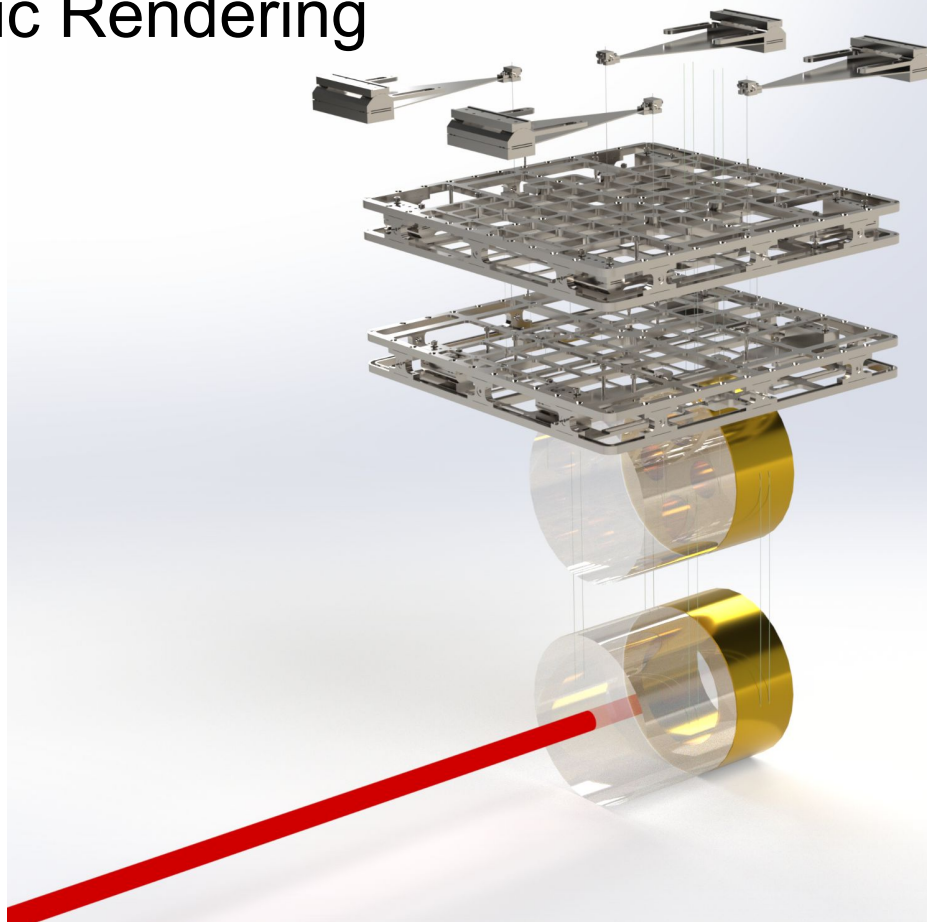


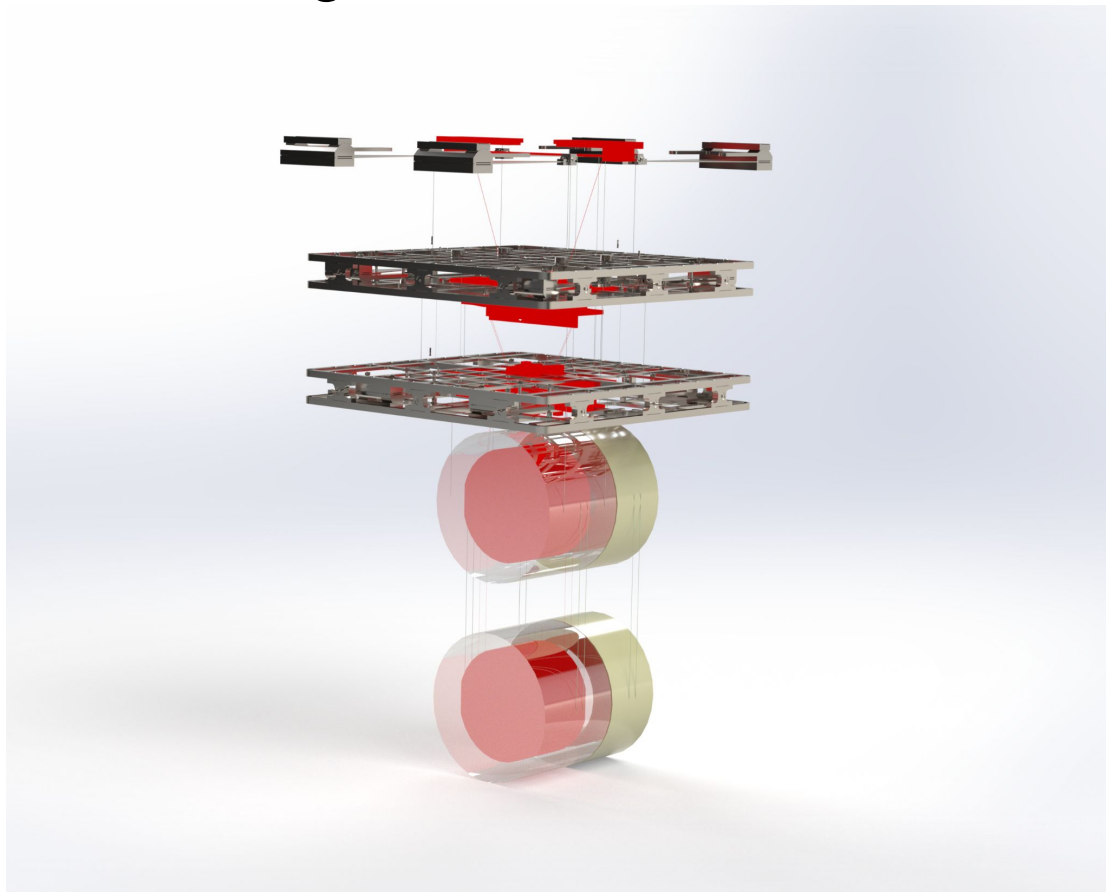
Design screenshots for A# BHQS, A# BHQS Prototype and A+ Quad Suspension

LIGO-G2401599
JD Heyns

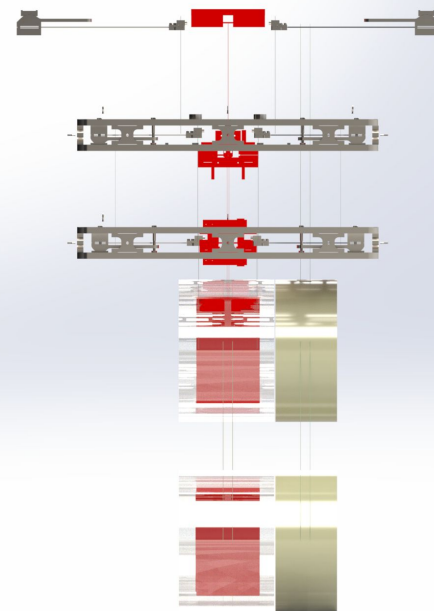
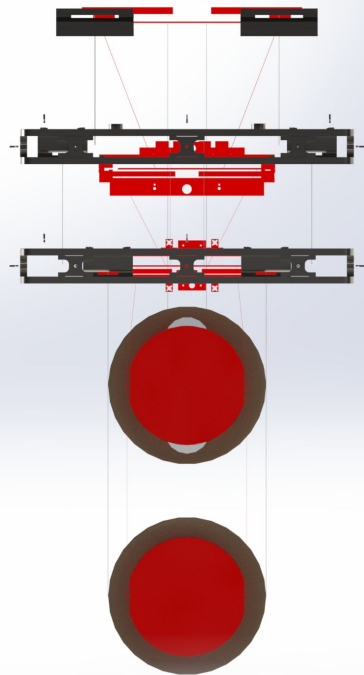
A# Realistic Rendering



