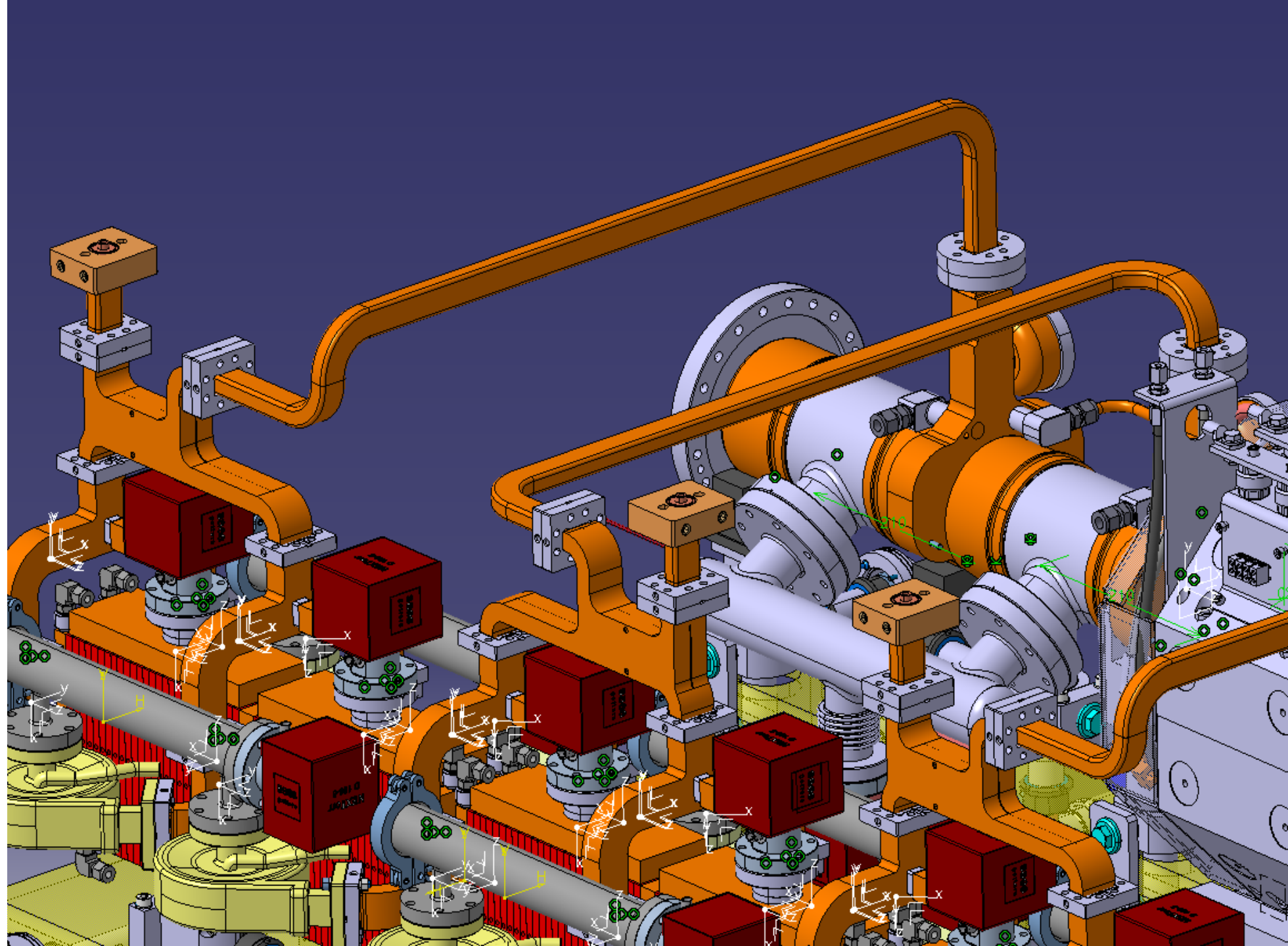
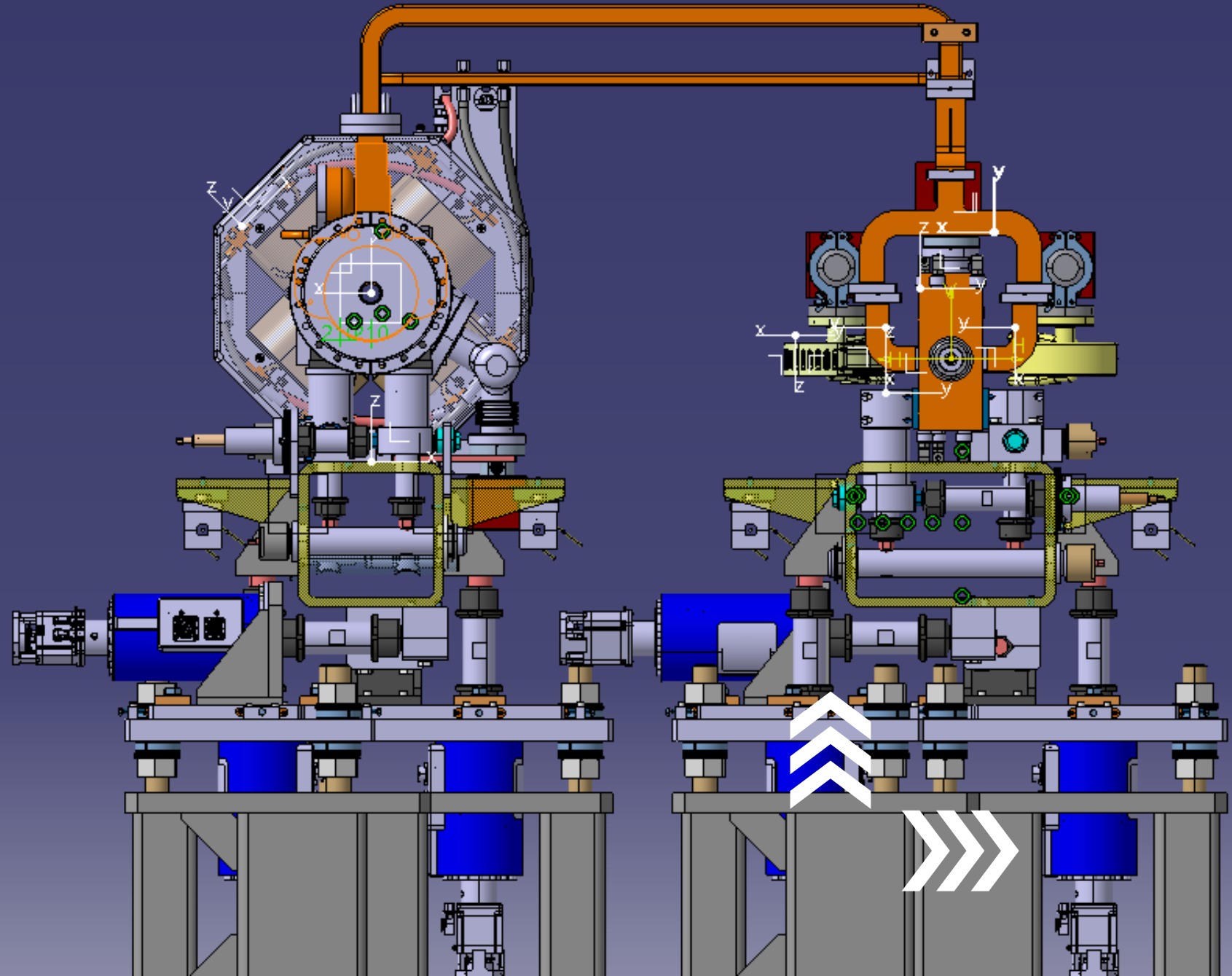


