ePIC Silicon Vertex Tracker

Concepts for a 4 LAS Wide Stave

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4 LAS Wide Stave

- Moving to 4 LAS wide staves increases options for stave layouts (odd number of modules along the stave length

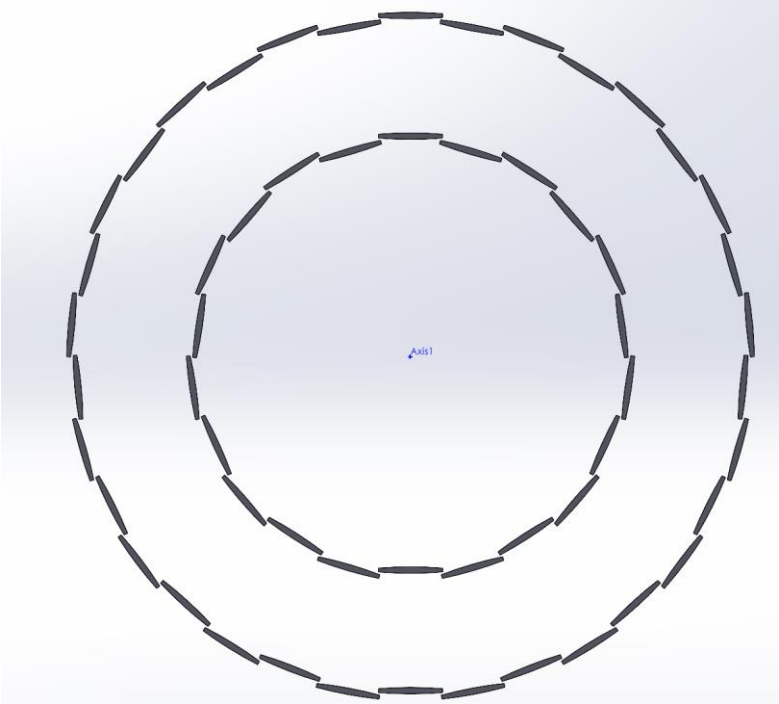
Layer/Radius (mm)	Length (mm)	Number of 5 RSU LAS	Number of 6 RSU LAS
L3 / 270	540	4.98 (5)	4.15 (4)
L4 / 420	840	7.76 (8)	6.46