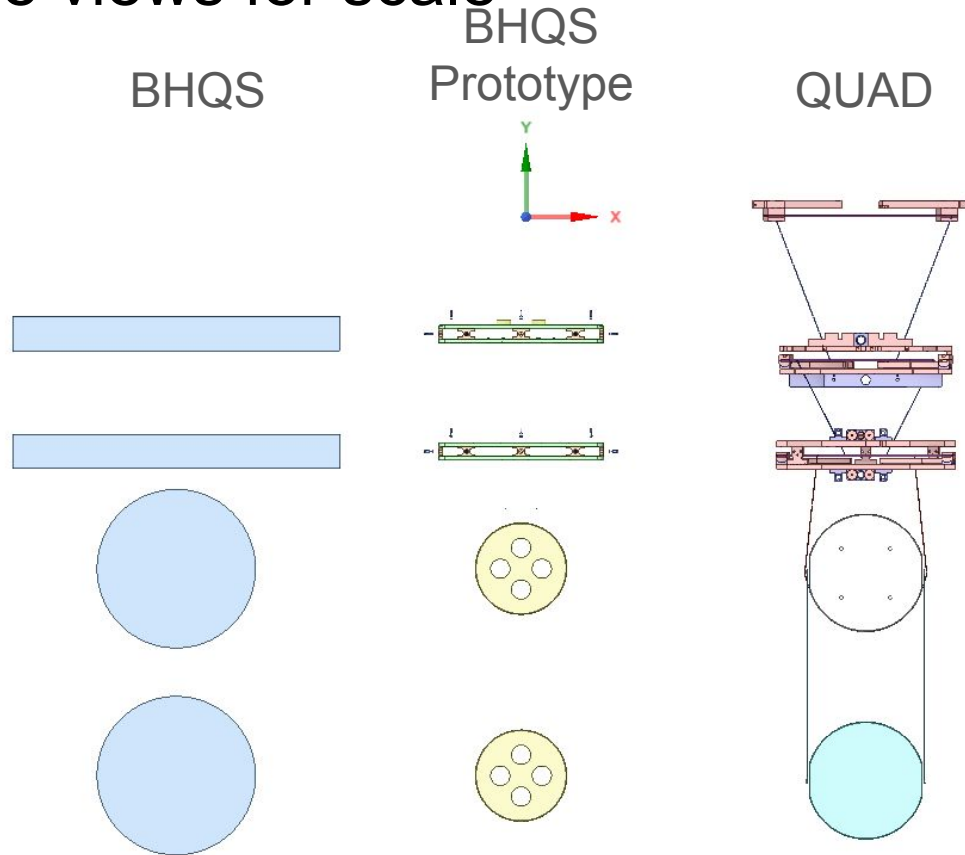
A# Realistic Rendering



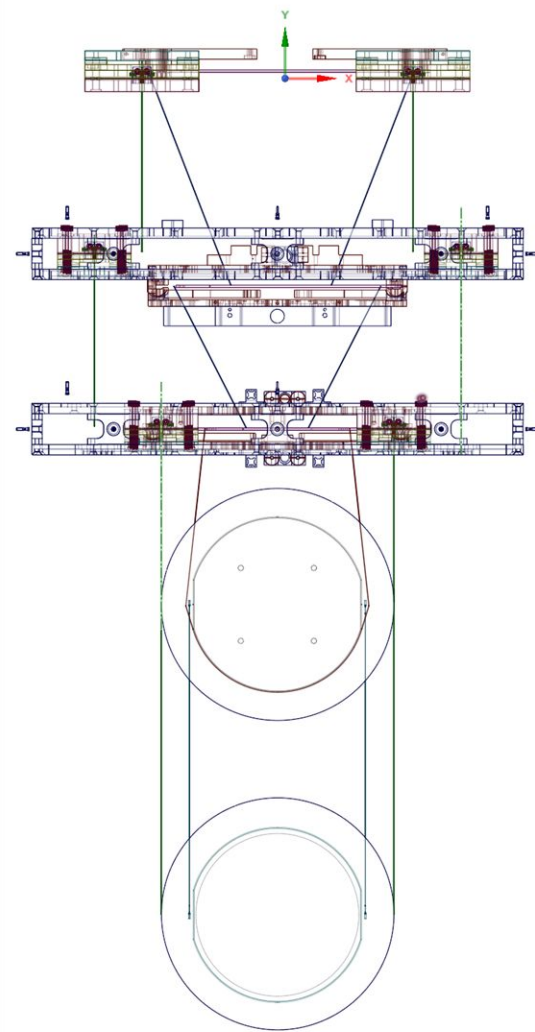
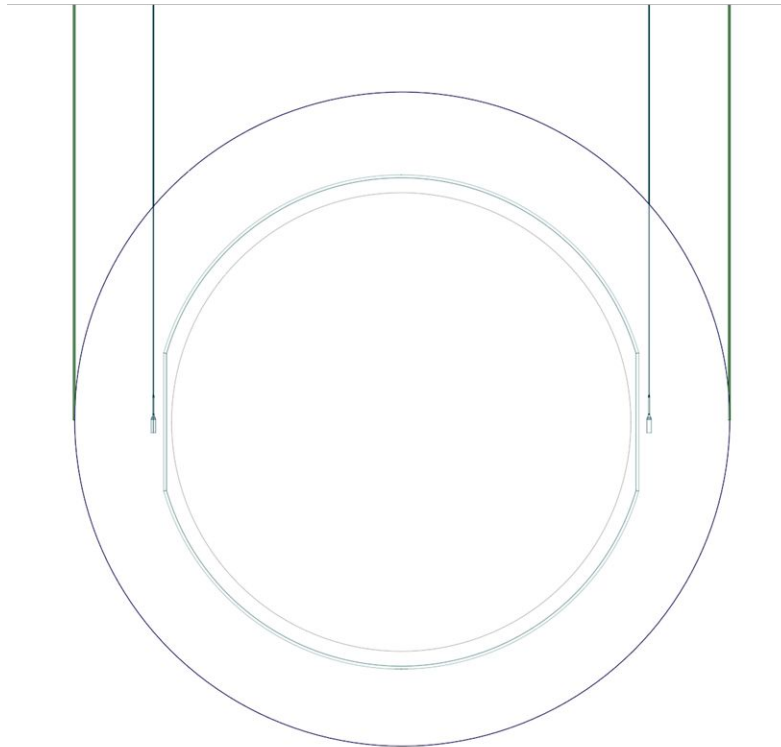
A# Realistic Rendering