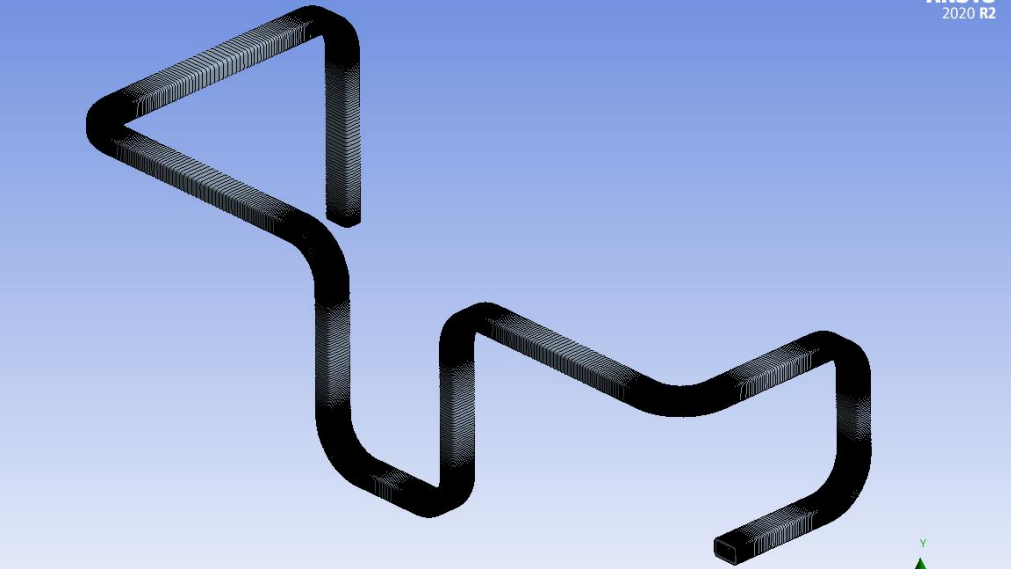
RF transfer
guides
between
main and
drive beam



