Update from CGEM Mechanics Group

2024/09/02 - BESIII Upgrade Meeting

By Stefano Gramigna on behalf of the working group

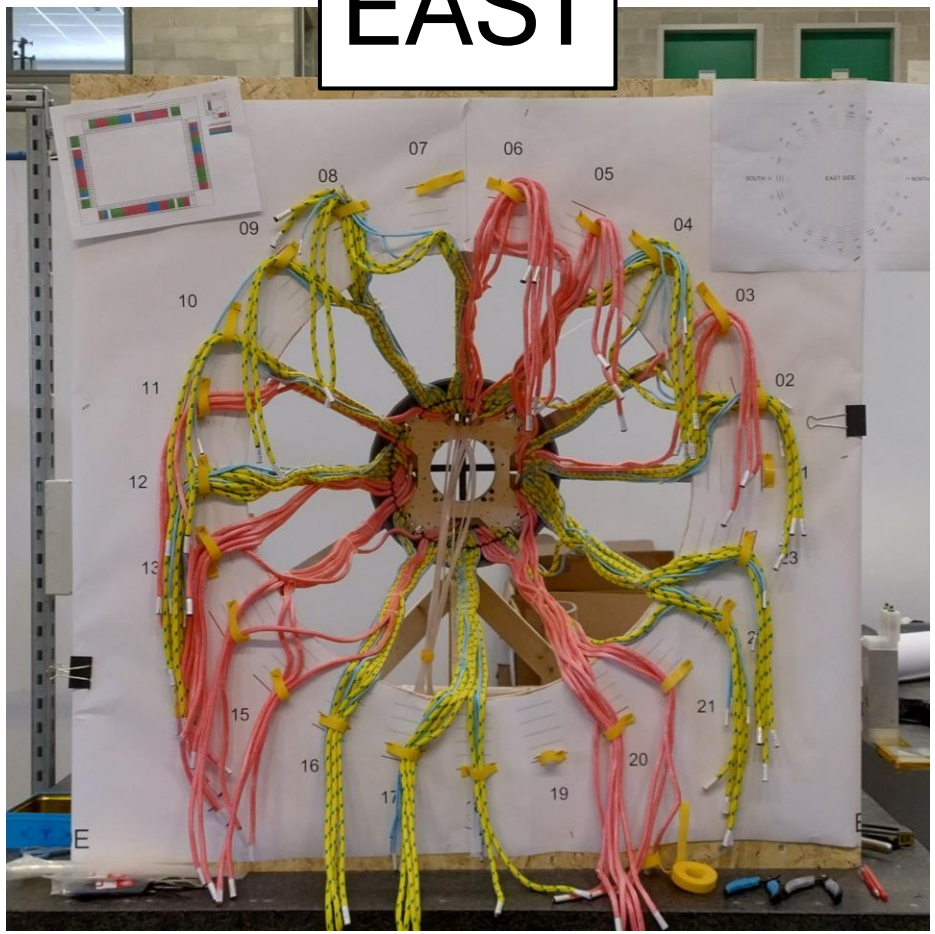
Outline

- Cabling
- Shielding
- Insertion Procedure

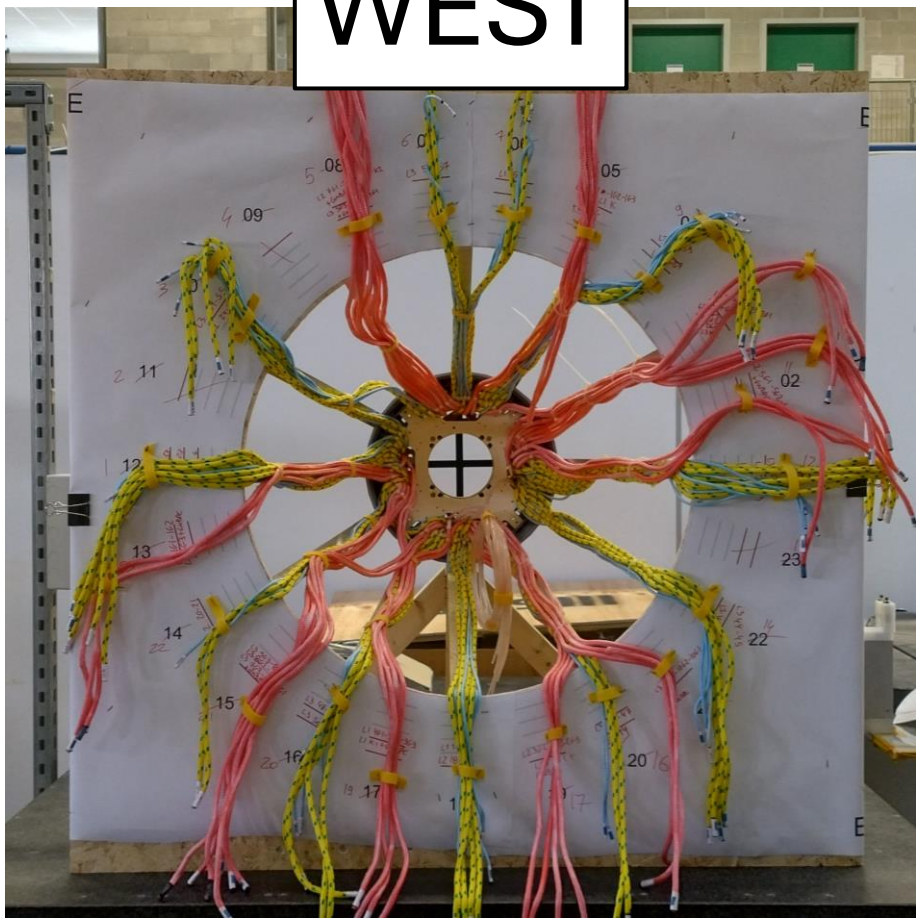
