ePIC Constraints

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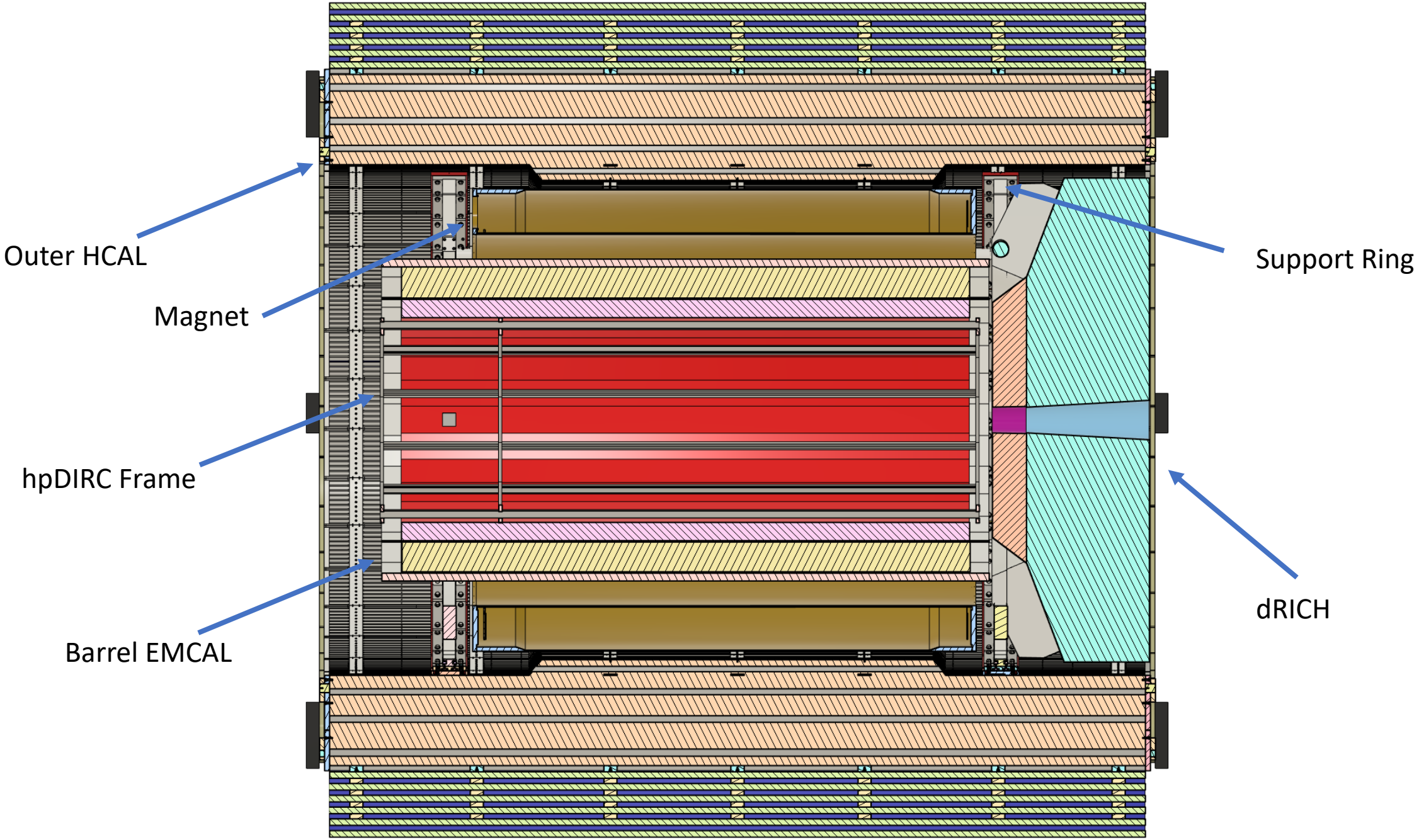
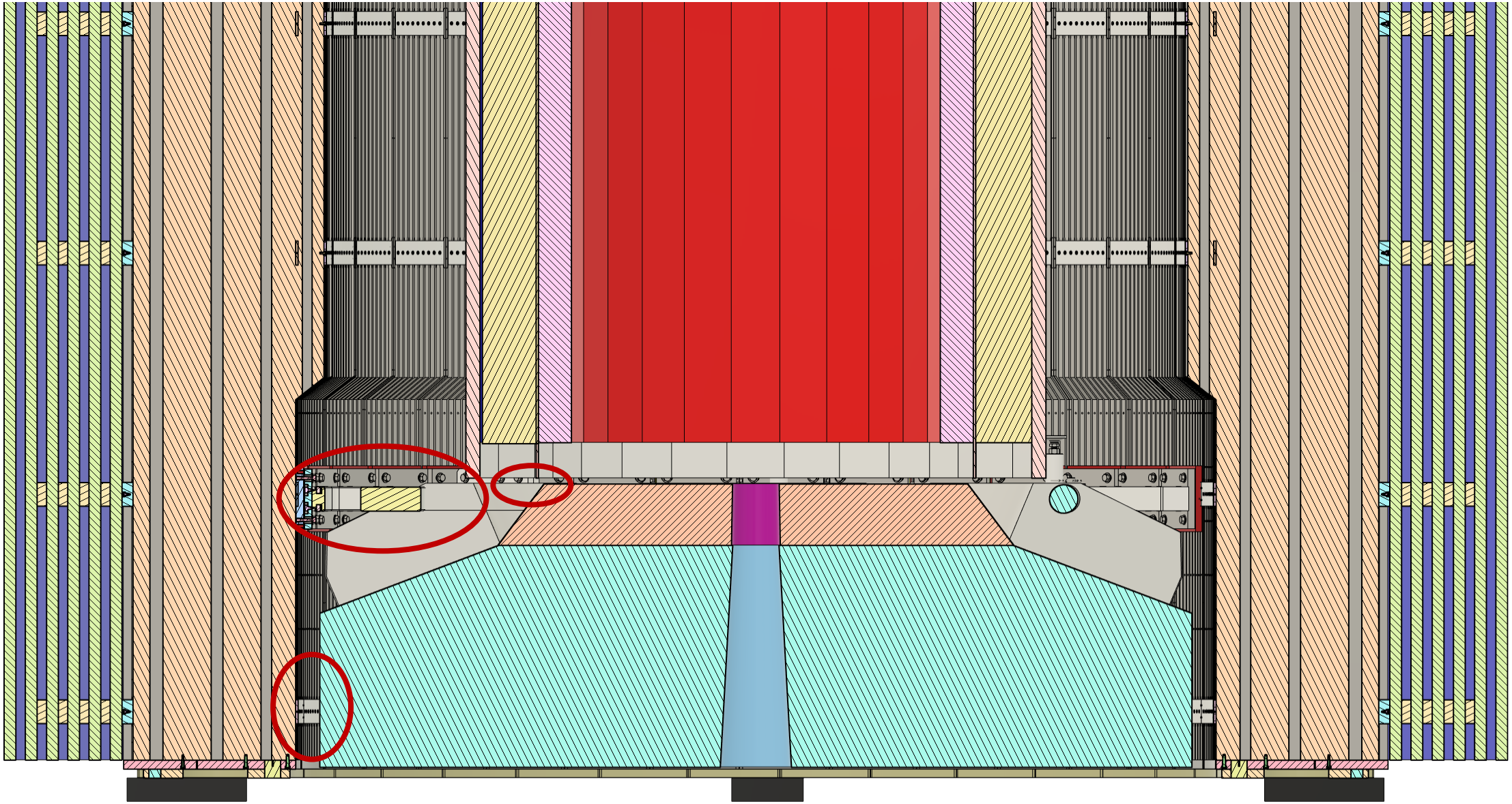