Recap

- A Degree of flexibility is required between the main, and drive mean without the introduction of a large reaction force on either structure.
- Needs to allow for X / Y movement

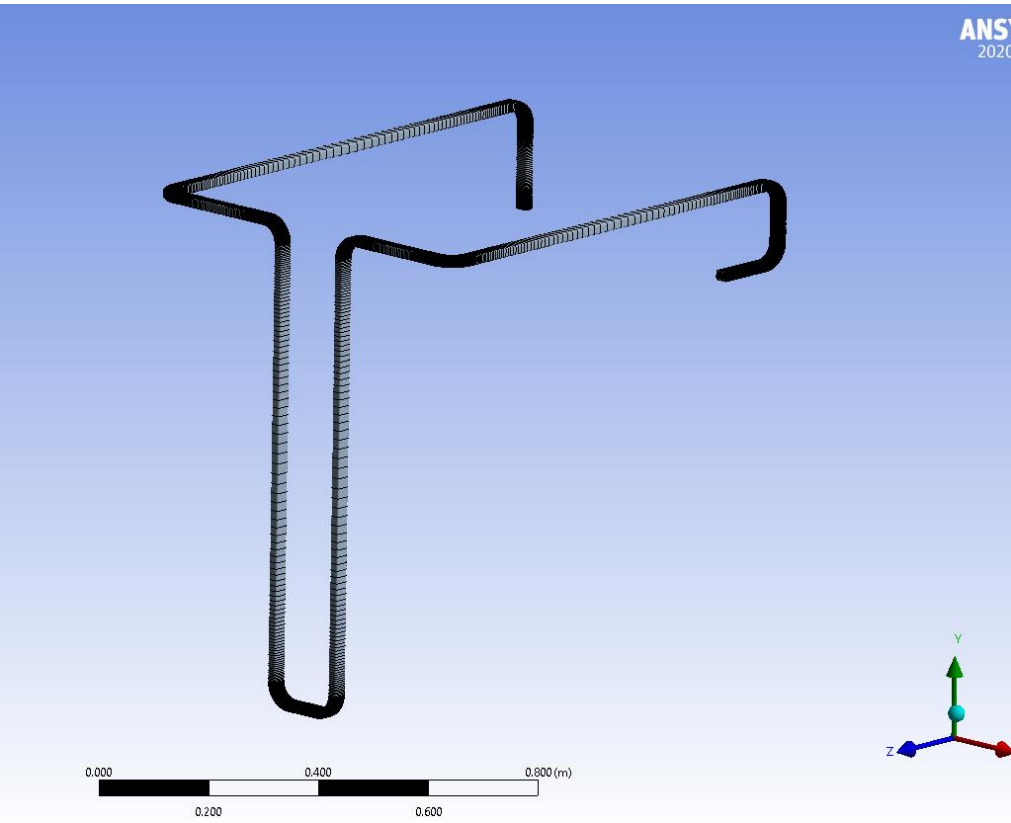




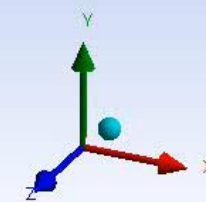
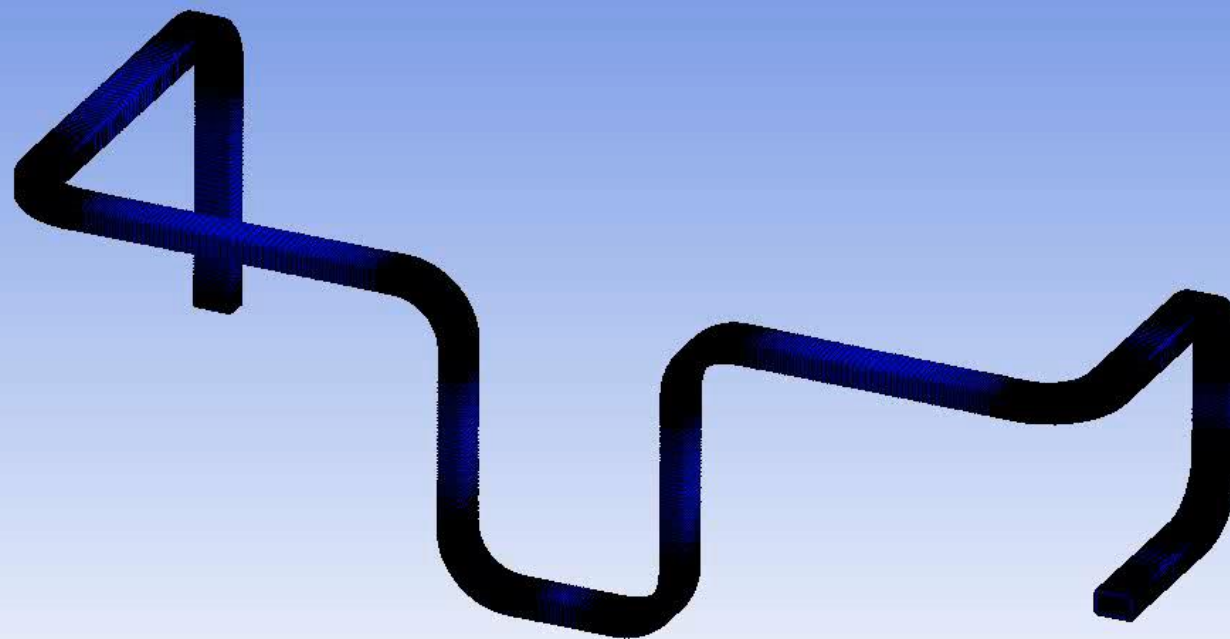
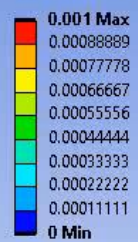