Cabling

Cabling Test Completed

EAST



WEST

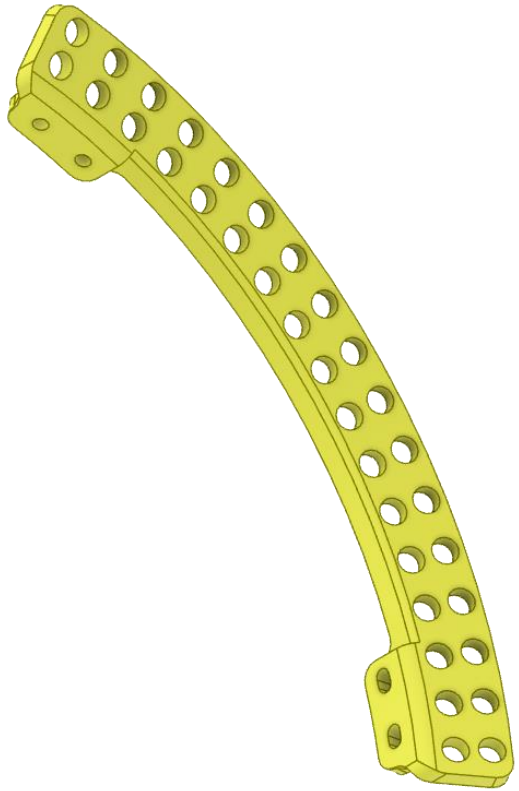


Cabling Test Completed

- Patch cards positioning schemes finalized (ATTACHED)
- Cable fixing schemes finalized (ATTACHED)
- Cable holders design finalized