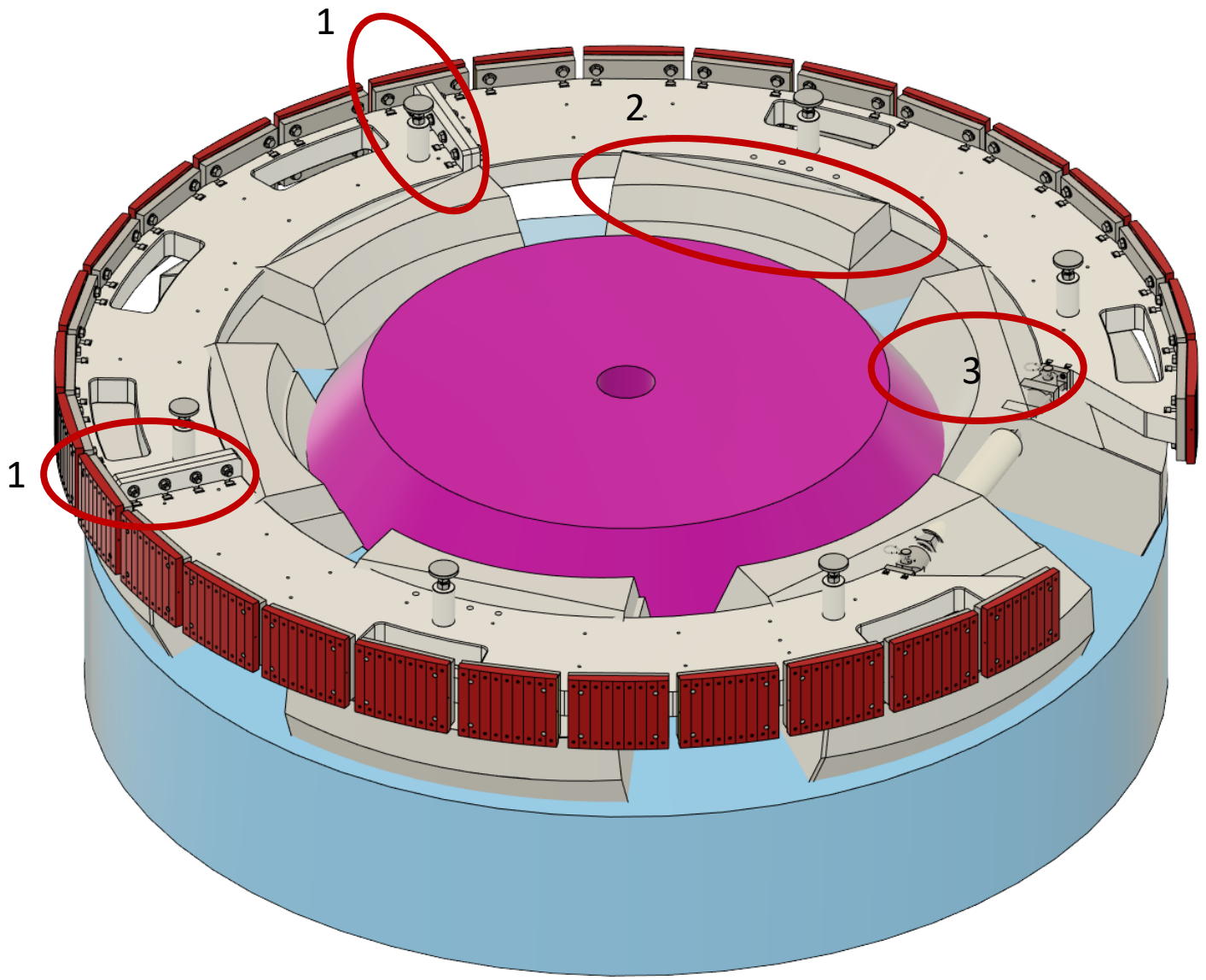
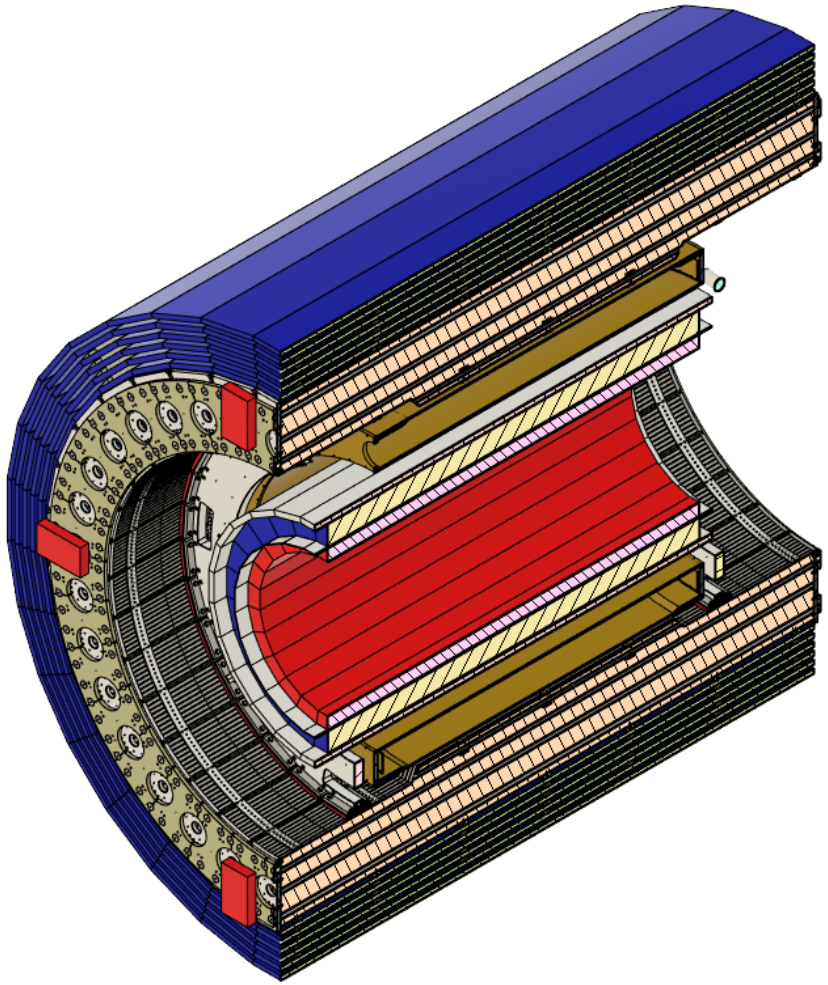