Study conducted to show the effect of adding chicanes in order to reduce reaction forces

Considerations include:

- Reducing the number of corners
- Reducing the total length
- Not obstructing to structure itself

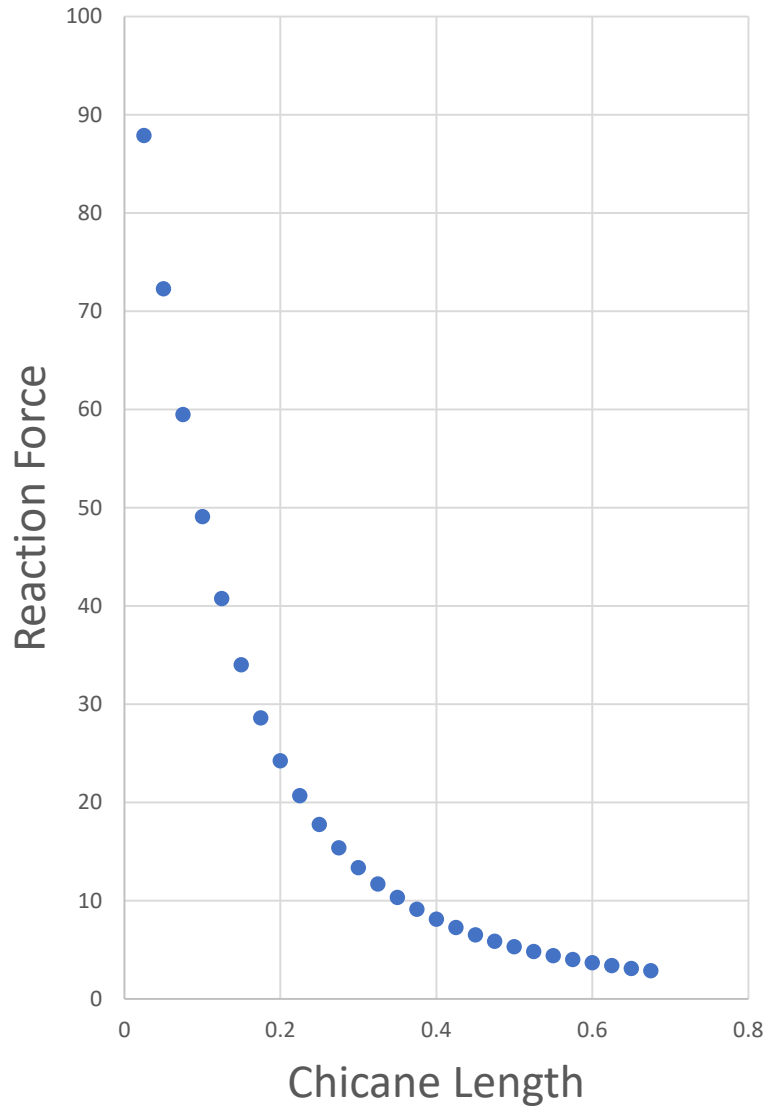


A: Static Structural
Total Deformation
Type: Total Deformation
Unit: m
Time: 0
25/10/2022 18:24