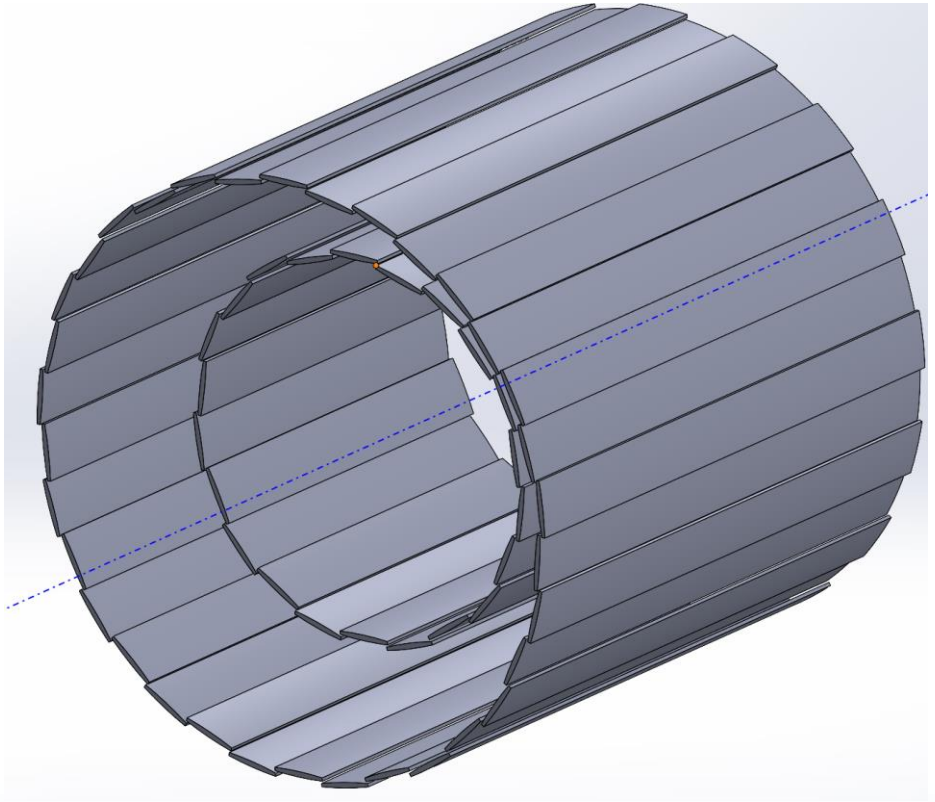
Current
Option

5 RSU Length	=5*21.667 = 108.3 mm
6 RSU Length	=6*21.667 = 130.0 mm

- Currently each FPC carries the data/power/control for 2 modules (4 LAS), a 4 LAS wide stave would need double the FPC width (7 mm) per 4 LAS module

Stave Layout



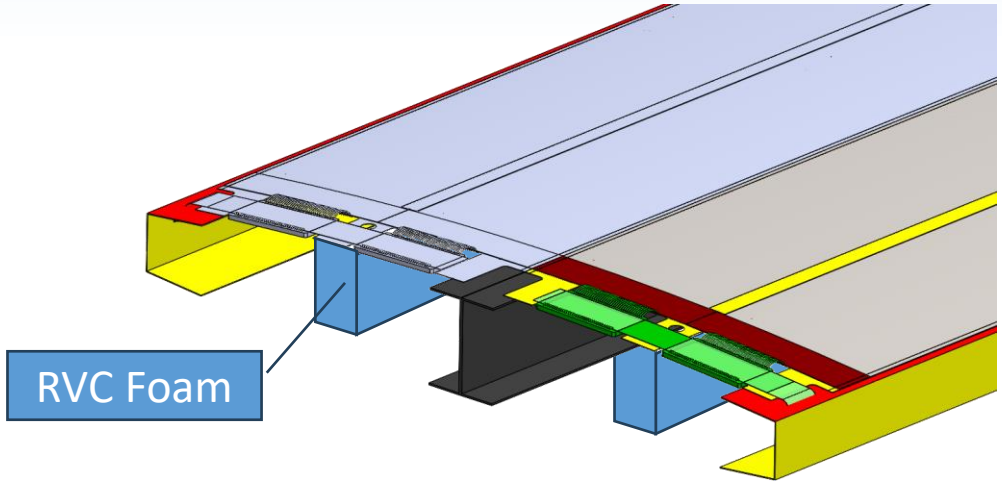


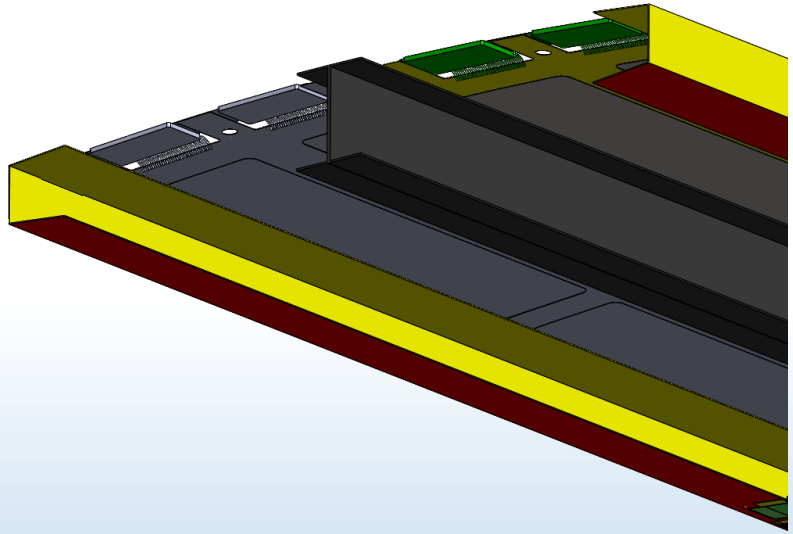
- L4 (34 Stave)
  - Outer 424 mm
  - Inner 416 mm
- L3 (22 Stave)
  - Outer 274 mm
  - Inner 266 mm