Outer HCAL
Magnet
hpDIRC Frame
Barrel EMCAL
Support Ring
dRICH

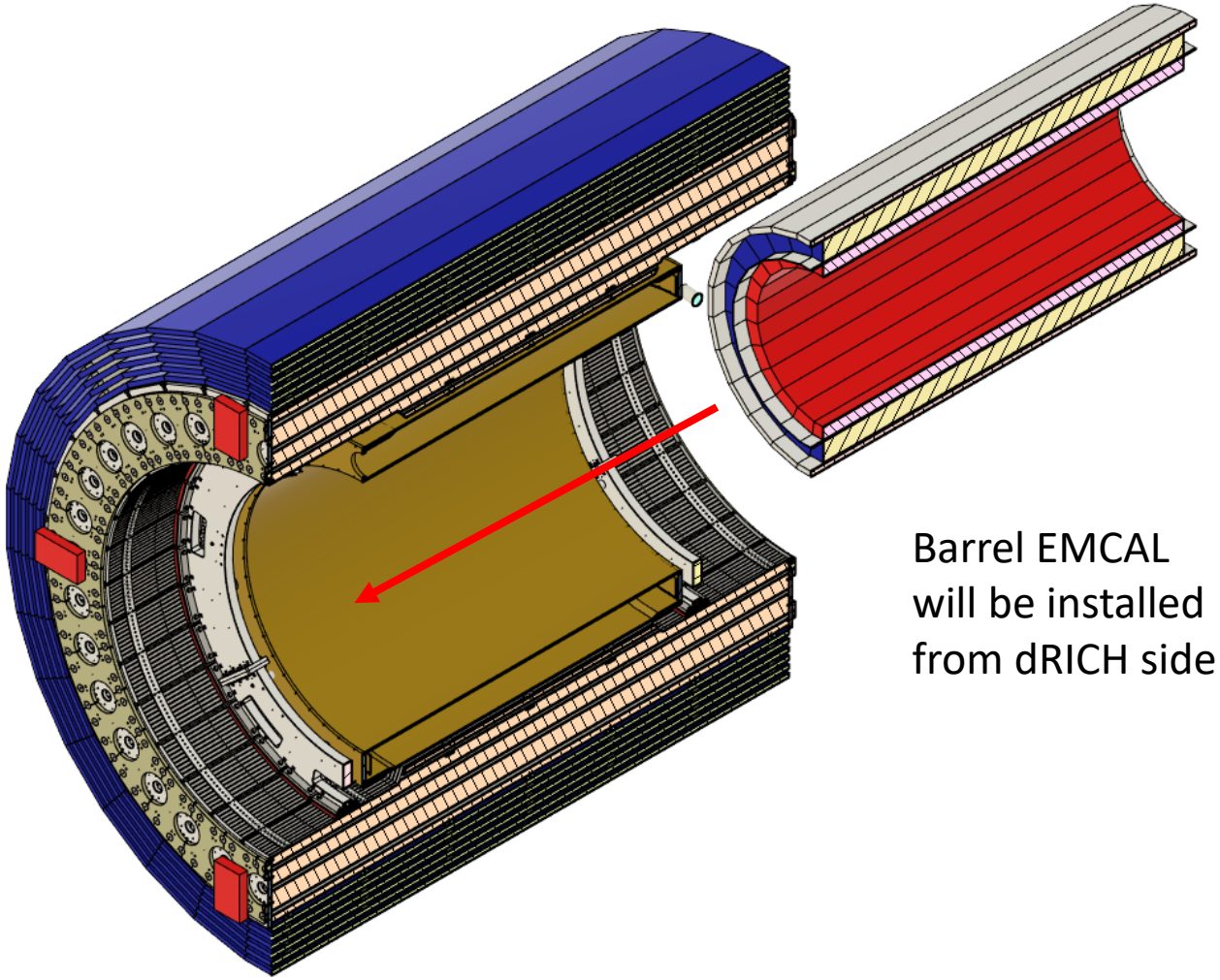


Points of interference with the support ring:

1. The support ring bolting flanges
2. The inner radius (all the way around)
3. The actuator (which will NOT be in place)