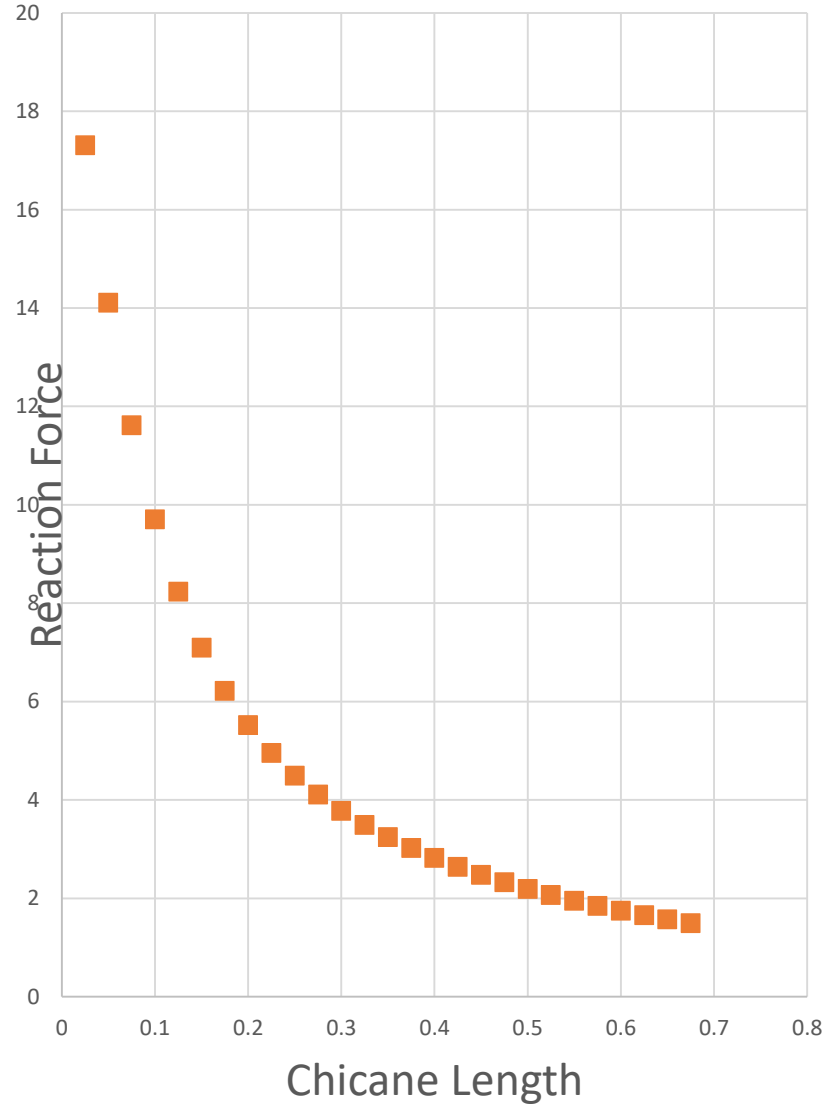


Single height data

Maximum Reaction vs Chicane Length in