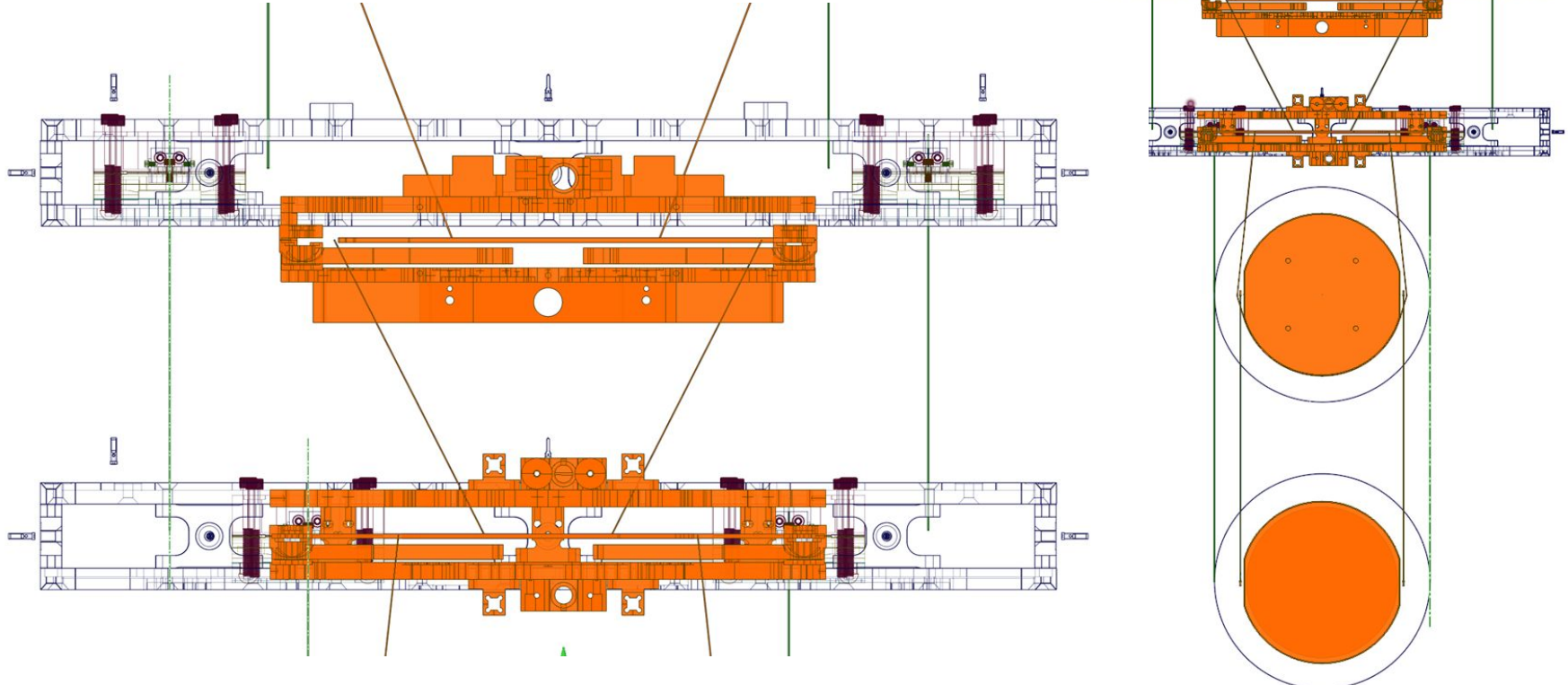
Side-by-side views for scale



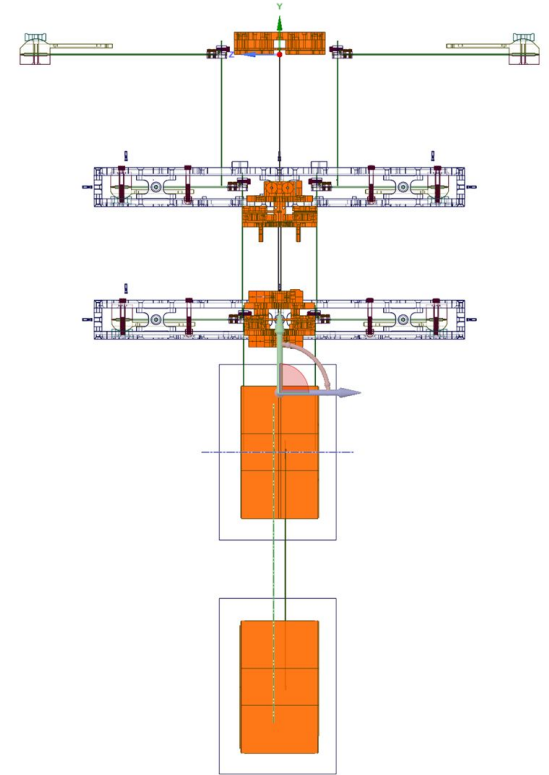
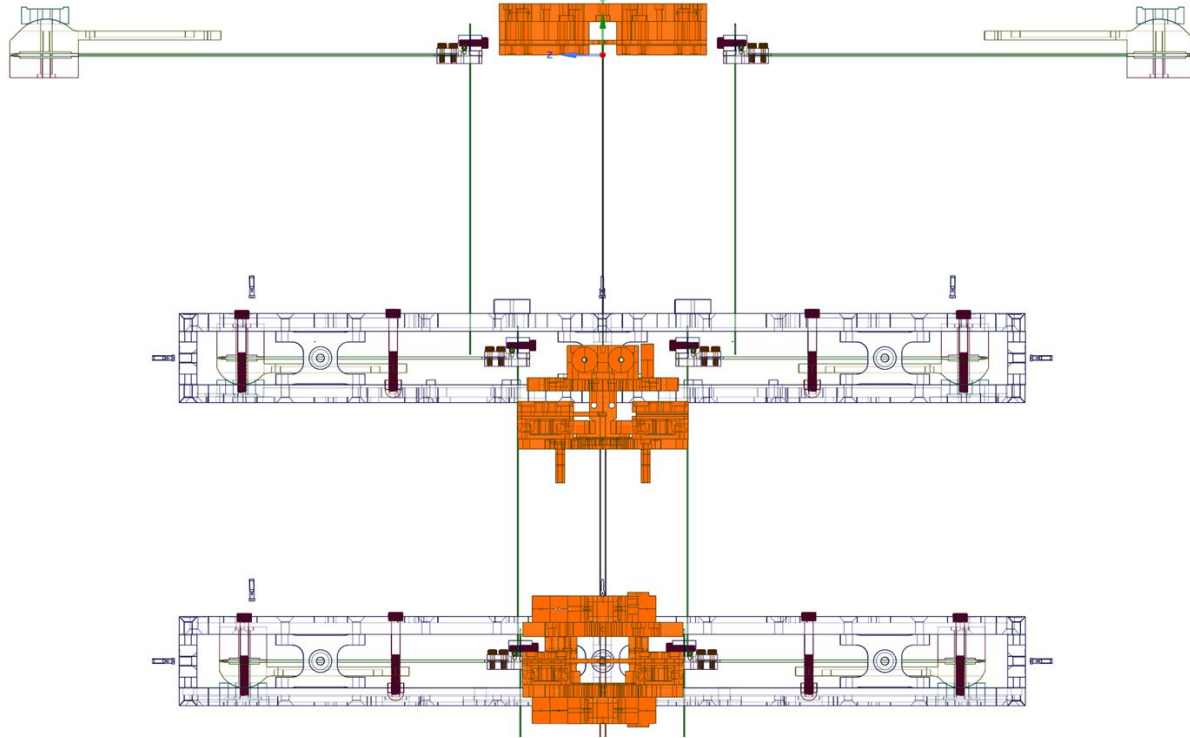
A# vs A+ Quad: Larger Optic