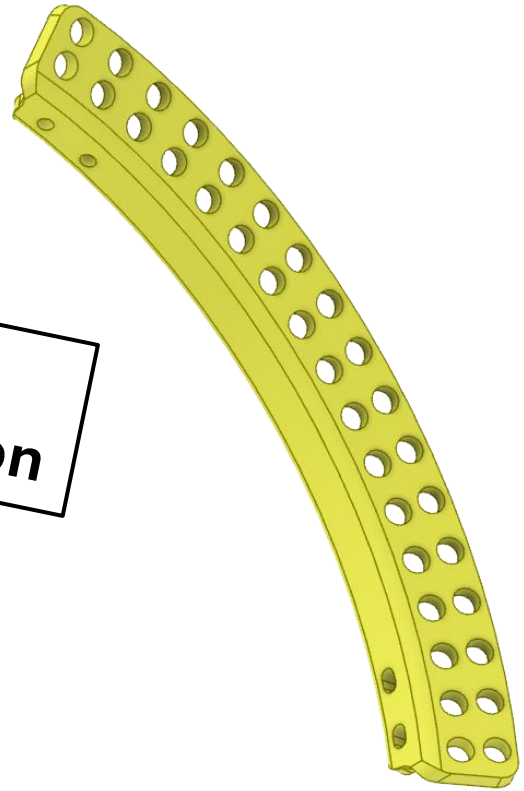
Cable Holder Final Design

MAINLINE

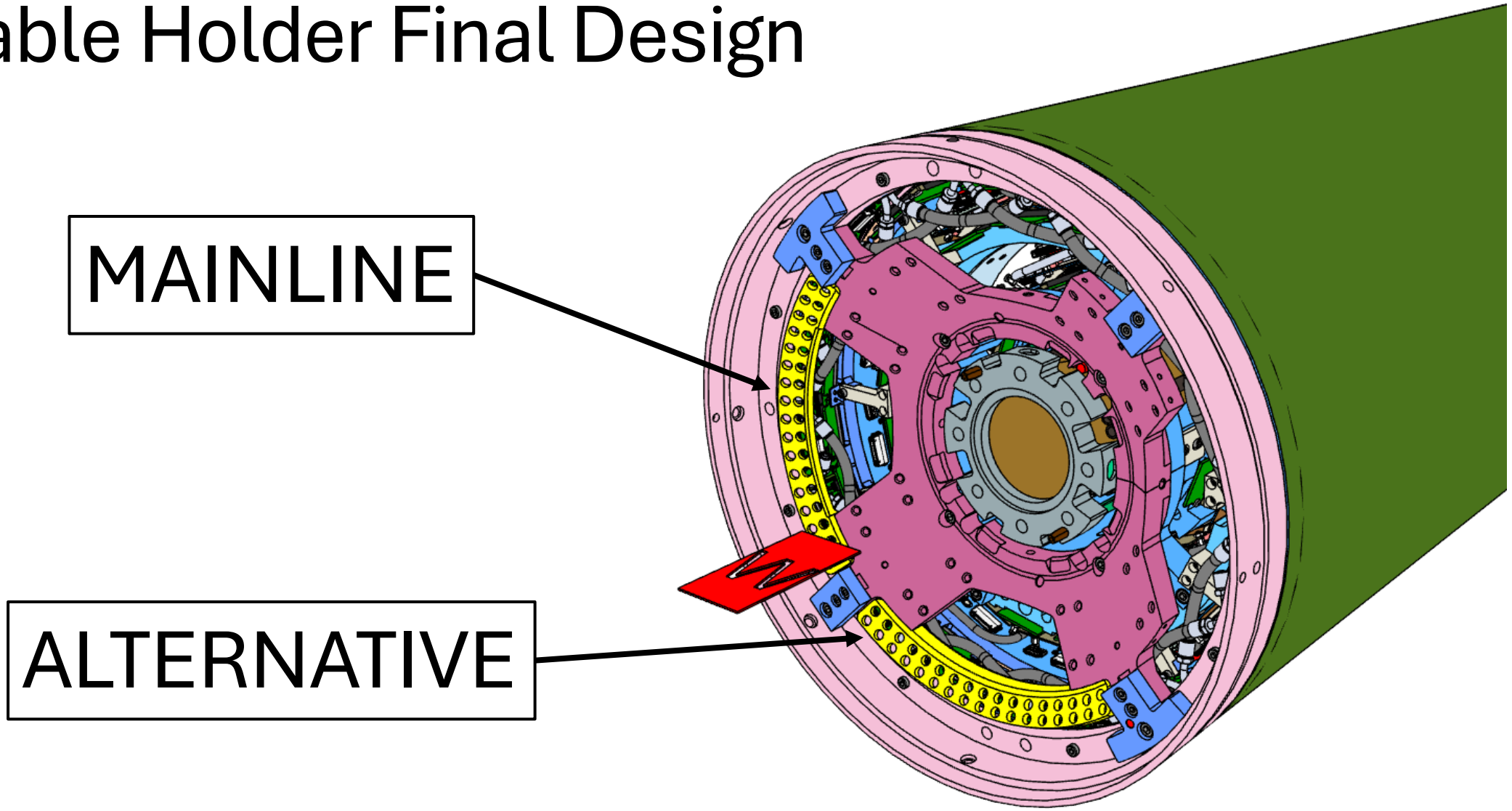


Both versions already in production

ALTERNATIVE



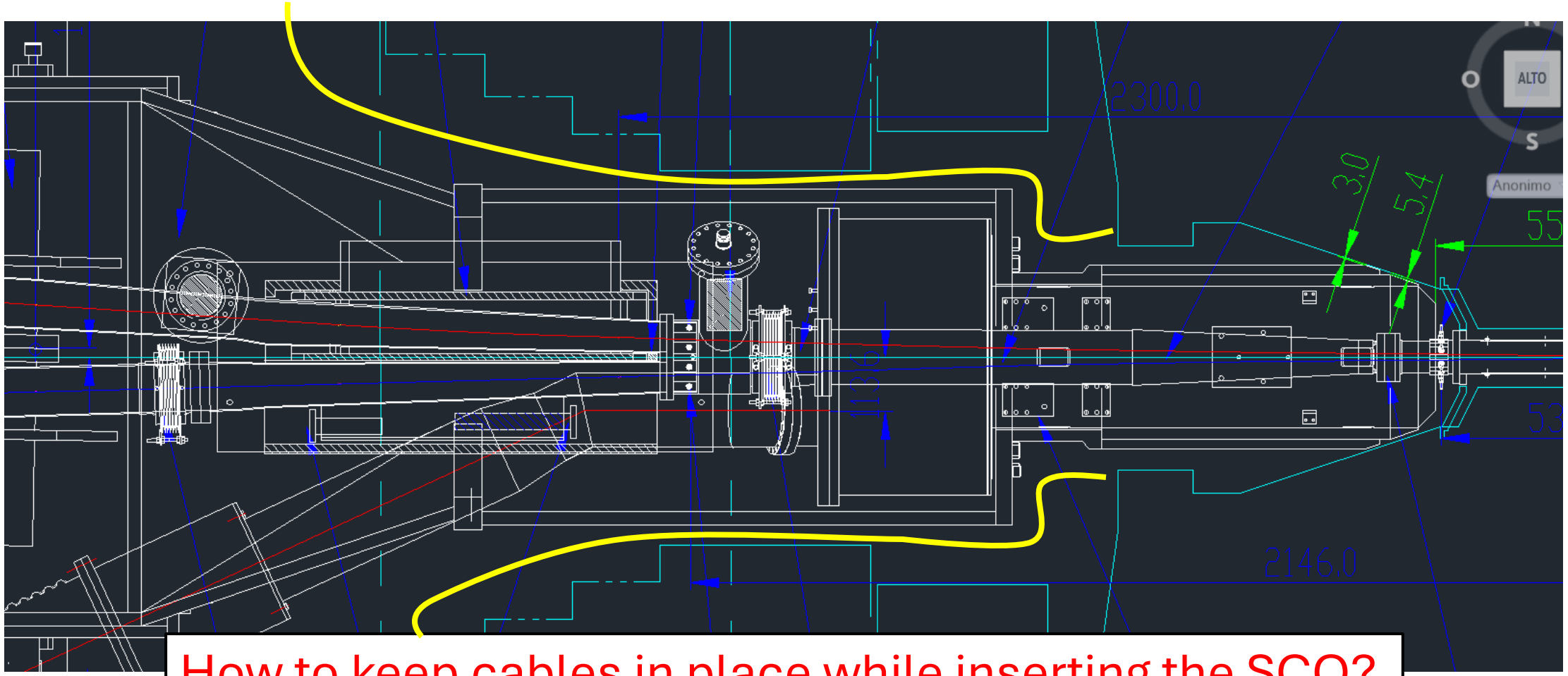
Cable Holder Final Design



Cabling Test Completed

- Patch cards positioning schemes finalized (Attached)
- Cable fixing schemes finalized (Attached)
- Cable holders design finalized
- Cable holder production ongoing (due before Sept 9th)
  - 3D printed in ASA
    - Structural test passed
    - No weakening due to radiation damage expected before 100 yrs at the 100Gy/y expected dose (references attached)
    - Faster production w.r.t. machining and bending/welding aluminum