Horizontal Direcetion

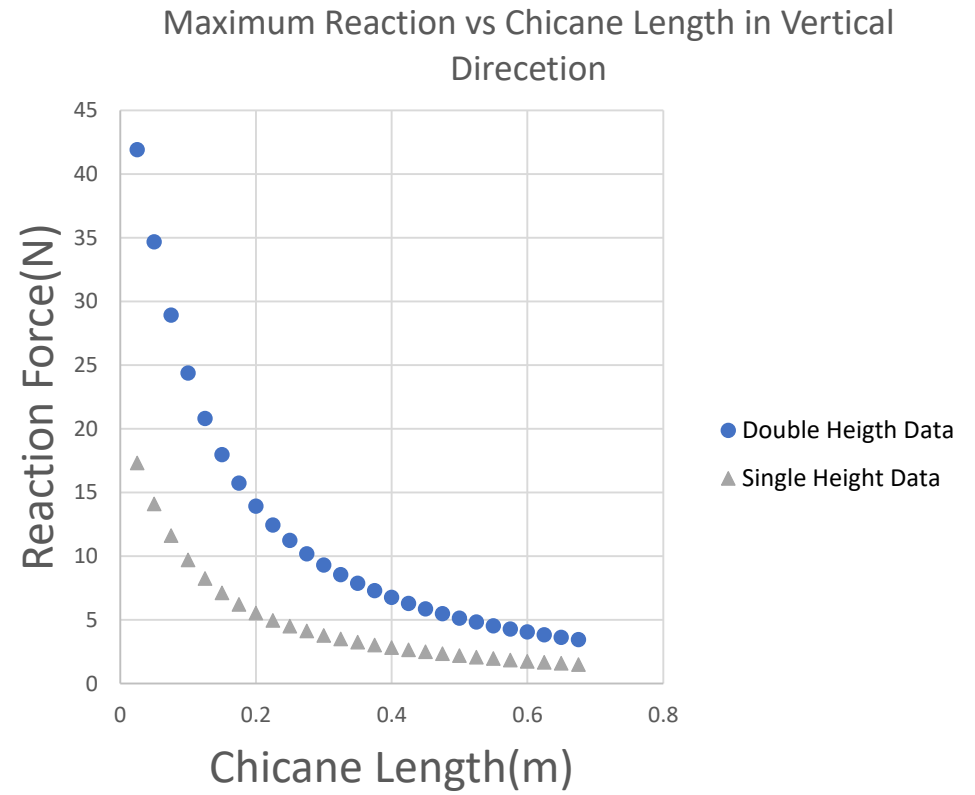
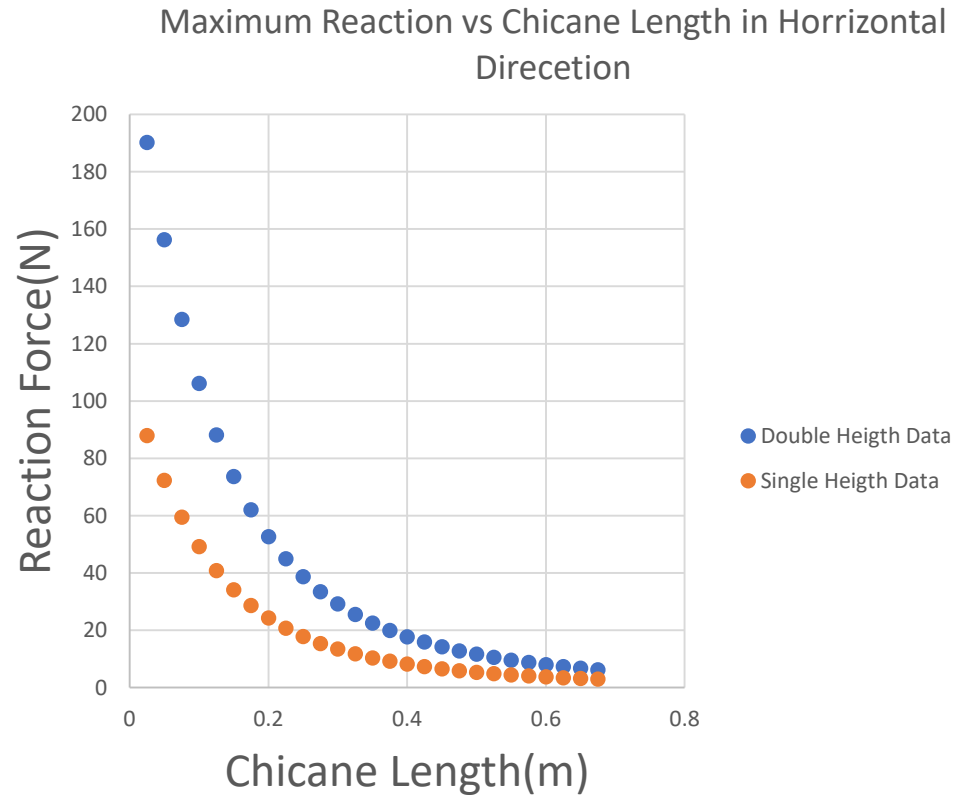