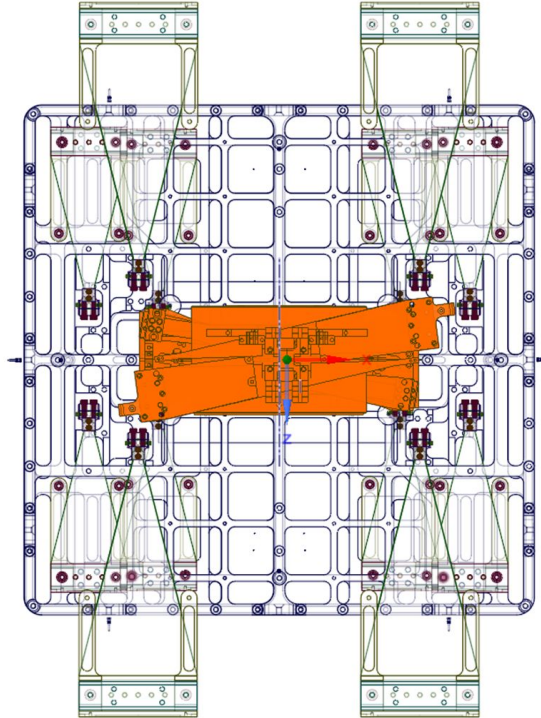
A# vs A+ Quad: Larger Upper Stages



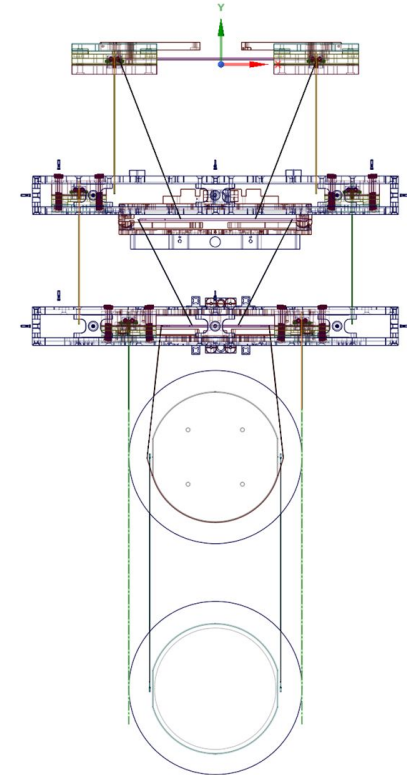
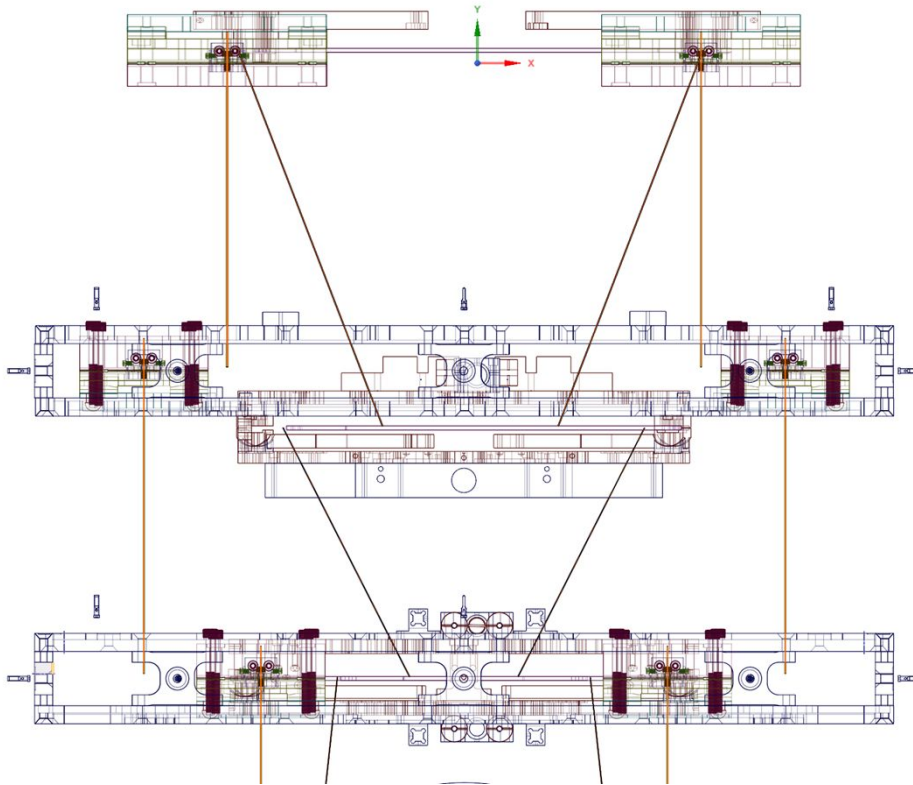
A# vs A+ Quad: Larger Upper Stages