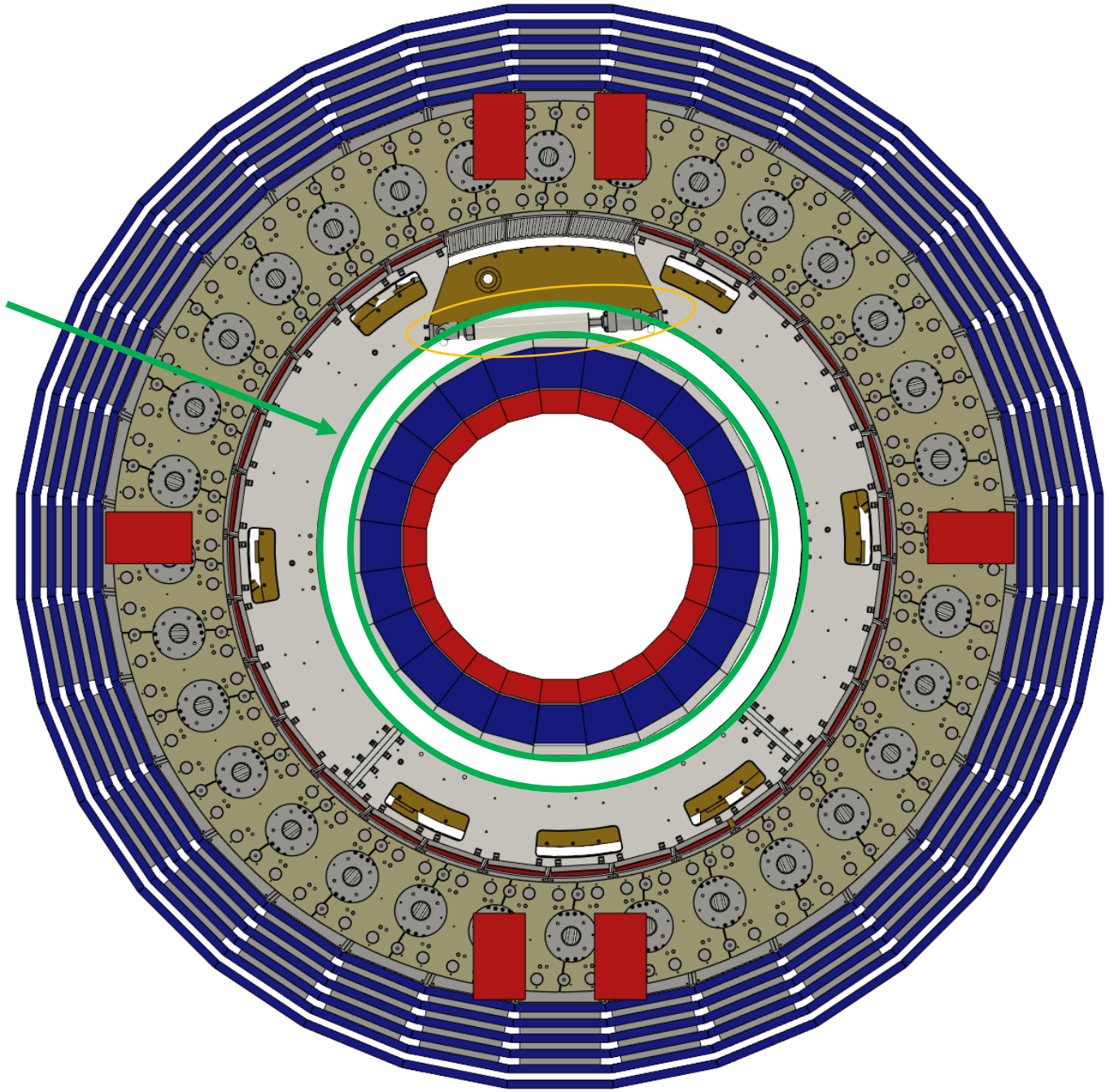




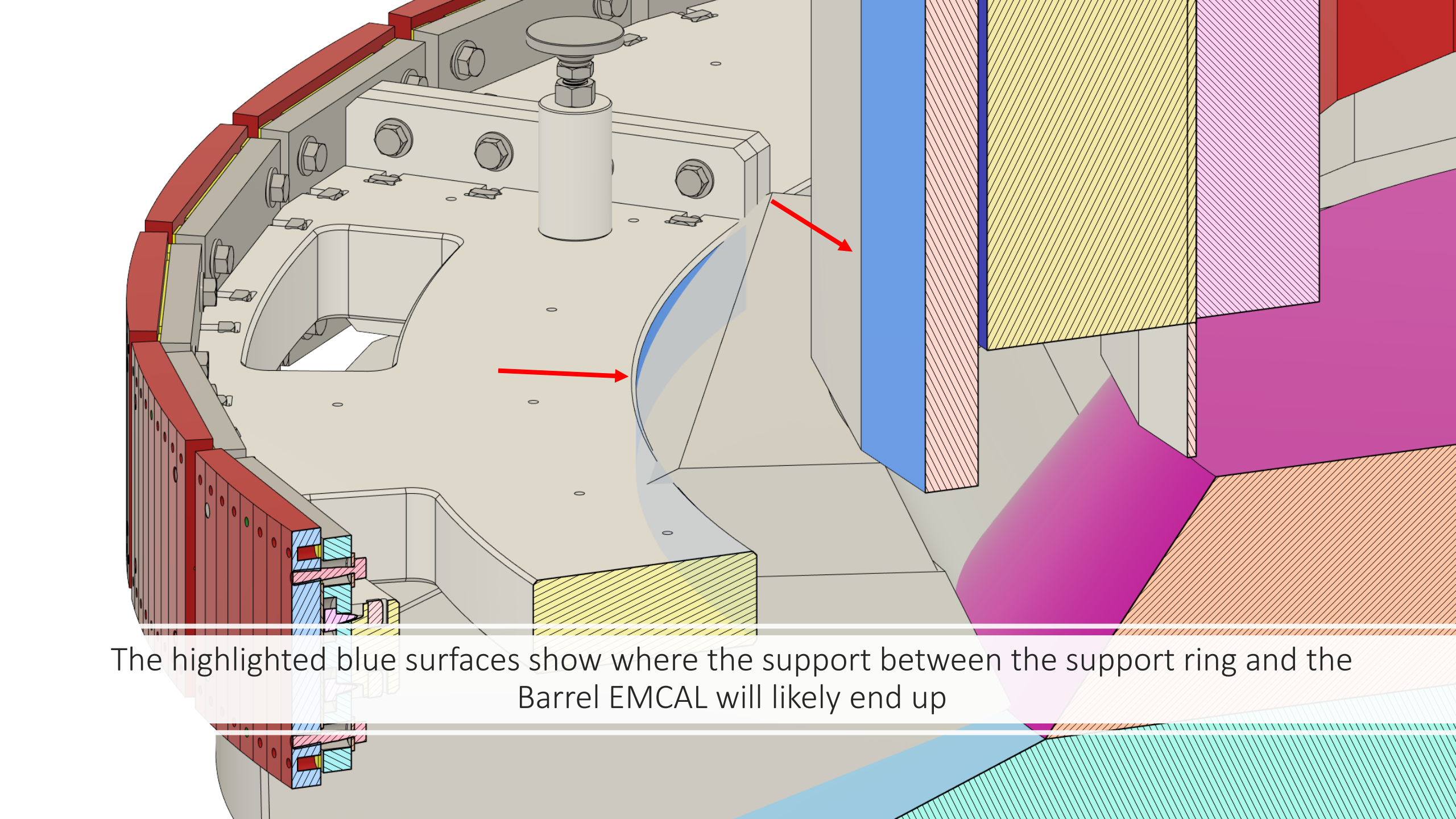


Barrel EMCAL
will be installed
from dRICH side

Support structure for 53T Barrel EMCAL will be tied to the support ring (green); actuator (orange) will not be in place after outer HCAL has been assembled