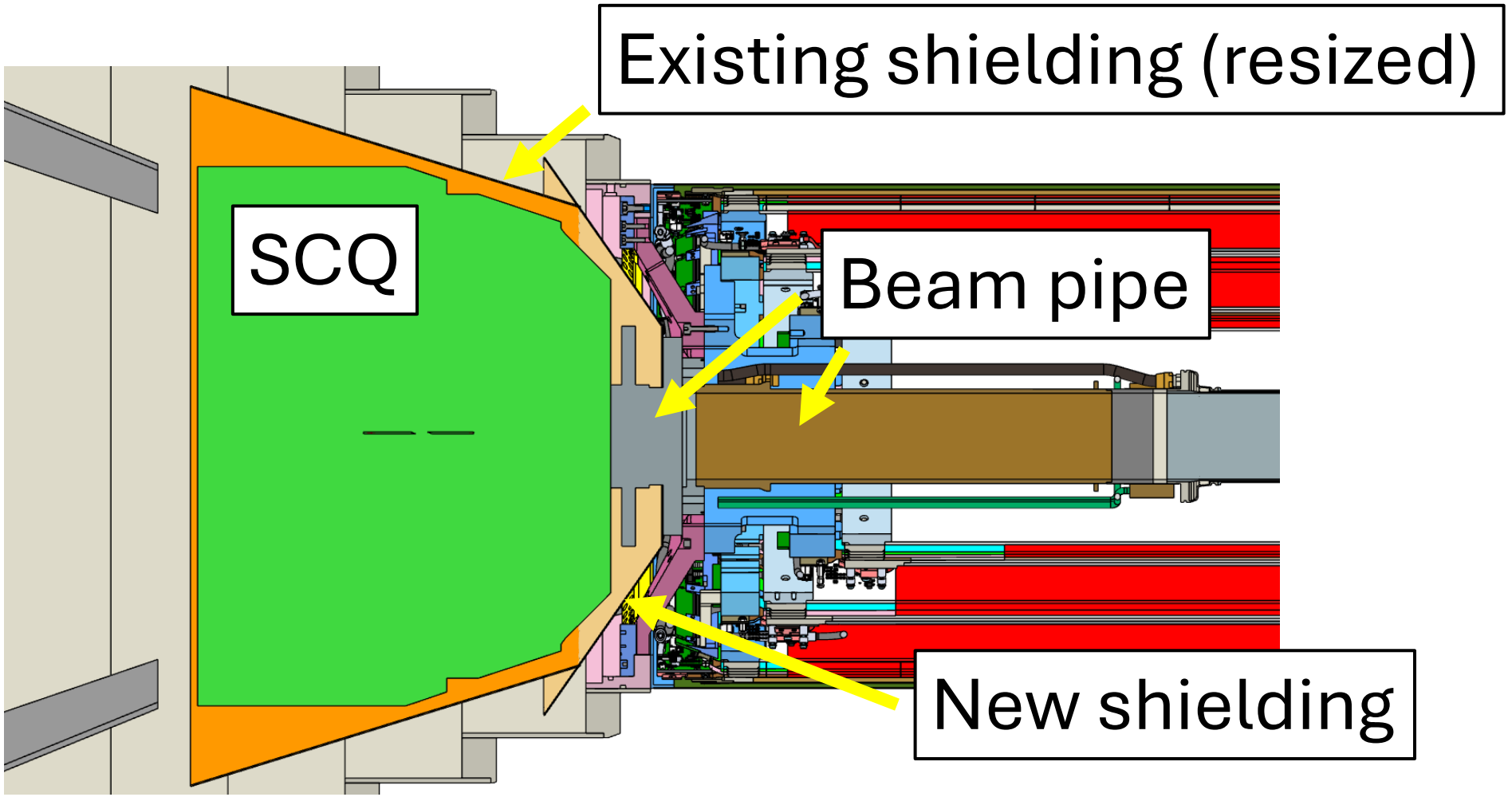
Cabling along the Beam Pipe



How to keep cables in place while inserting the SCQ?

Shielding

Shielding Plate Proposal



Shielding Plate Proposal

- 0.5 to 1 mm thick aluminum sheet or 0.25 to 0.5 copper sheet
- 2 half-cones 190° (2x5° overlap)
- Held in place with either aluminum duct tape or copper tape
- Either fully rigid and pre-shaped to spec or semi-rigid, pre-shaped, and finalized on-site

Some points still to be clarified:

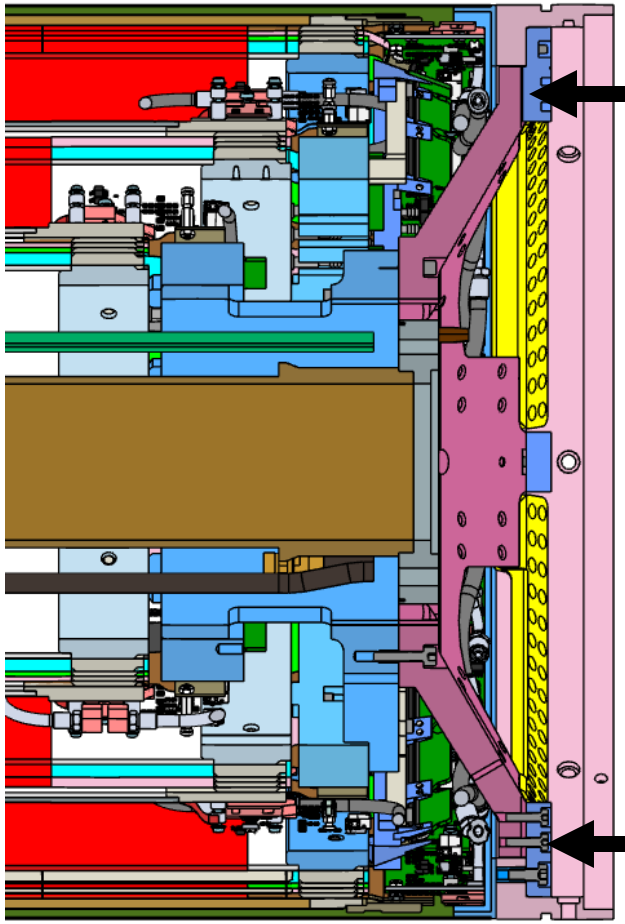
- When to install it? Before or after installing the BP?
- What's the recommended clearance w.r.t the SCQ and the BP?
- Are windows/holes needed in the shielding?

