

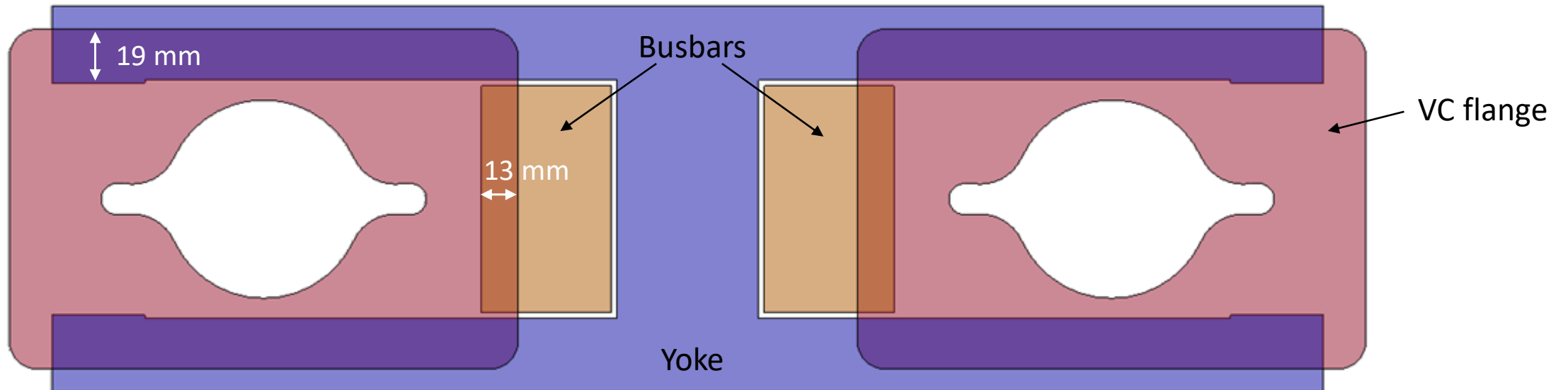
FCC-ee Magnet Interconnections Space Requirements

Carl Järmyr Eriksson, Jérémie Bauche (TE-MSU)

Overlap – flange connection (D-D)

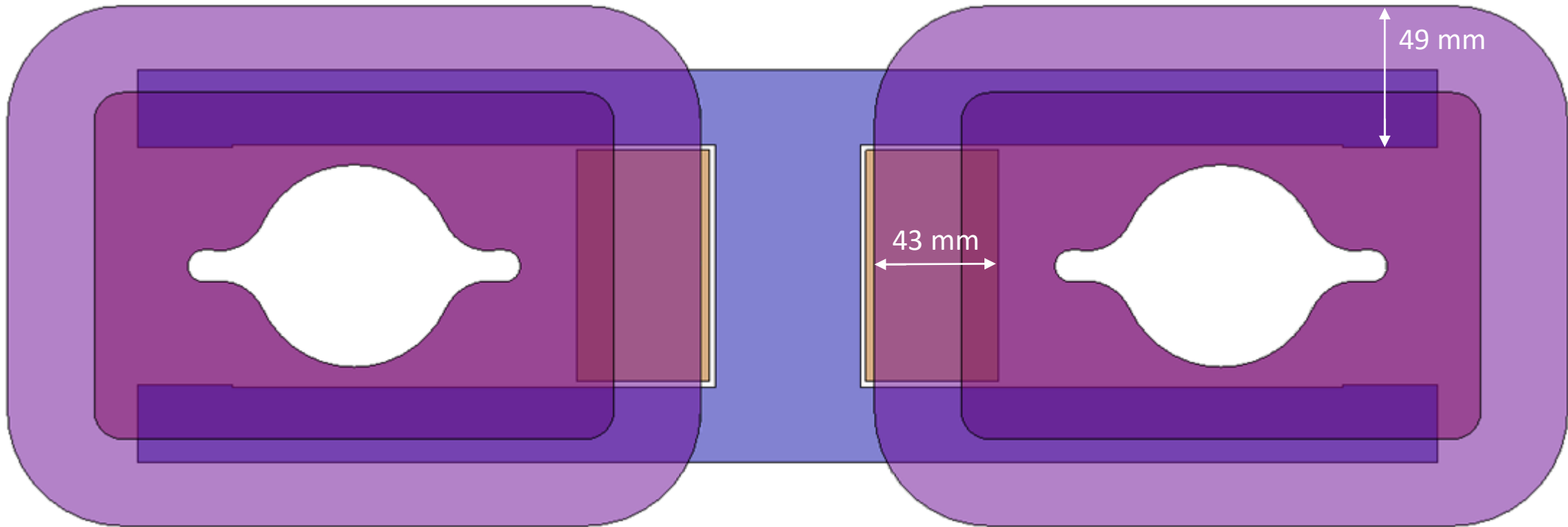
Assuming that the flange connection (without bellows) is possible at the dipole-dipole connection:

- In order to add plates over & under D-D connection, **gap height** must be **increased** by at least **40 mm**, from 84 to 124 mm (assumes at least 1 mm on each side for clearance)
- In order to run busbars straight through D-D connection, **inter-beam width** must be **increased** by at least **28 mm**, from 300 to 328 (1 mm on each side for clearance)



Overlap – bellows

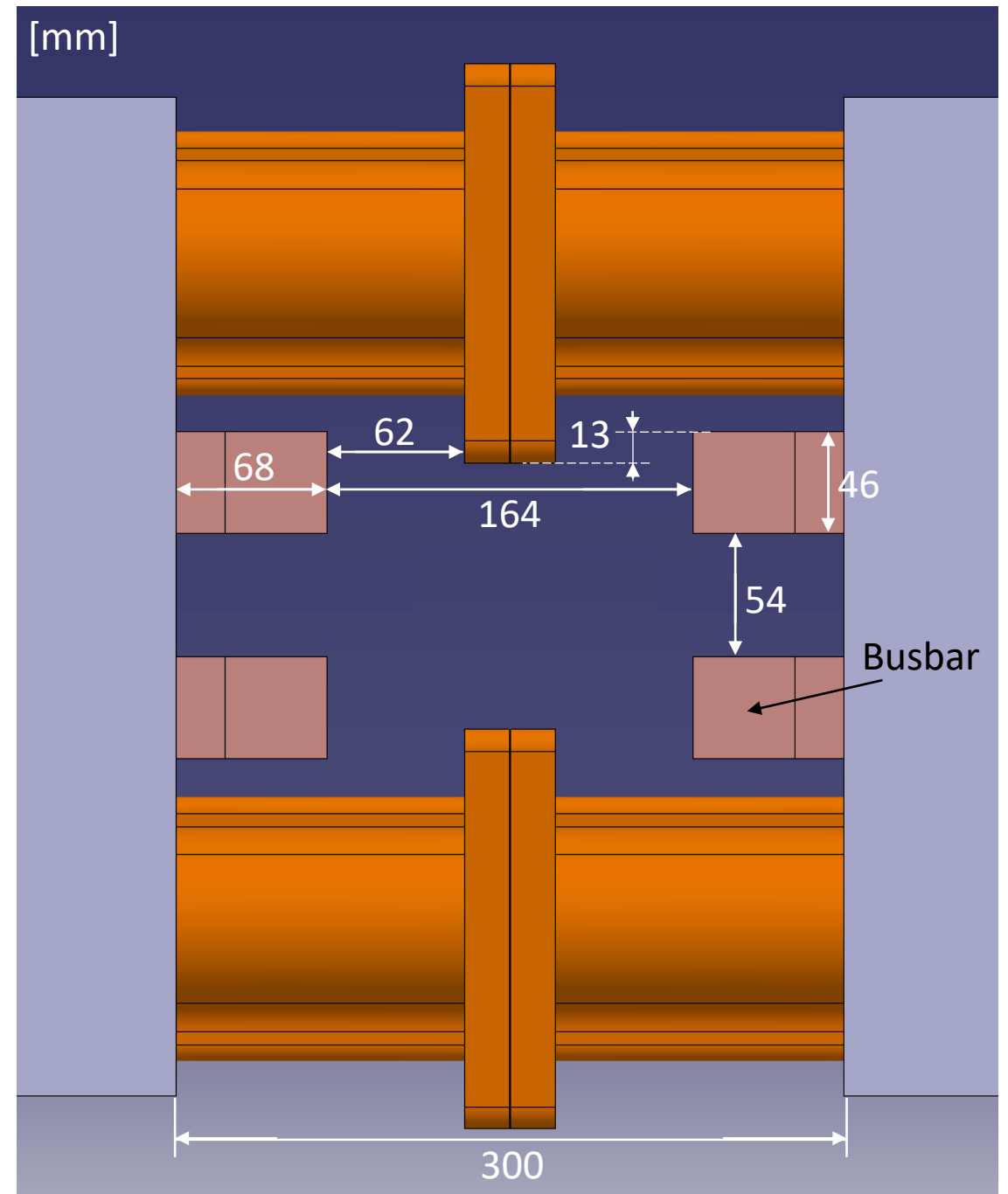