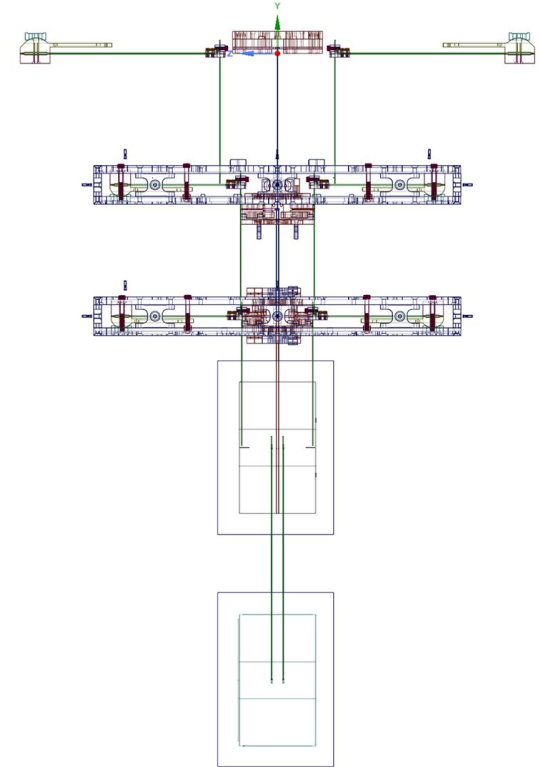
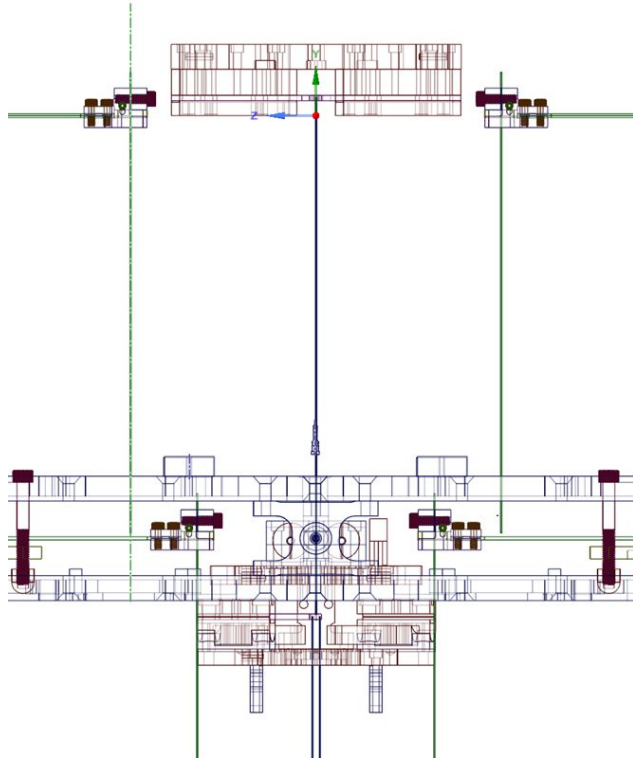
A# vs A+ Quad: Larger Upper Stages