Insertion Procedure

Insertion Procedure

- Insertion procedure finalized (attached)
- Detector fixing solution finalized
- Risk assessment report completed
- Parts production initiated (due before 09/21)

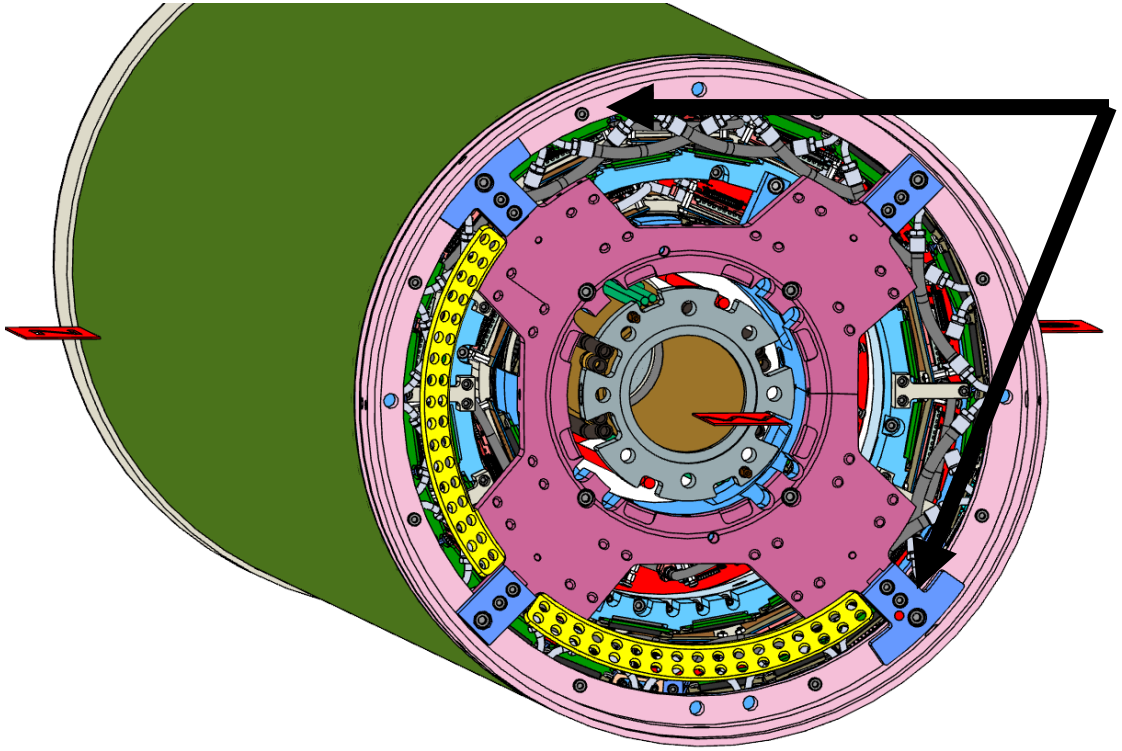
West (Fixed) Side



1 slot + relief as reference
For constraining position and angle

M4 screws, well tightened

West (Fixed) Side