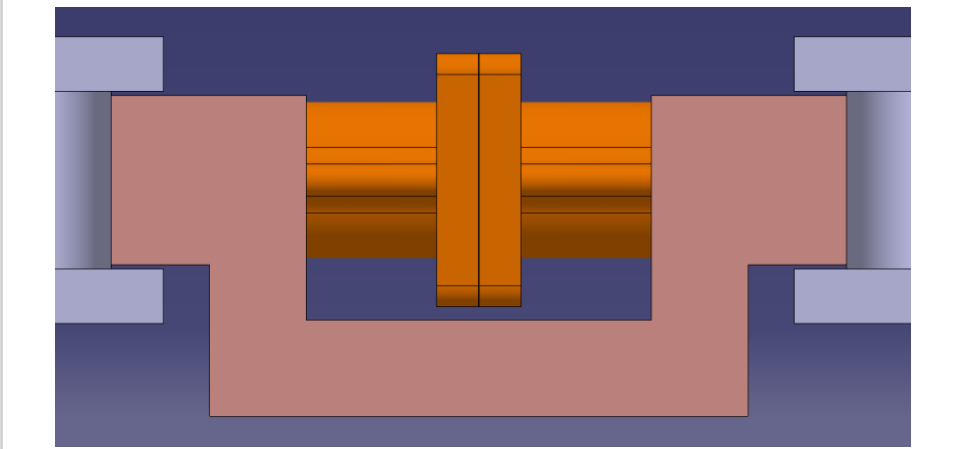
- If the bellows are to be taken into account:



Available space – D-D connection

- Assumes flange connection at D-D
- Assumes 300 mm gap between dipoles yokes
- Assumes same coil dimensions, same coil protrusion from dipole edge as in prototype
- The actual magnetic gap (distance between magnetic lengths "edges") would be in the range of 220 mm