Maximum Reaction vs Chicane Length in Vertical Direcetion

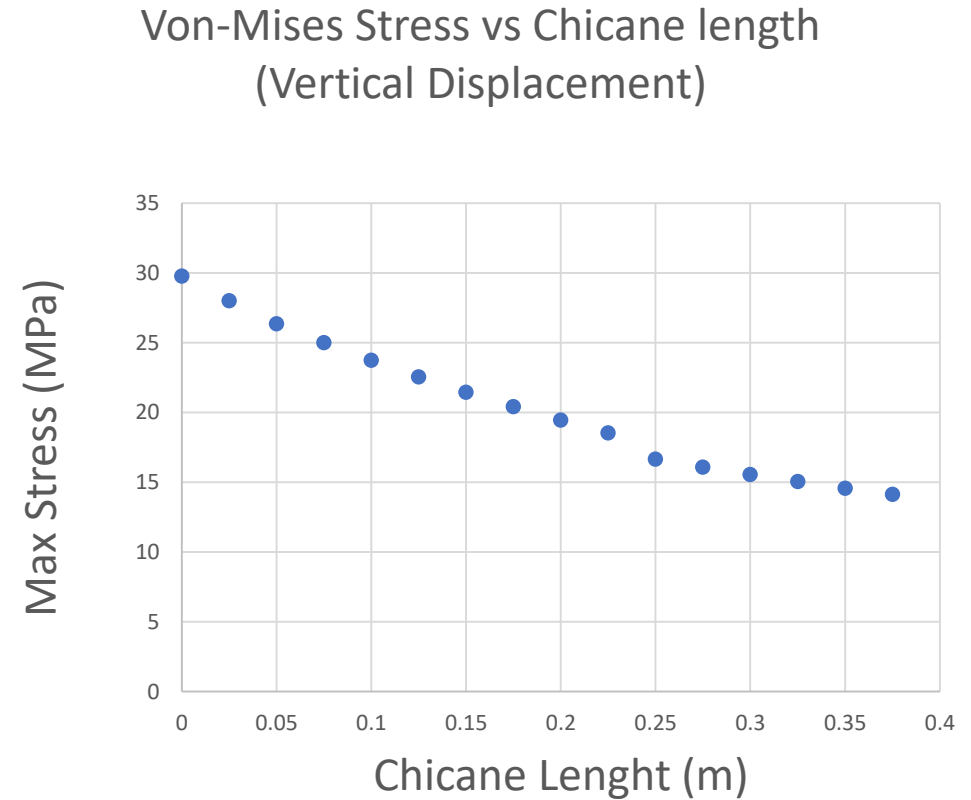
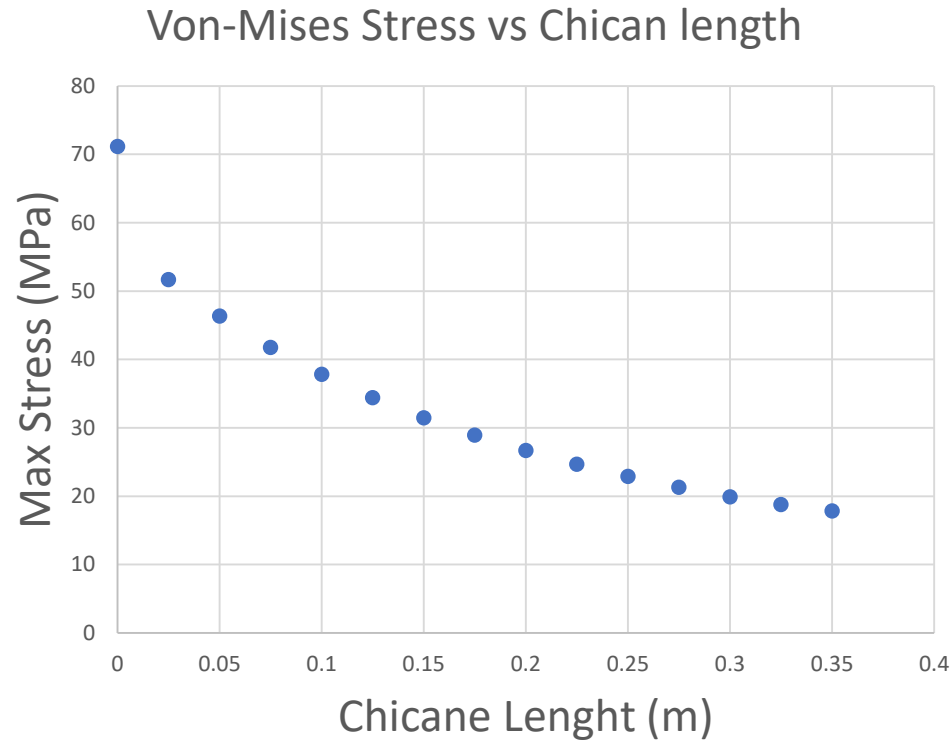


- Results show reaction forces can be reduced significantly by extending the length of added chicanes
- Other meshing techniques to be used to validate results further