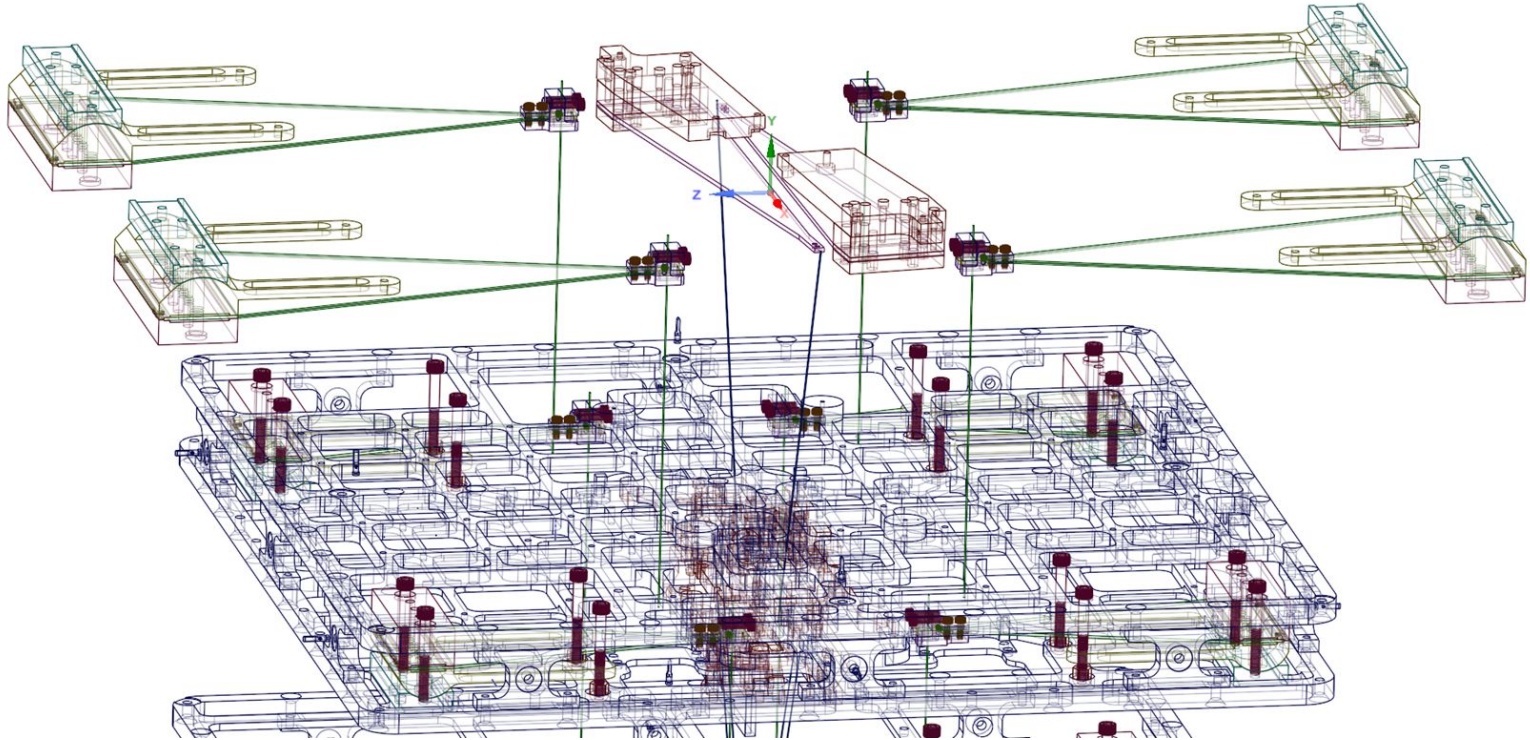
A# vs A+ Quad: Vertical wires



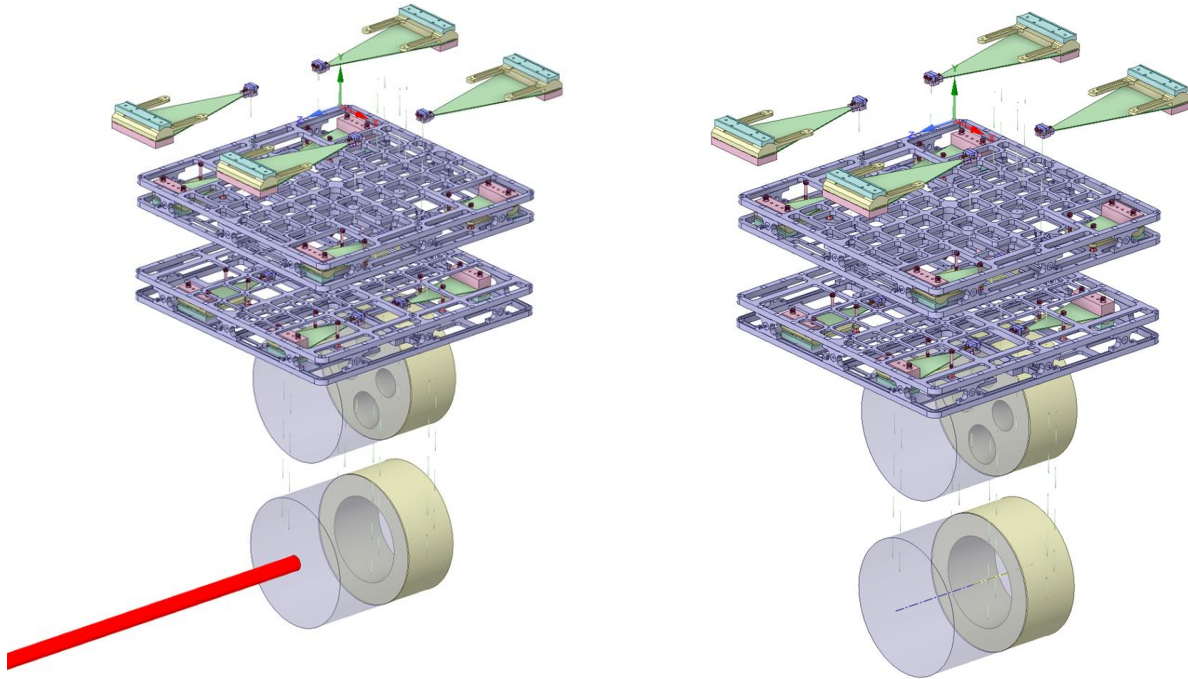
A# vs A+ Quad: 4 Wires from Top Stage



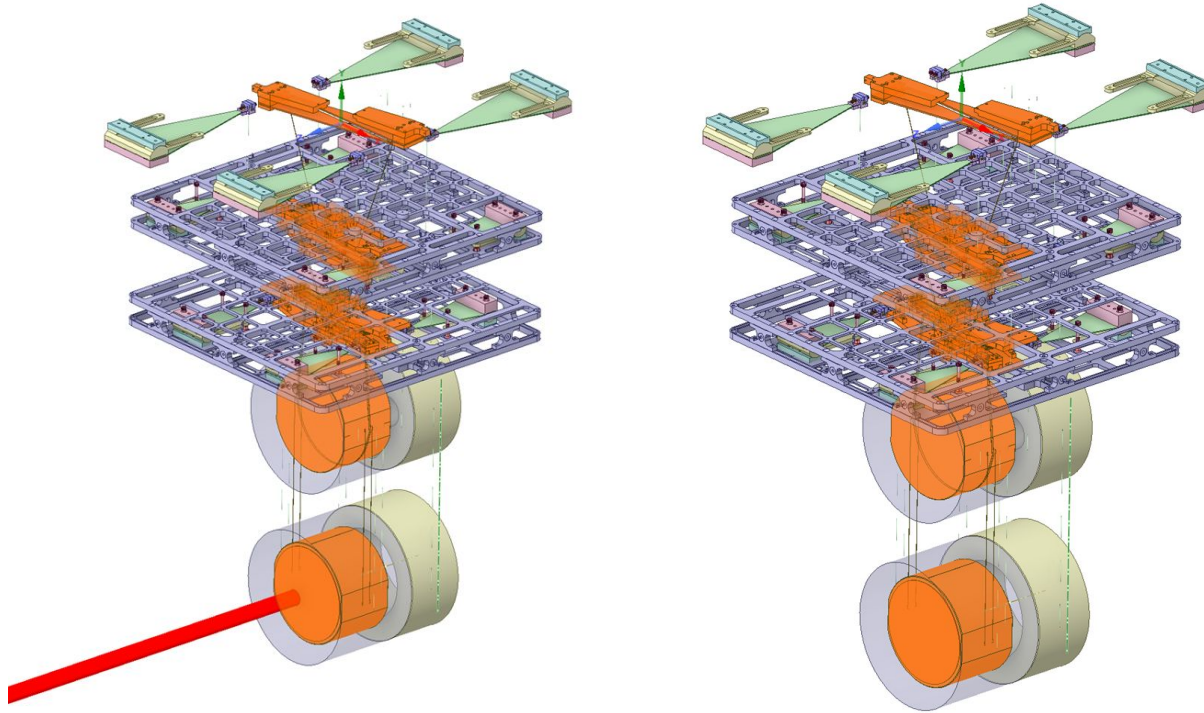
A# vs A+ Quad: 4 Wires from Top Stage



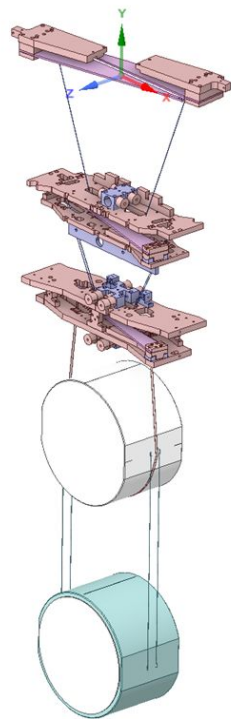
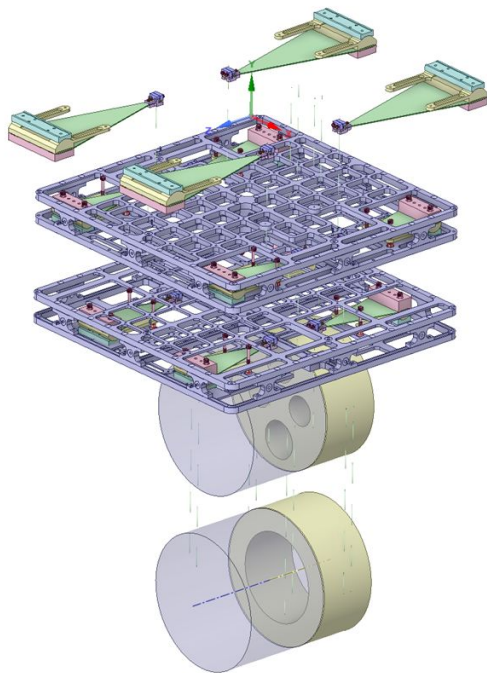
A# vs A+ Quad: Double Stage Reaction Chain



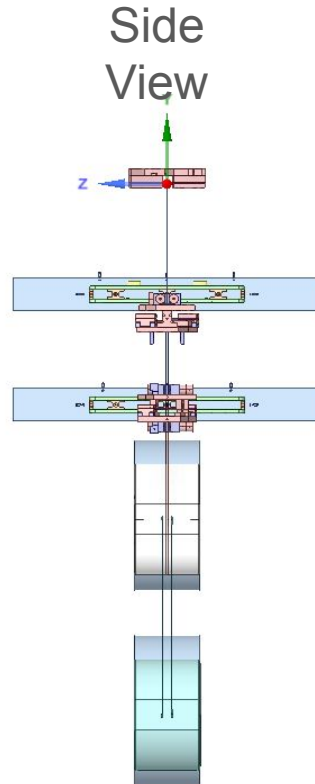
A# vs A+ Quad: Double Stage Reaction Chain with A+