Side view: busbars connect underneath flange

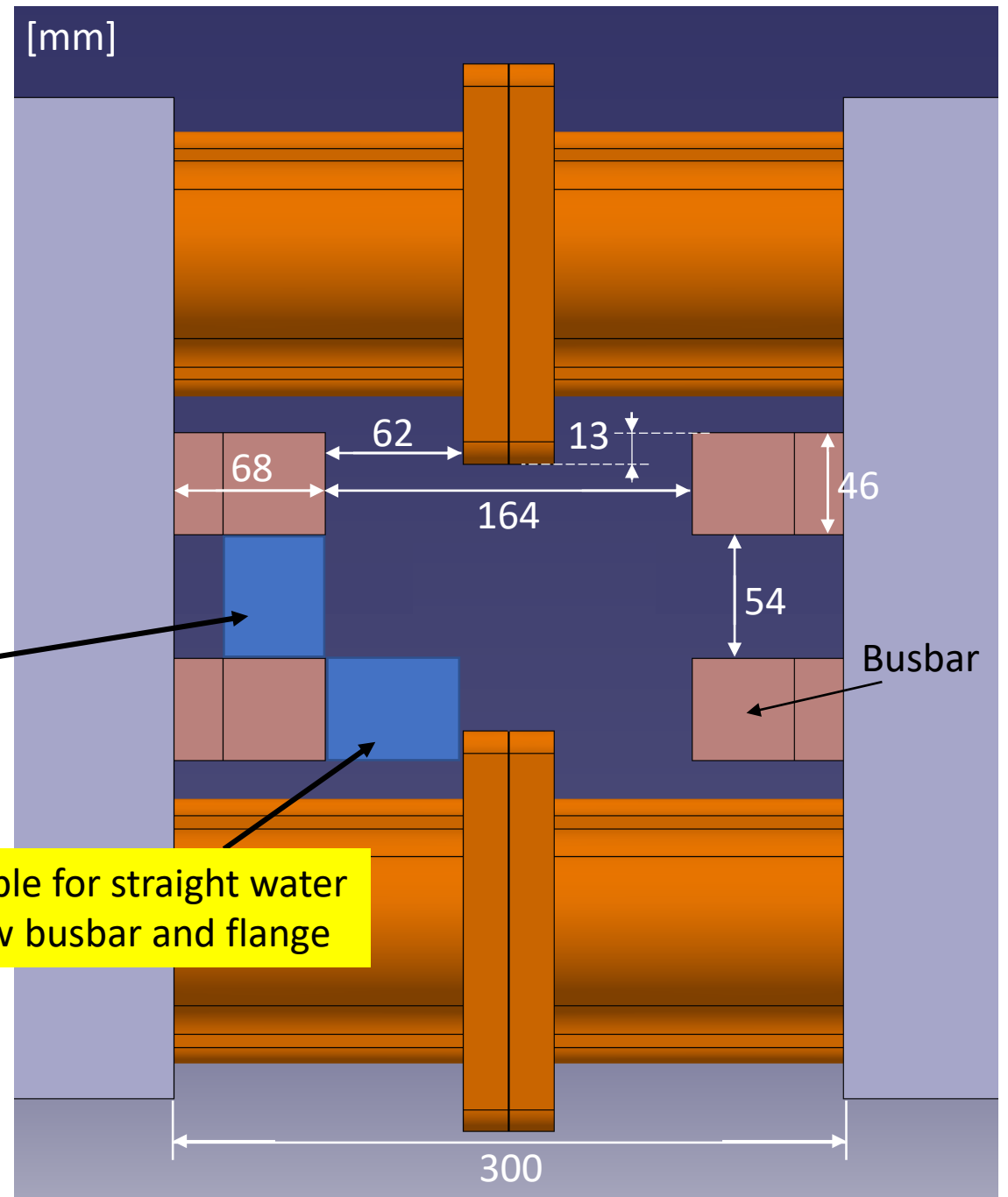
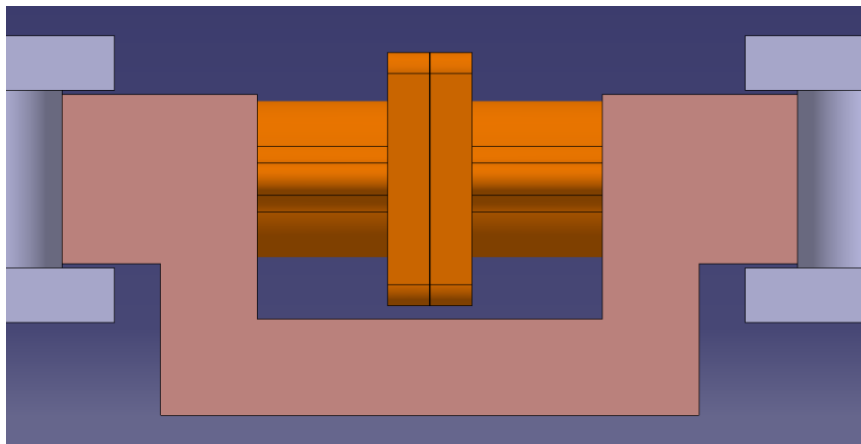


