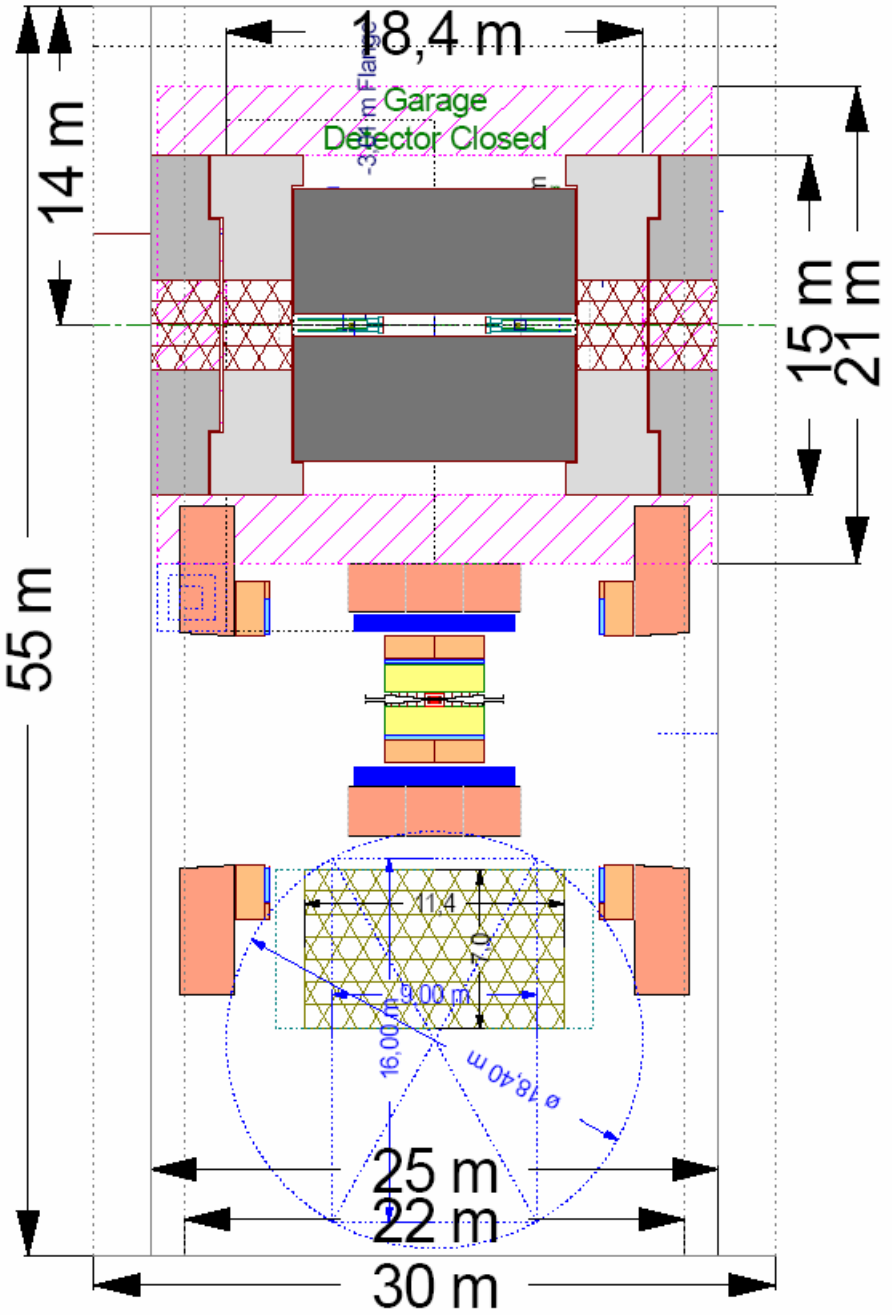
Only trailer problem left

Q: But how the stair case and the elevator in the shaft?

➔ Turn rectangle and all detector rings (?)

Q: Second shaft?