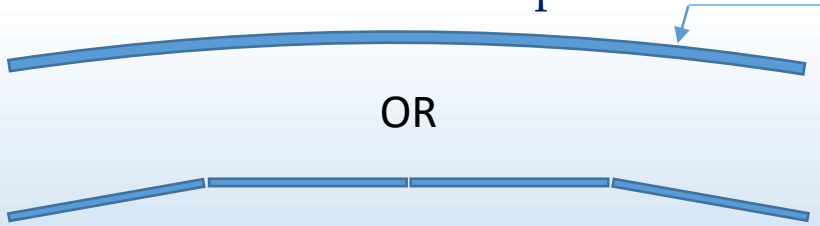
Internal Structure

- Previous FPC arrangements only had traces on one C-channel “wing”
- Options:
  - Have 2 bridge FPC per module
    - Need left/right-handed modules
    - Bridge FPC exits opposite side on half of the modules

  OR
  - Bridge FPC joins 4 LAS
- More symmetric FPC layout
  - TBD if asymmetry of FPC traces will cause issues with stave deformation
- Internal pressure more of an issue for wider staves
  - ⌀400 curvature or angled end LAS to reduce deformation due to internal pressure



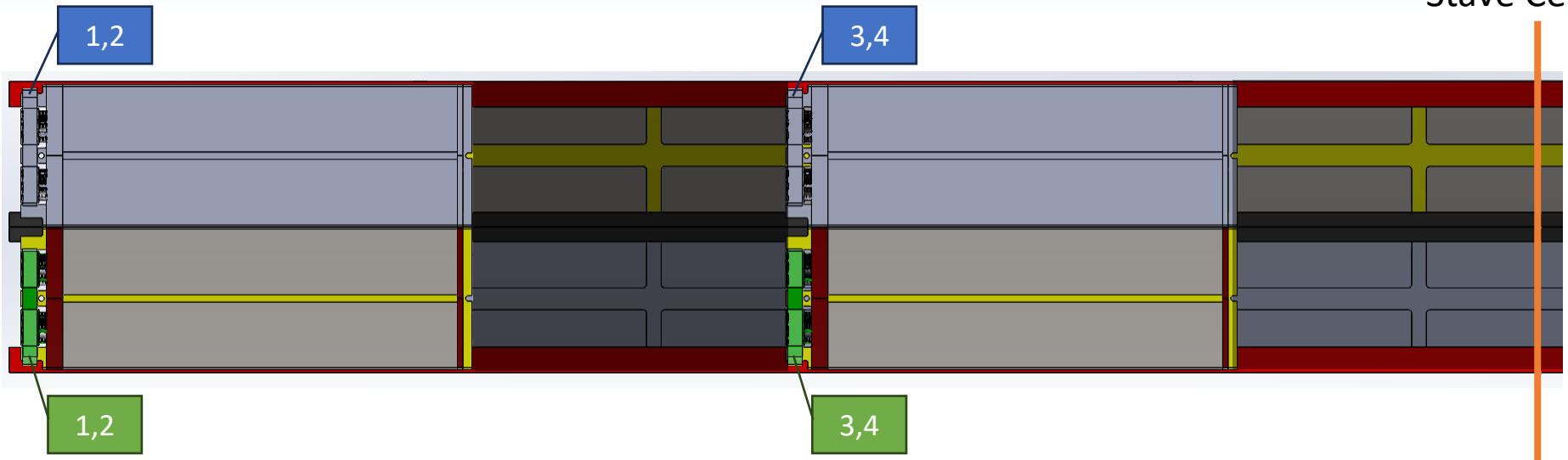




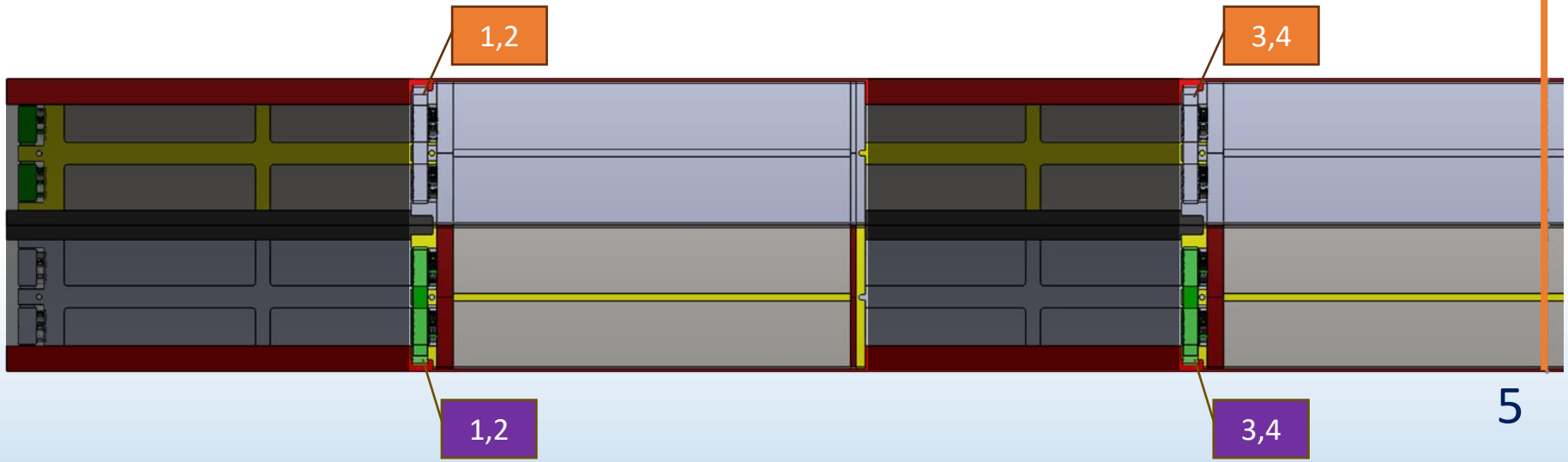
L4 FPC Arrangement – 2 LAS Module

Stave Centre

Top Side



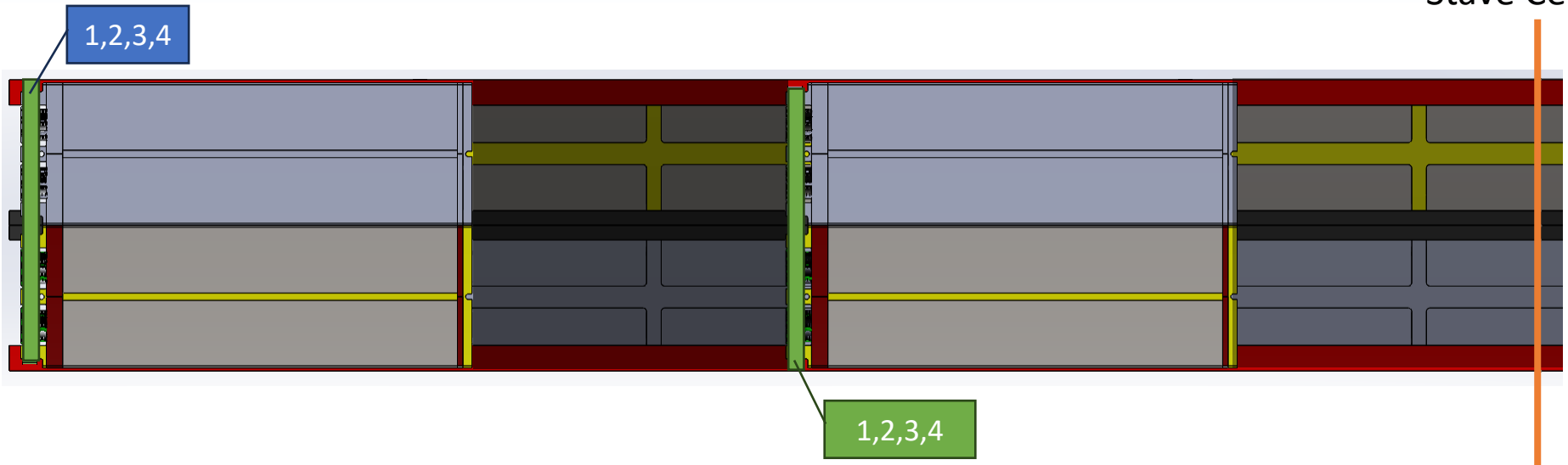
Bottom Side



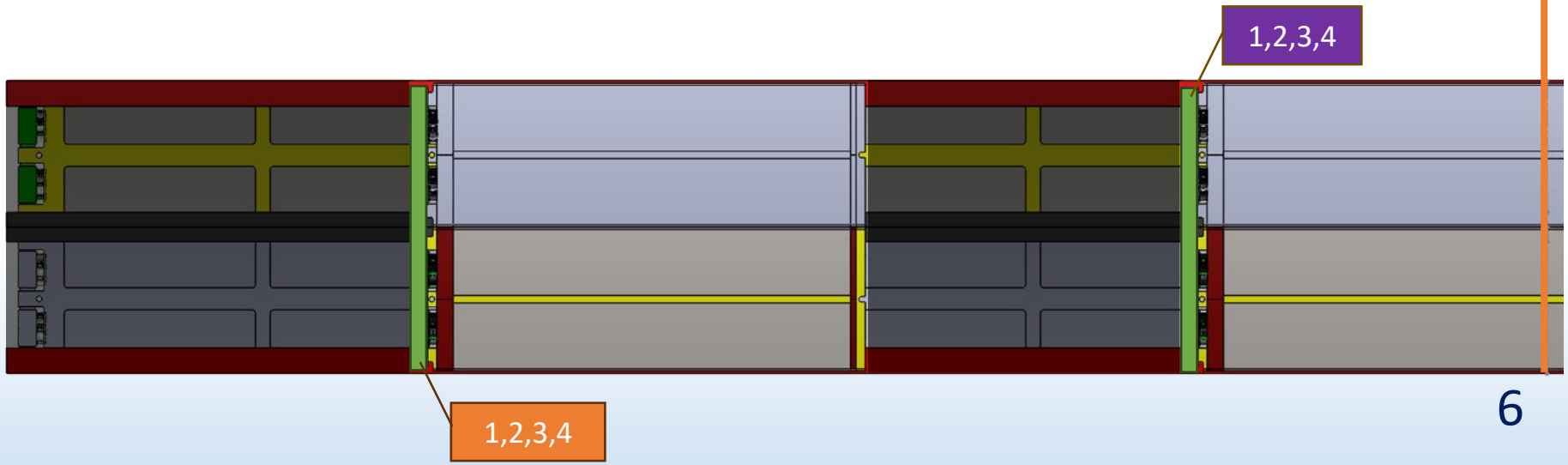
L4 FPC Arrangement – 4 LAS Module

Stave Centre

Top Side

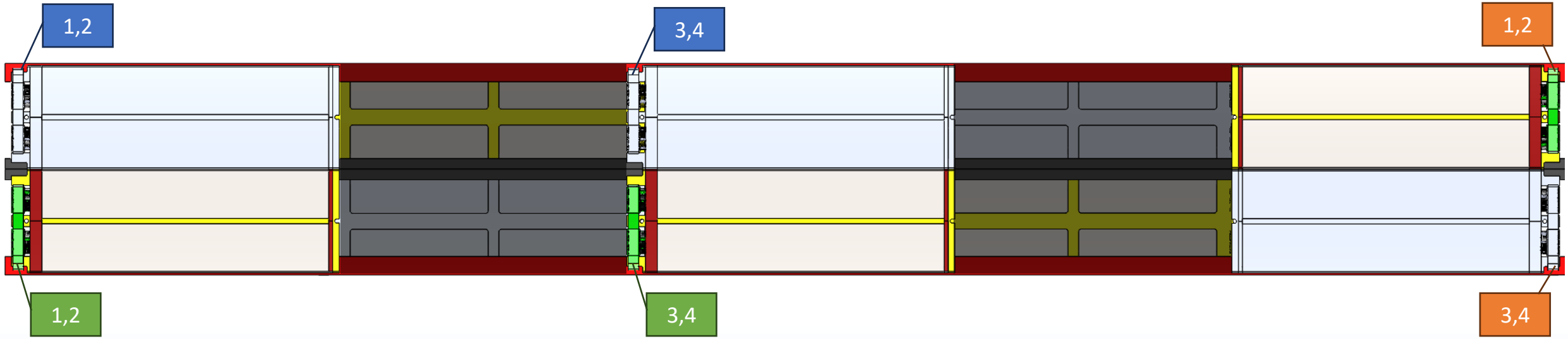


Bottom Side



5 RSU L3 Considerations

- Need to find room for an additional FPC location
  - Along Central I beam
  - Flip modules so bridge FPCs connections meet in the middle



Conclusions

- Benefits
  - Could build all staves from 5 RSU LAS
    - If disc layers need 6 RSU, is this a benefit?
  - Higher tortional stiffness
  - Less service connections for coolant
  - L4 FPC more symmetric
  - Half as many staves to manufacture
- Drawbacks
  - May require multiple module versions (flipped bridge FPC)
  - LAS deformation due to internal pressure likely to be higher
  - Each stave is more complex