Available space – D-D connection

- Assumes flange connection at D-D
- Assumes 300 mm gap between dipoles yokes
- Assumes same coil dimensions, same coil protrusion from dipole edge as in prototype
- The actual magnetic gap (distance between magnetic lengths "edges") would be in the range of 220 mm

Sideways water connectors undesirable: 54 mm space must be shared by both busbars' connectors

Side view: busbars connect underneath flange

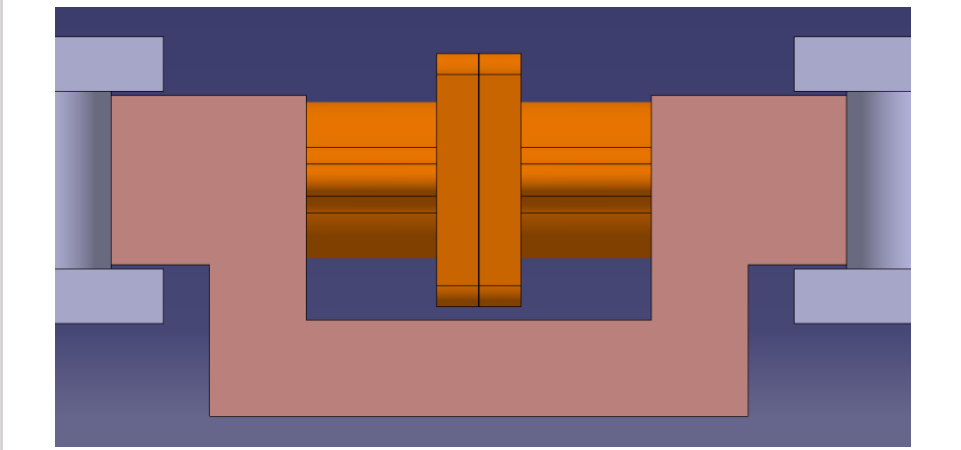


62 mm available for straight water connector b/w busbar and flange

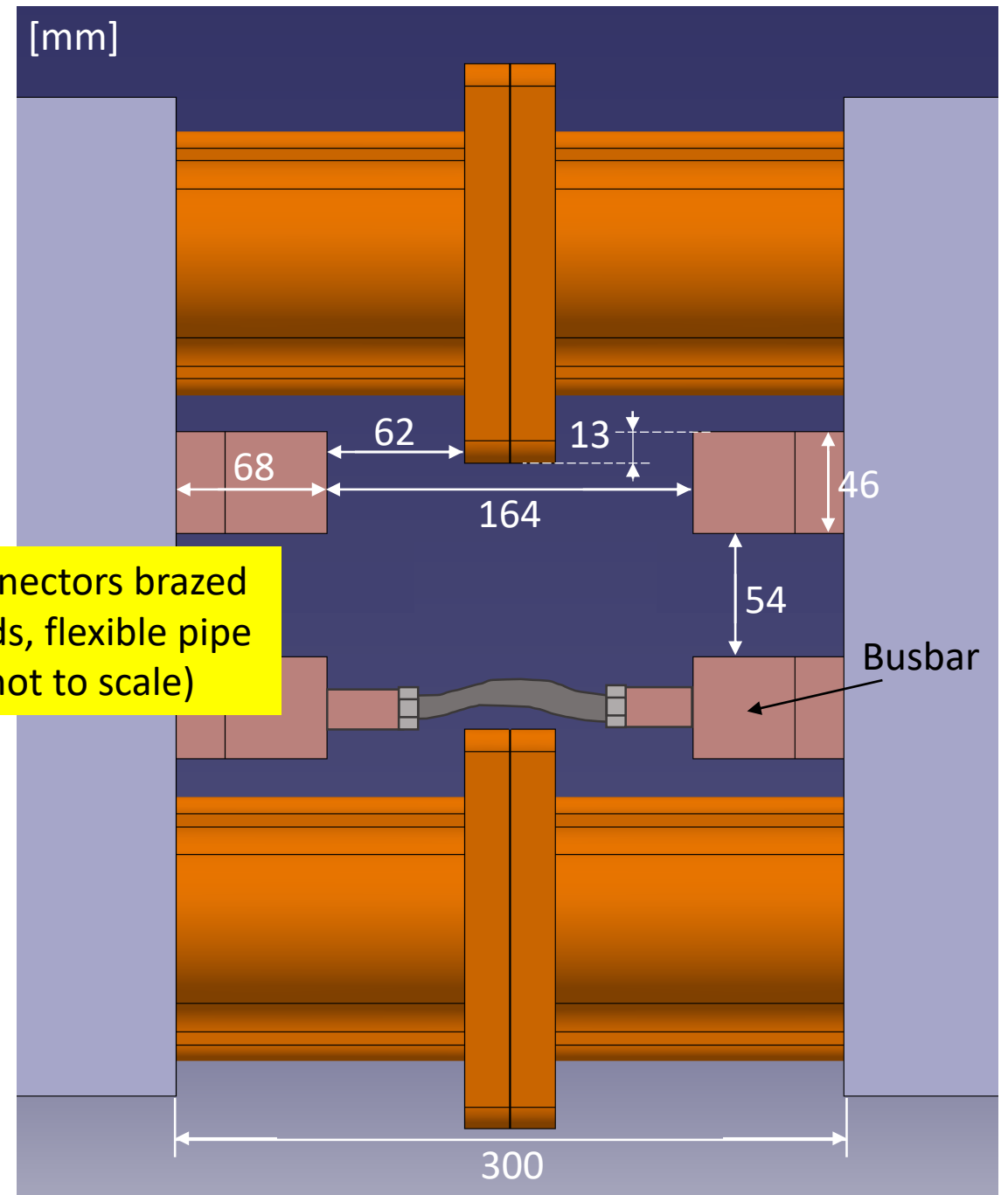
Available space – D-D connection

- Assumes flange connection at D-D
- Assumes 300 mm gap between dipoles yokes
- Assumes same coil dimensions, same coil protrusion from dipole edge as in prototype
- The actual magnetic gap (distance between magnetic lengths "edges") would be in the range of 220 mm