Extra set of T-shaped brackets also being manufactured

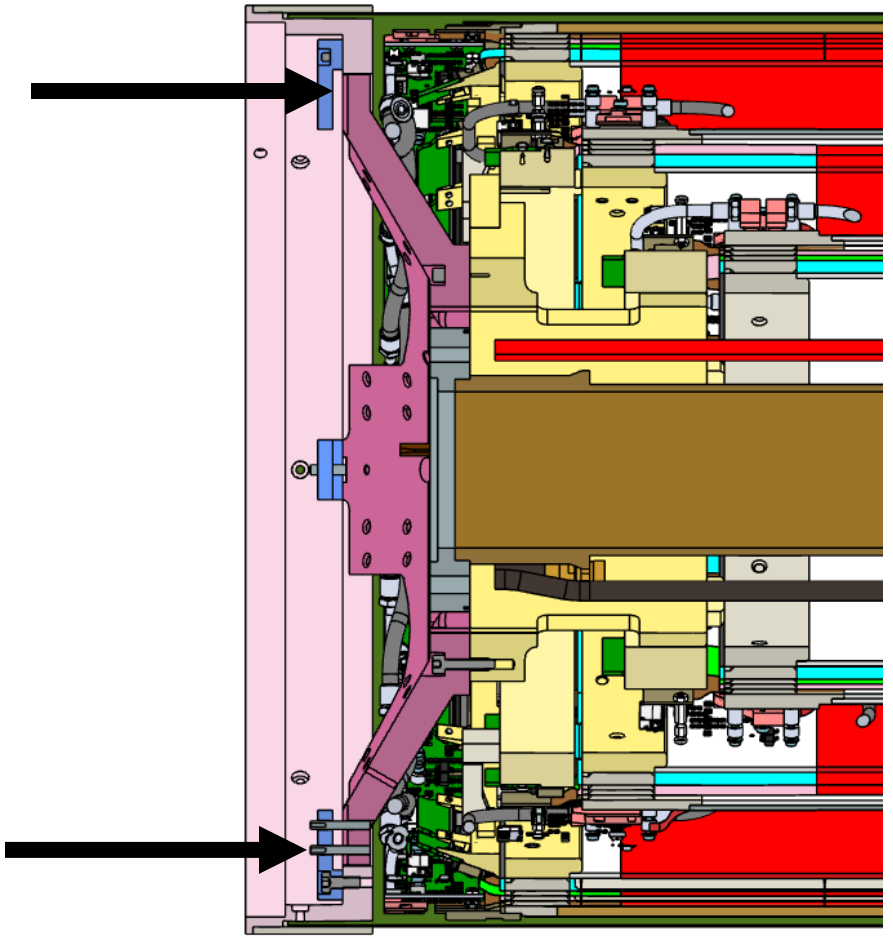
To prevent accidental rotations of the brackets during the operations

Coupling diameter in untoleranced in the drawings, possibility to adopt this solution still uncertain

East (Free) Side

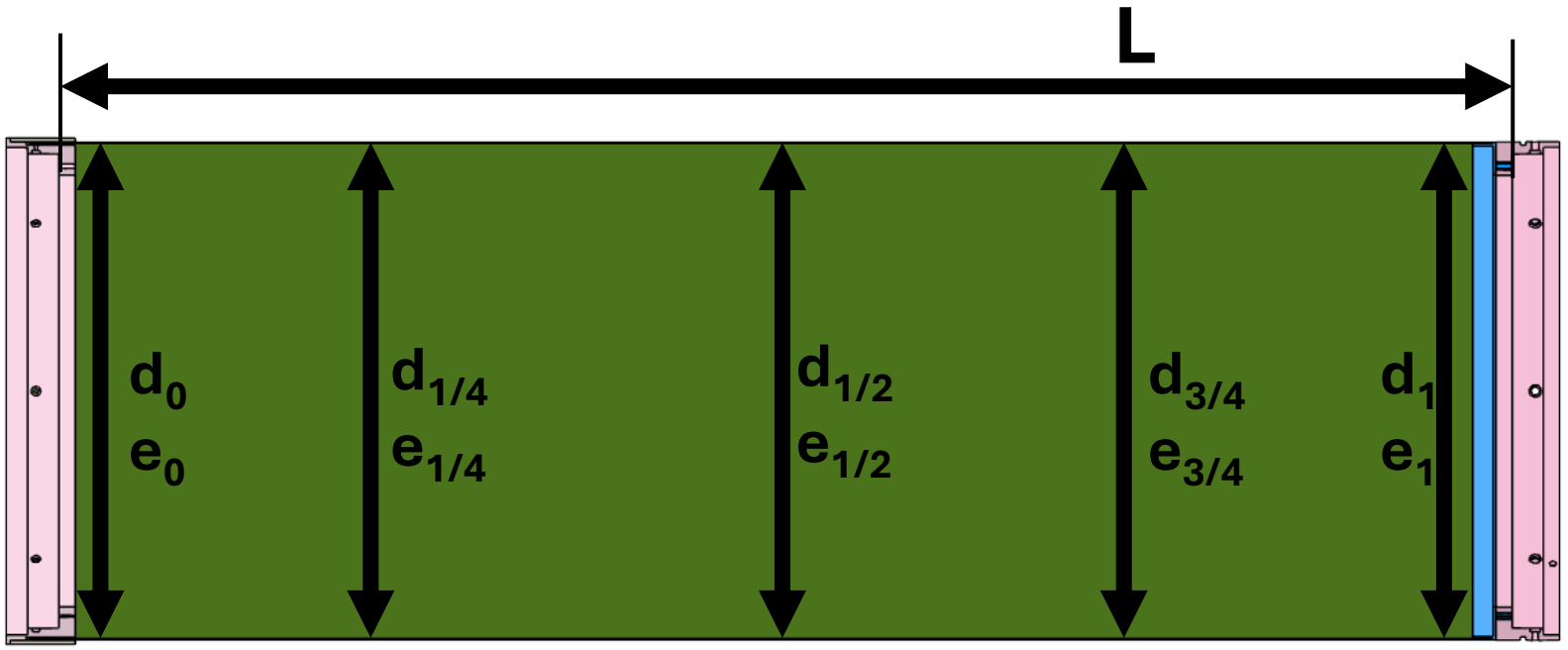
Removed Face to face constraint
To safeguard against accidental compression