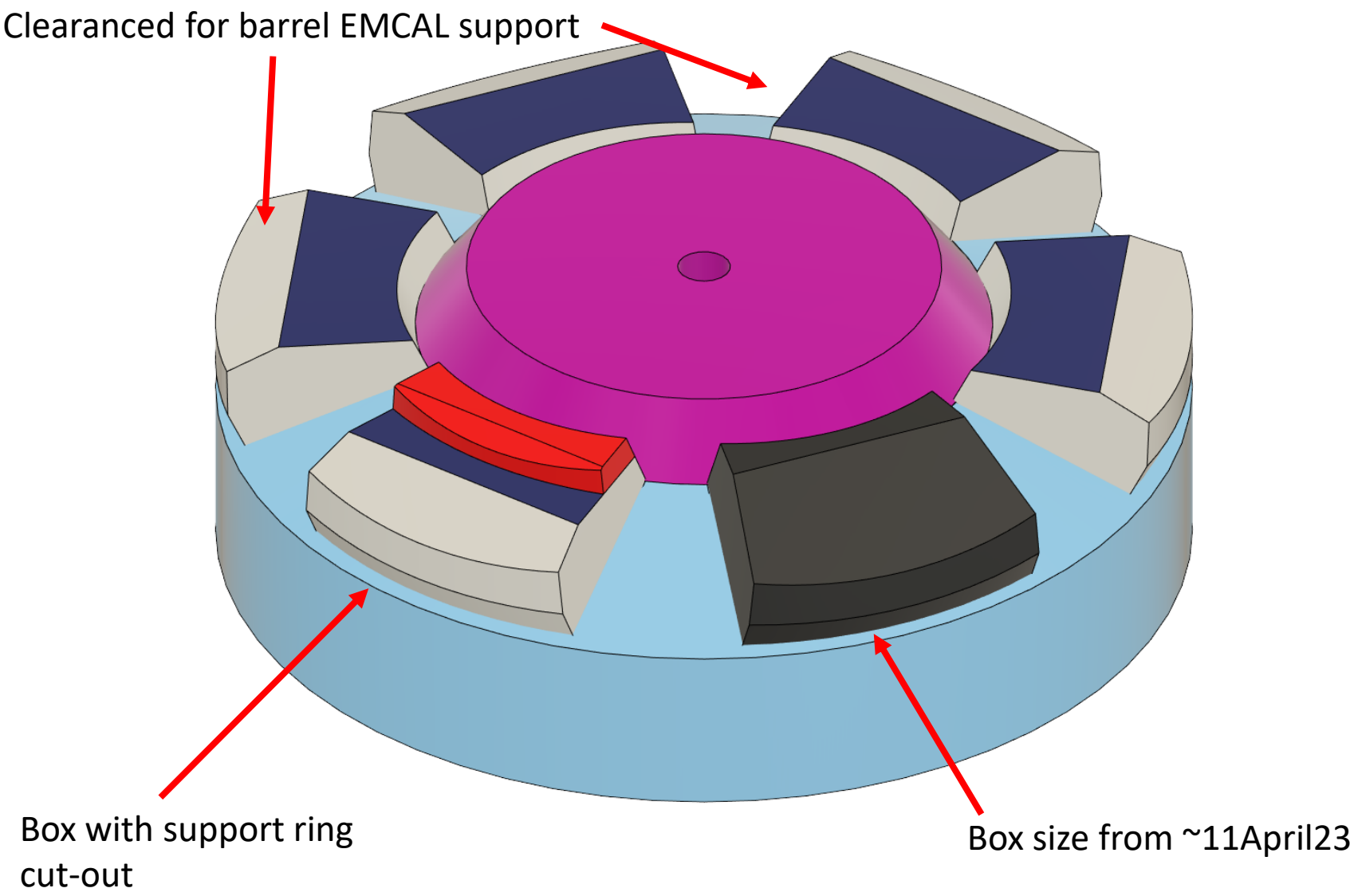


Based on the direction of installation and the mounting location, there will be a plate (thickness TBD) and hardware on the inner radius of the support ring that needs to be accounted for in the dRICH boxes.