Side view: busbars connect underneath flange



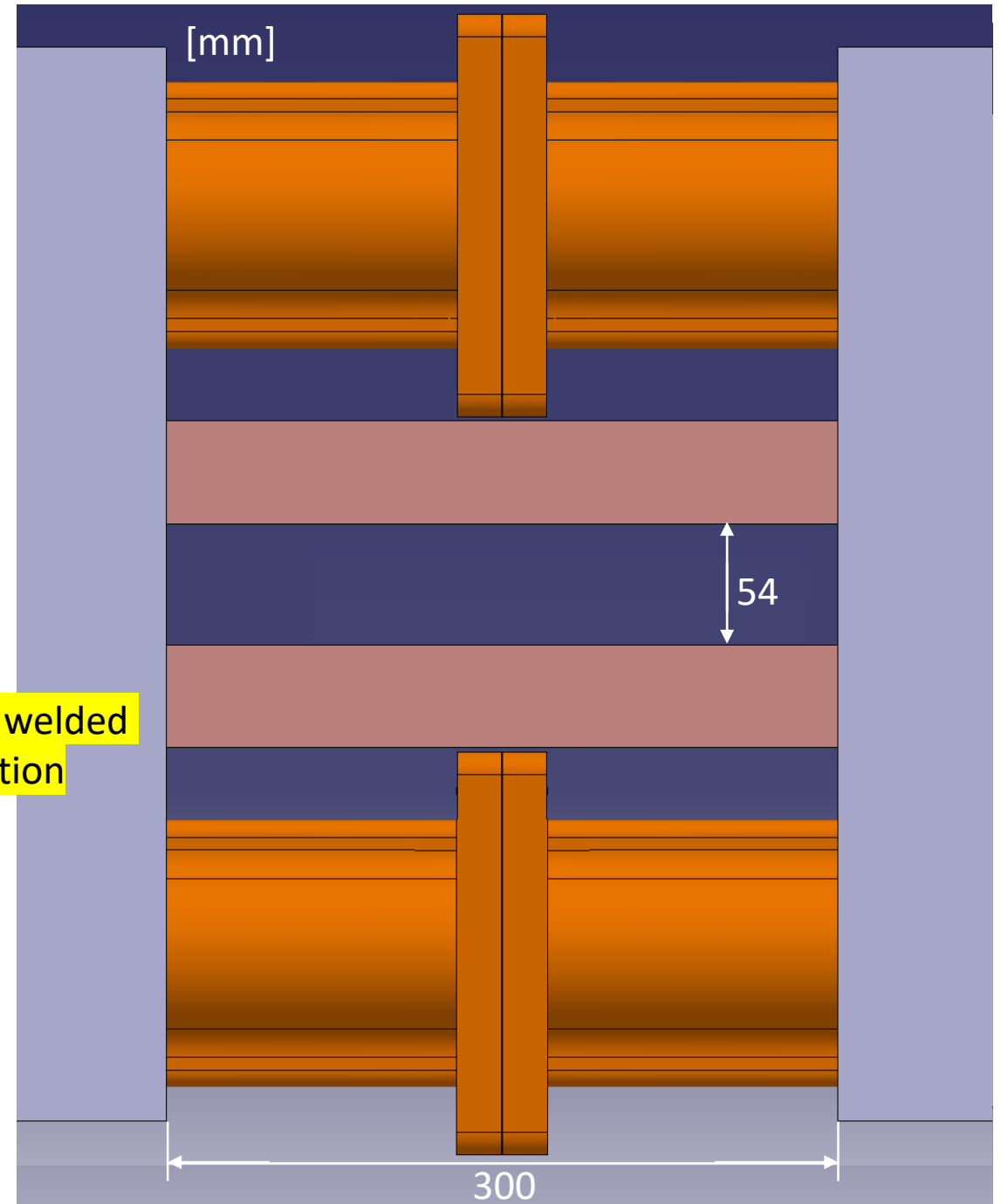
Example: connectors brazed to busbar ends, flexible pipe in between (not to scale)