A# vs A+ Quad

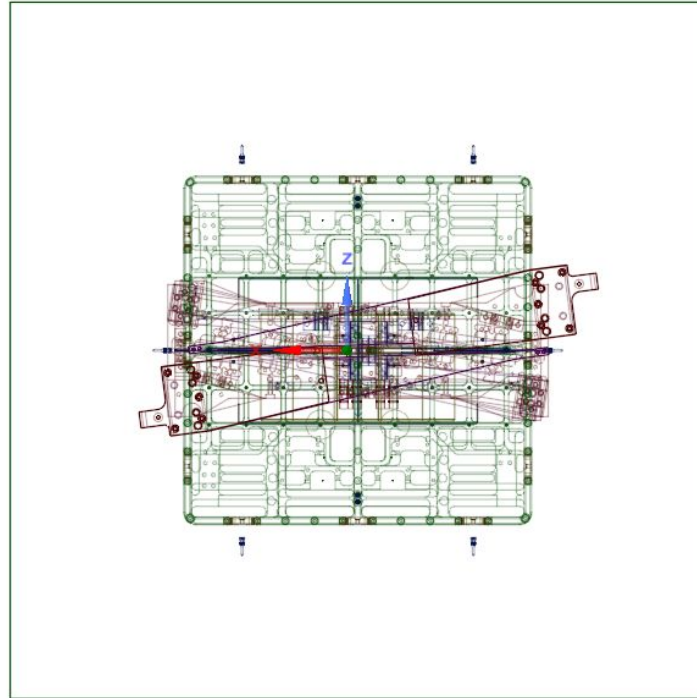


Side-by-side views for scale



Side-by-side views for scale

Top view

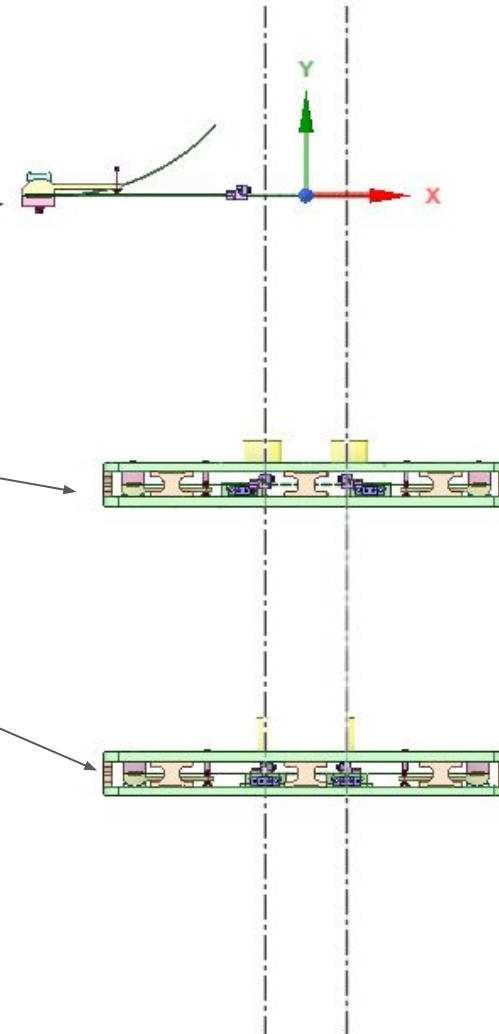
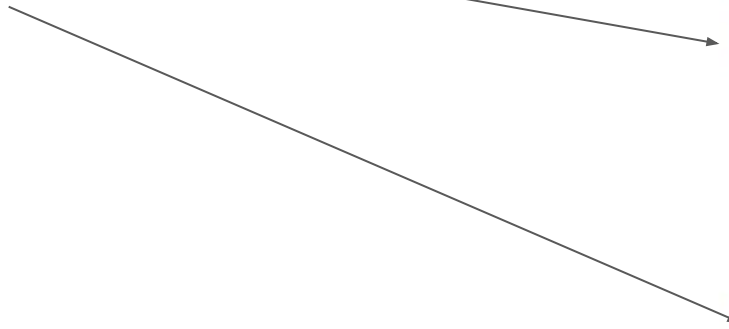


Current design review

Top Stage

TOP Mass

UIM Mass

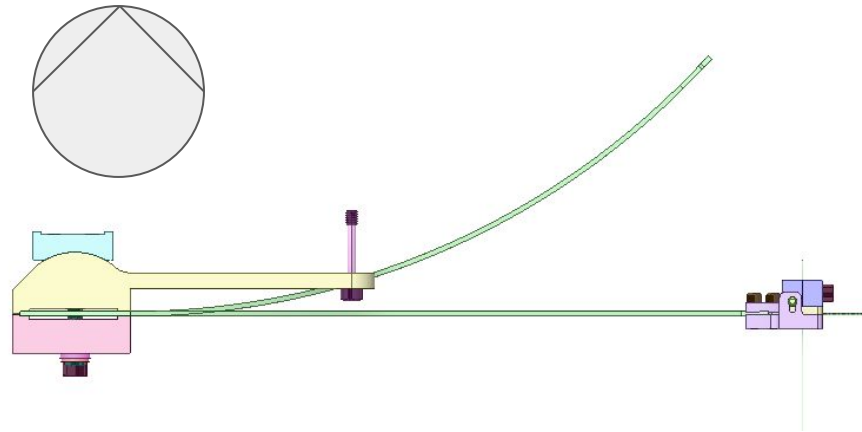
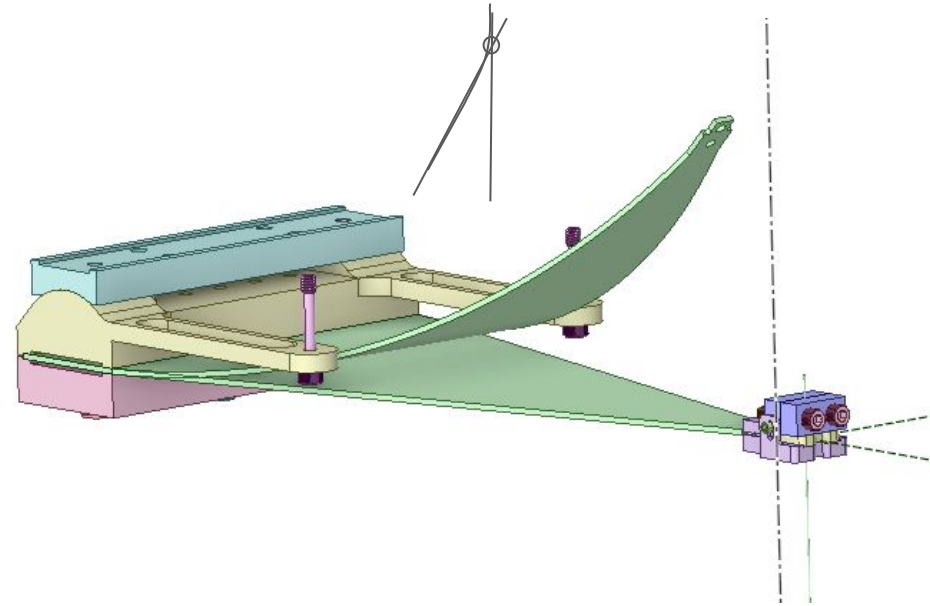