Set of calibrated pins
To minimize backlash when relaxing the rail
No constraint in the beam direction



Request for a Laser Survey of the Cavity

- A geometrical survey of the cavity is advised, with the east flange mounted, before CGEM insertion



+ Flanges parallelism and perpendicularity w.r.t. the cavity's axis

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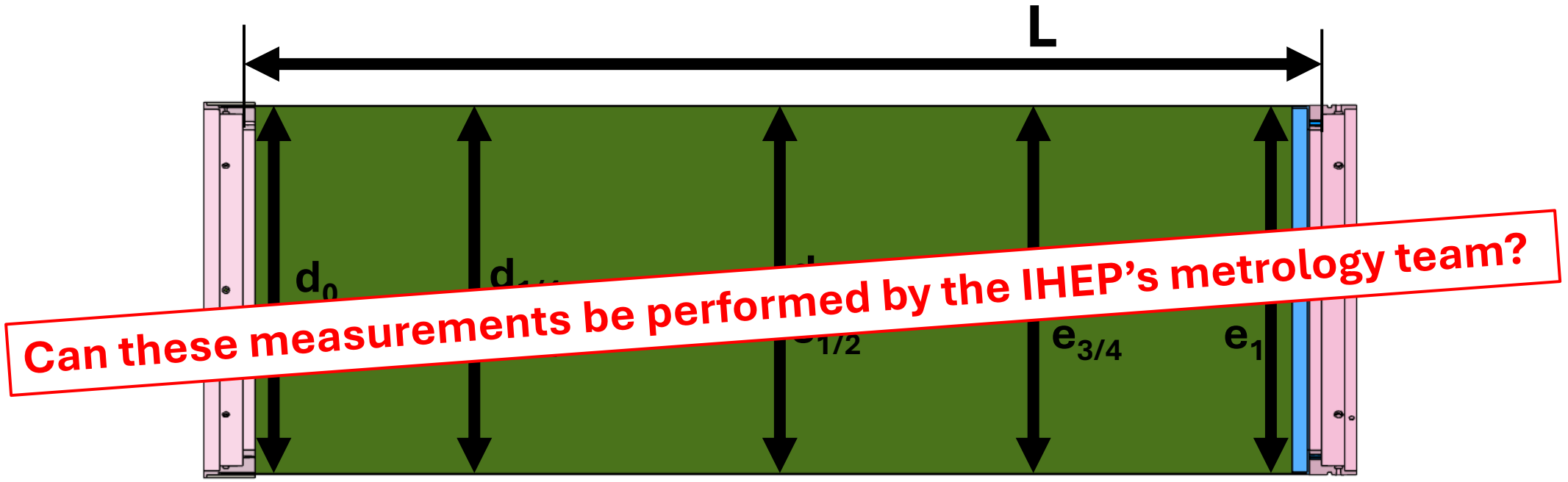

+ Flanges parallelism and perpendicularity w.r.t. the cavity's axis

Thanks for your attention

...questions?