Comparison of the single and double waveguide data

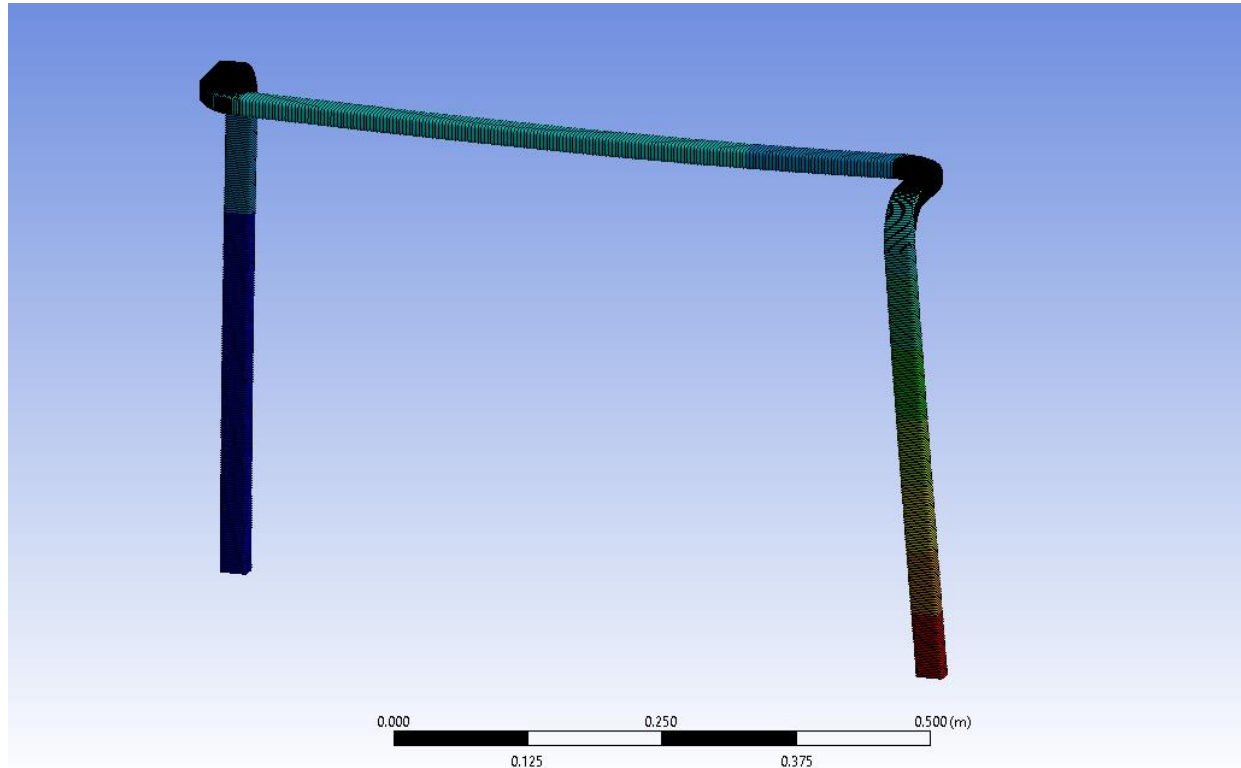


Evaluation of stress in the double height waveguide structure



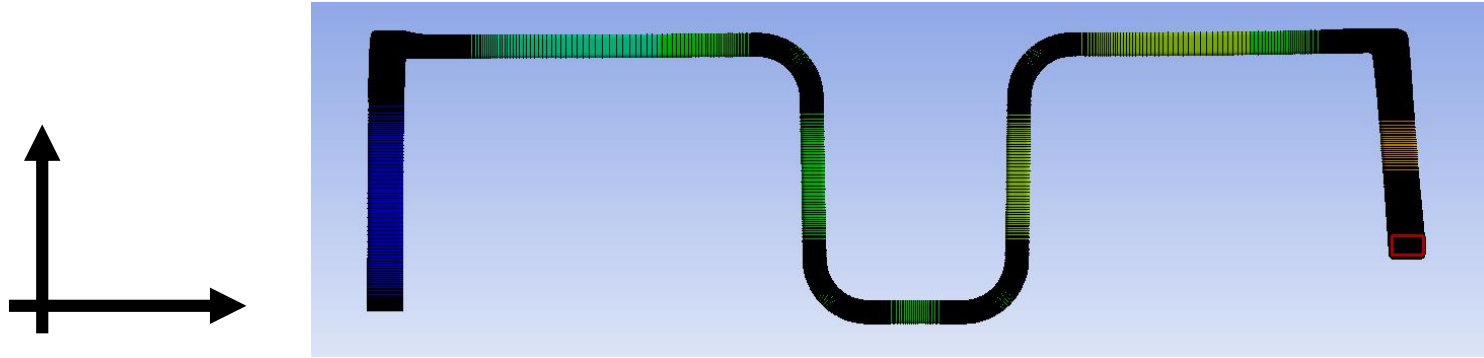
Yielding stress of Copper Waveguides = 33.3MPa → Chicane length is restricted to a minimum length

Single Height Configuration



- A waveguide configured in the following way reduces the number of corners overall from 10 to just 4 while keeping the force reaction near 20N (level required to keep structure disk displacement up to 2 microns)
- This design is likely only feasible for a single-height waveguide in the drive beam style module, as the double-height waveguide structure would be notably taller
- The length of this design is also shorter than that of the chicane design and less copper is needed

Final Notes



*The waveguide needs to support flexibility in the vertical and lateral axis.

- Using the single-height waveguide allows for shorter waveguide structures and may allow for the use of no chicanes
- Using the single-height configuration may dramatically reduce the number of bends
- Using a single height 4 corner configuration increases the size of the module by a notable amount (Approximately 400-600mm)
- Klystron CLIC design to be investigated. Chicanes unlikely to be needed due to the longer waveguides