The highlighted blue surfaces show where the support between the support ring and the Barrel EMCAL will likely end up

- Before the workshop, I took the original box (shown in black) and made a cut to accommodate the support ring.
- The grey/blue/red box represents what we looked at recently.
- The blue-faced boxes are the current “worst case scenario” and represent the boxes having no volume inside the radius of the support ring



Ideas

1. Can we combine the magnet support jacks with the support ring to move the support ring further away from the dRICH?
2. Can we regain some of the space between by only removing material between the support (similar to leaving the red box from last slide and only clearancing for the flange and mounting hardware)?
3. Other support structure ideas for the Barrel EMCAL that might minimize interferences for dRICH sensor boxes.

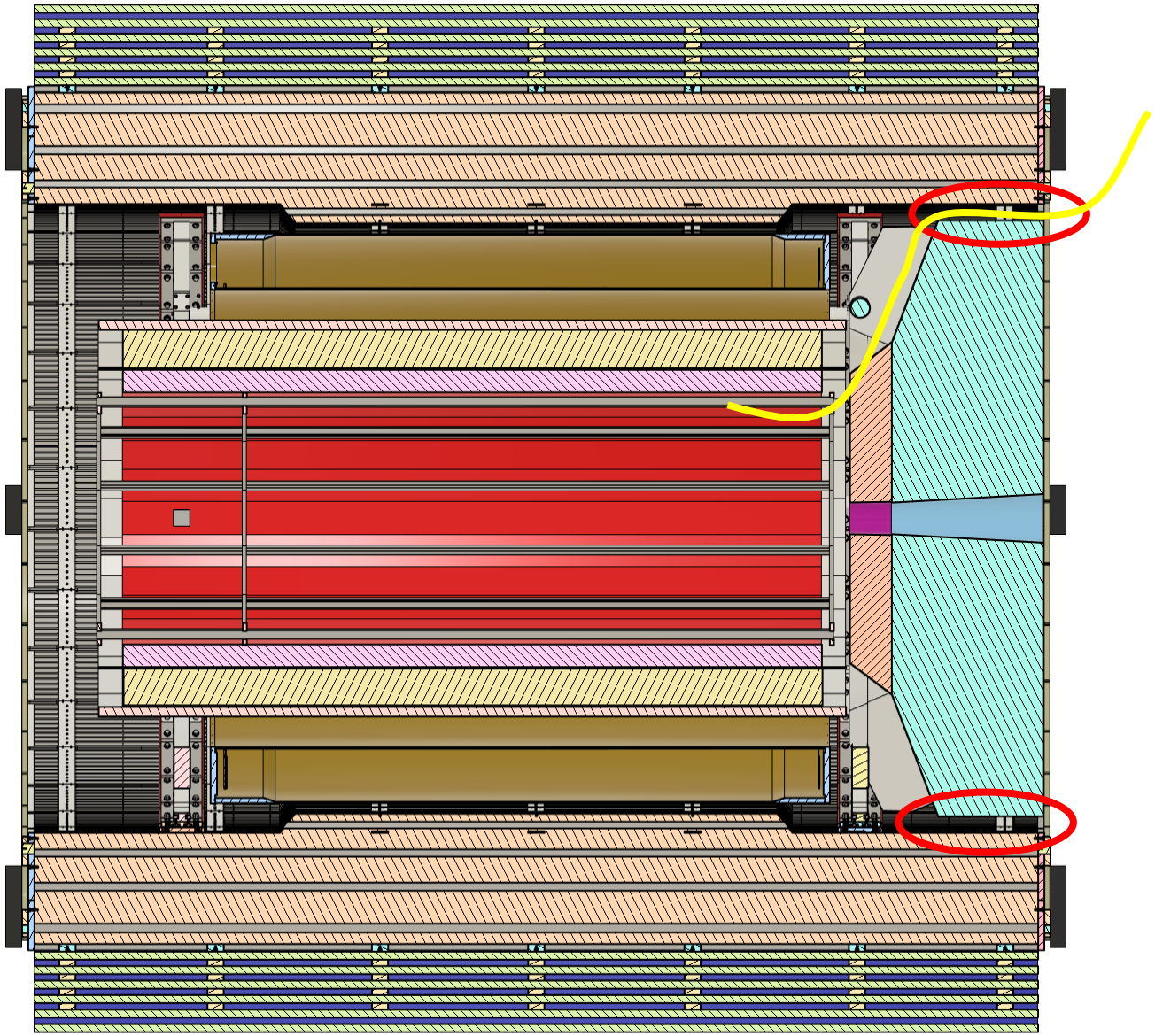
Still need to know

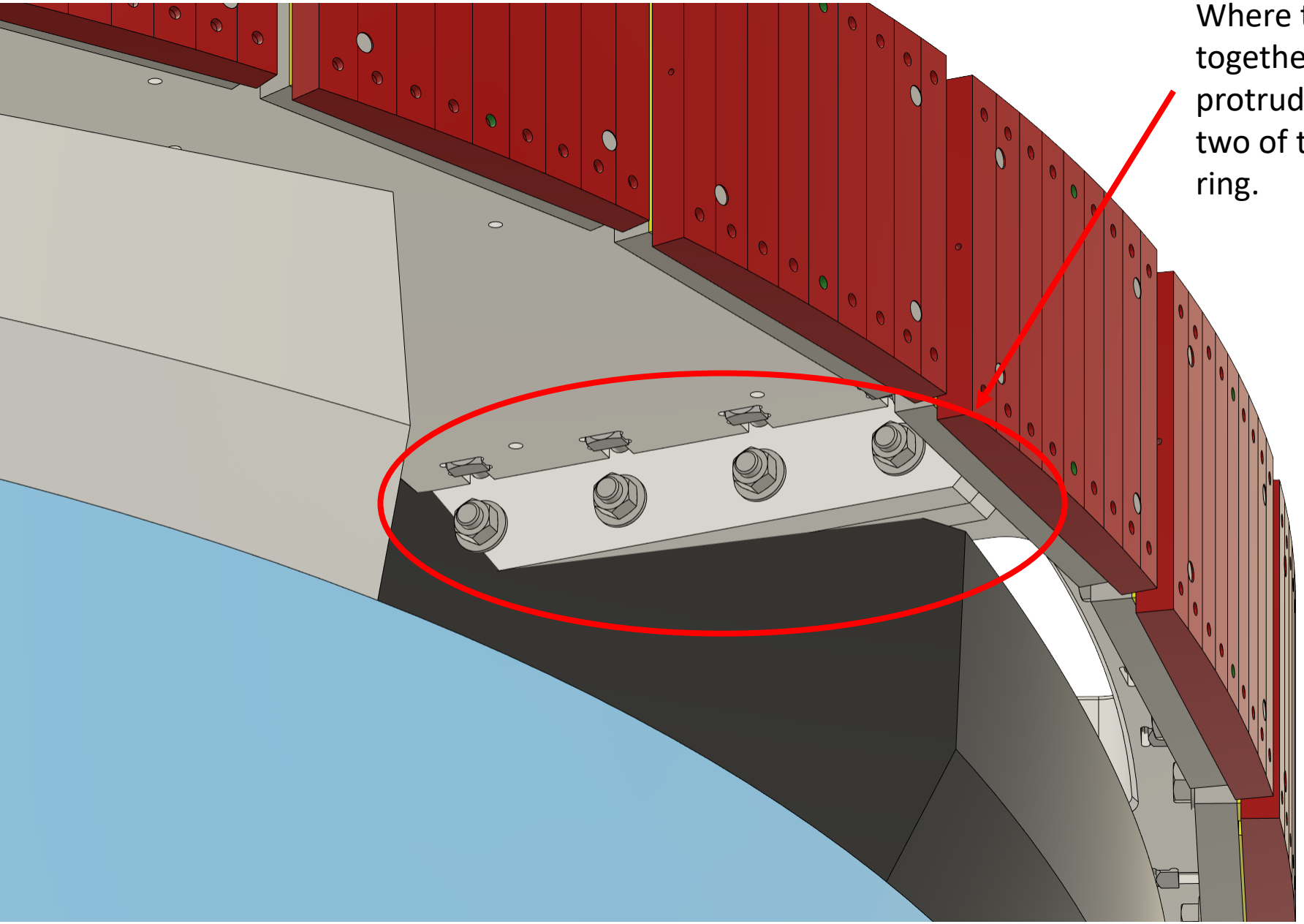
- Magnet design is still in the works; more details soon
- Barrel EMCAL design is still being developed (electronics/supports are most critical for dRICH)
- How the Barrel EMCAL will support the hpDIRC on the dRICH end

Services for the inner detectors are planned to route out from the hpDIRC frame, between the sensor boxes, and then out between the outer HCAL and the dRICH (approximated by yellow line).

After looking at the planned services, there was already a ~92% fill at the outer radius of the dRICH (red circles).

In order to have room for services to exit, we need to shrink the overall outer diameter from 370cm to 360cm. The fill between the boxes (as sized) seems to be adequate.





Where the support ring bolts together, there is a flange that protrudes into the boxes. There are two of these flanges on the support ring.

Rotating the dRICH could avoid one of these flanges, but not both. Possible solutions:

- Move the support ring away from the dRICH (as discussed)
- Redesign the flanges to see if they can be clamped on the far side
- Make necessary clearance in the dRICH boxes (again)