Available space – D-D connection, widened for clearance for busbars

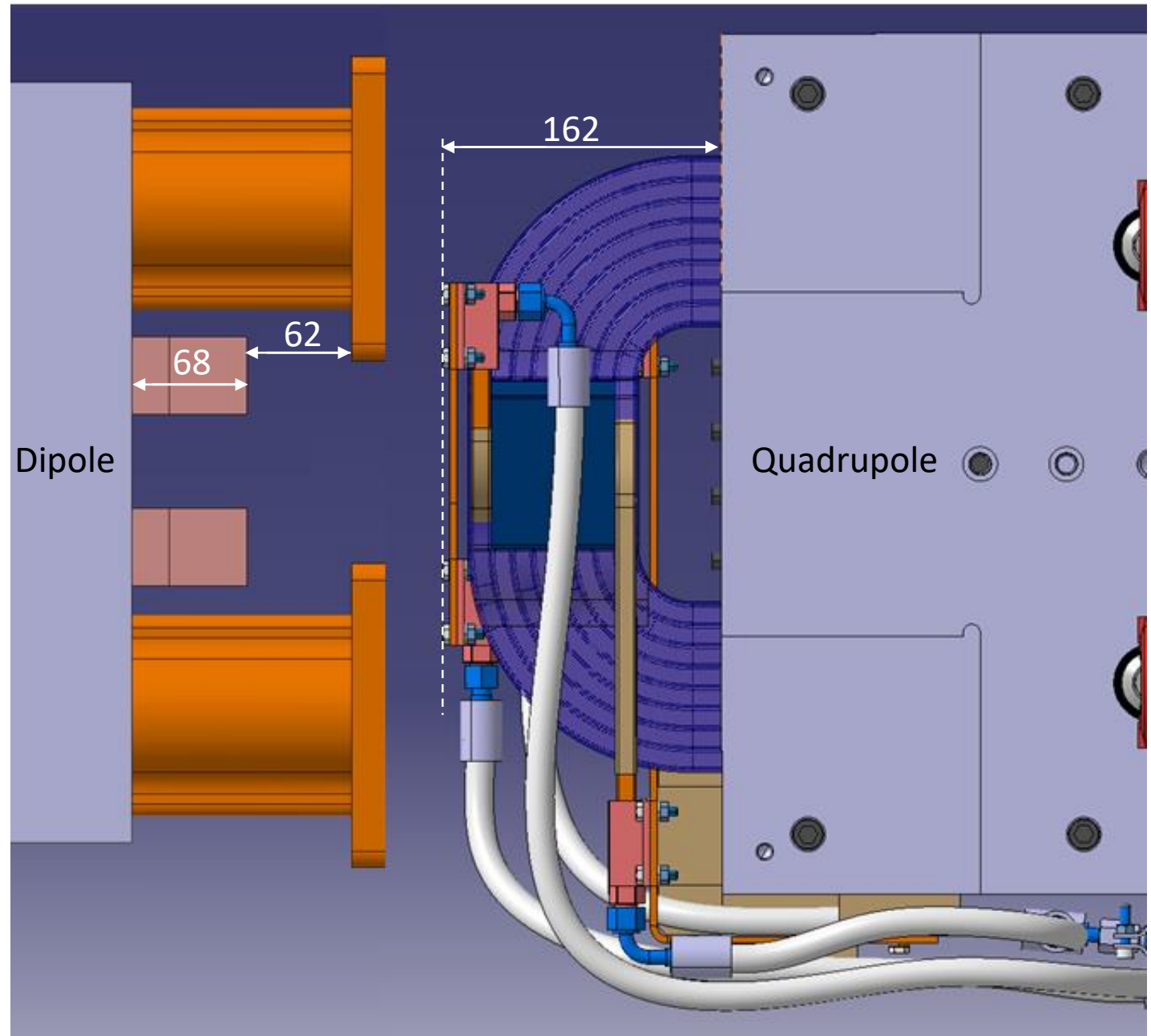
- Same coil dimensions as in prototype
- Assumes inter-beam width extended to at least 328 mm

2× ~12 m busbars to be welded together at interconnection



D-Q connection

- Assumes same dimensions as in prototypes
- Dimensions of interconnections not taken into account – only accounts for space needed by each magnet.



Sextupoles

- The S-S distance assumed in the optics model is 100 mm.
- Only a conceptual cross section of the magnet exists at this stage, the 3D will be developed this year.
- From existing similar size sextupoles, we estimate that:
 - The space required on either sides of the magnet for power and cooling connections is 80 mm;
 - Additional space may be required if flanges are needed between the two sextupoles, but we would assume that they can be assembled with a common vacuum pipe going through the two magnets (to be confirmed by TE-VSC)

→ S-S distance 160 mm