Safety

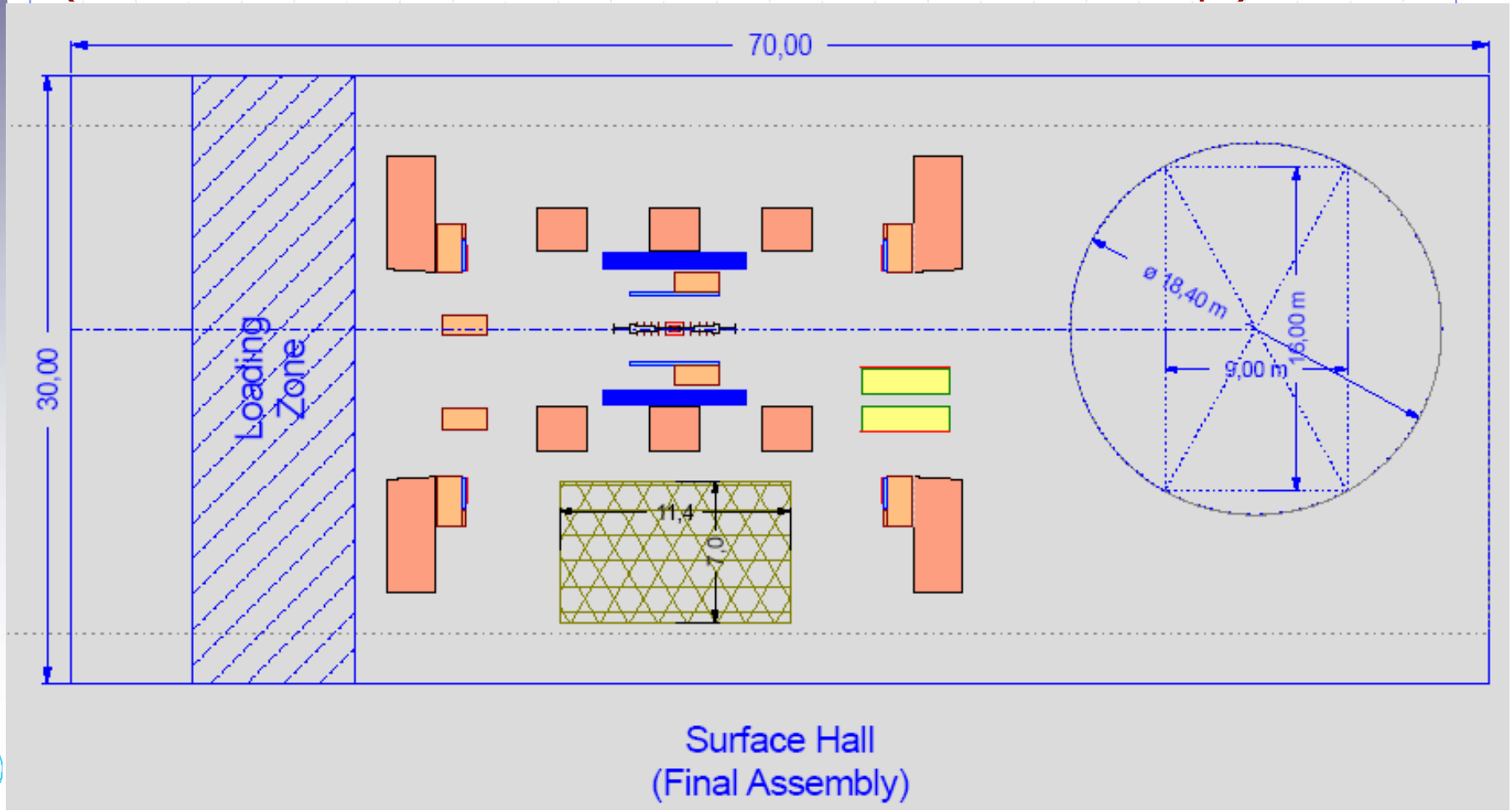


Surface Assembly

It would be possible!

(Attention: HERE Surface Hall 90º to Underground Hall)

(In case of a shallow hall I would stick to the TESLA concept)



Surface Hall
(Final Assembly)

Summary

- Garage Position incorporated
- Underground Hall size:
  55m x 25m; Shaft at the end — OKAY
- Surface Assembly
  - CMS style — OKAY
  - GLD style (I have not fully understood) — Possible

Open Questions:

- Where Electronic and Auxiliary Caverns? (Size?)
- Radiation Shielding
  - Separation Wall: No (or Yes?)
  - Tickness?
- Surface Hall Orientation?
- .....

Detector in Beam Position

Shielding modifed

- 4m for Machine
- Overlaps at the Gaps

➔ E-Trailer smaller