Current design review

Top Stage

TOP Mass

UIM Mass

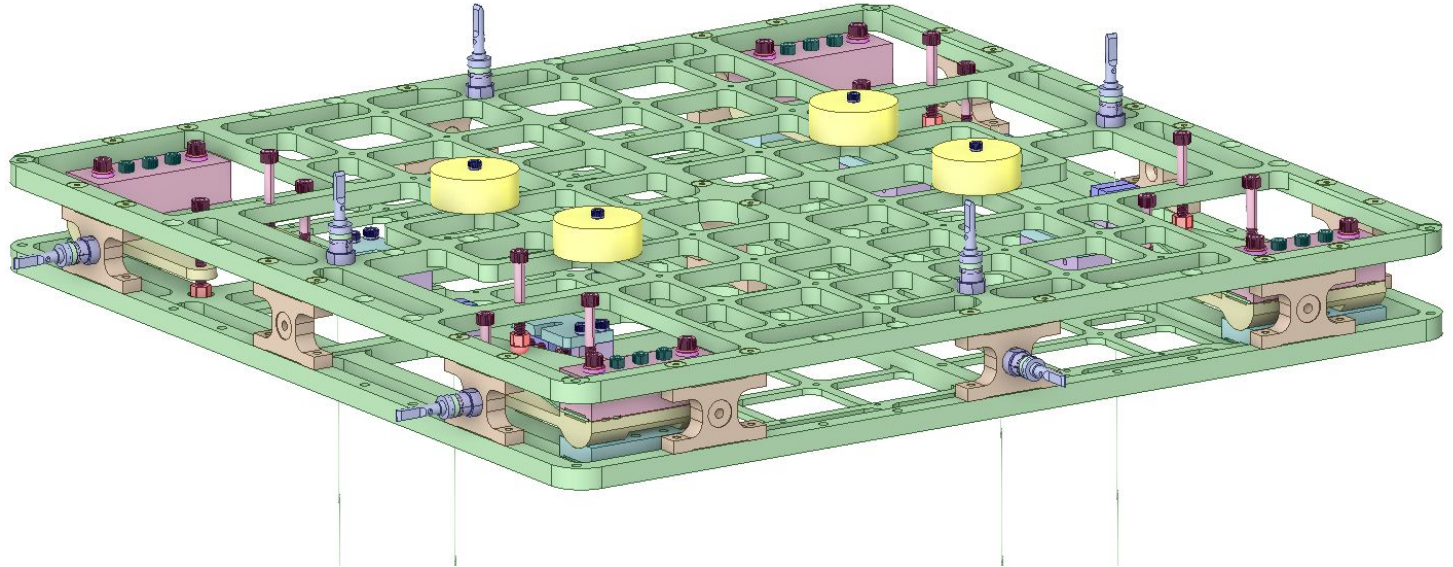


Current design review

Top Stage

TOP Mass

UIM Mass



Current design parameters: TOP Mass

Top Stage

TOP Mass

UIM Mass

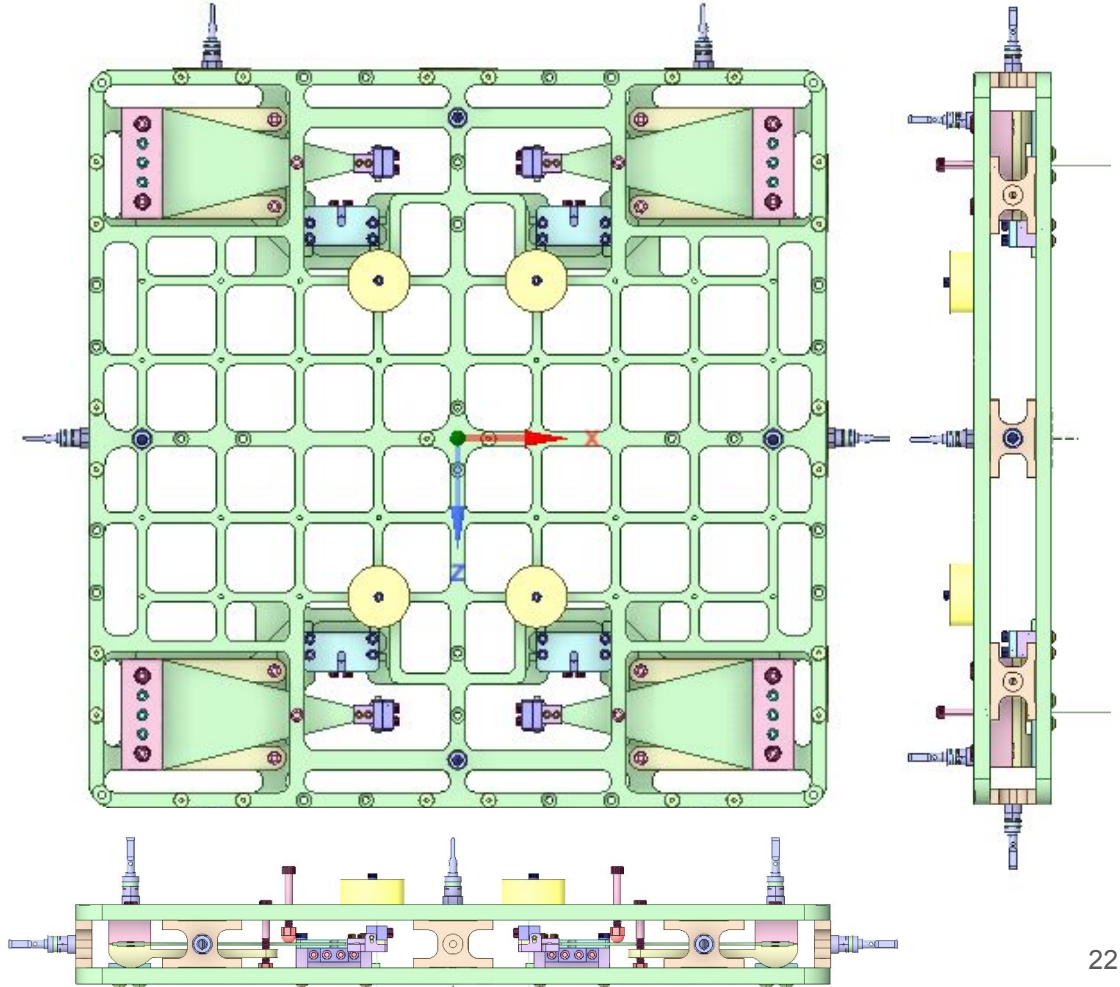
Parameter	Target	Achieved
Mass	14 040 g	14 040 g
Center of Mass offset	0 μm	6 μm
Yaw Moment of Inertia	0.64 kgm^2	0.66 kgm^2
Pitch Moment of Inertia	0.37 kgm^2	0.33 kgm^2
Roll Moment of Inertia	0.37 kgm^2	0.34 kgm^2

Current design review

Top Stage

TOP Mass

UIM Mass

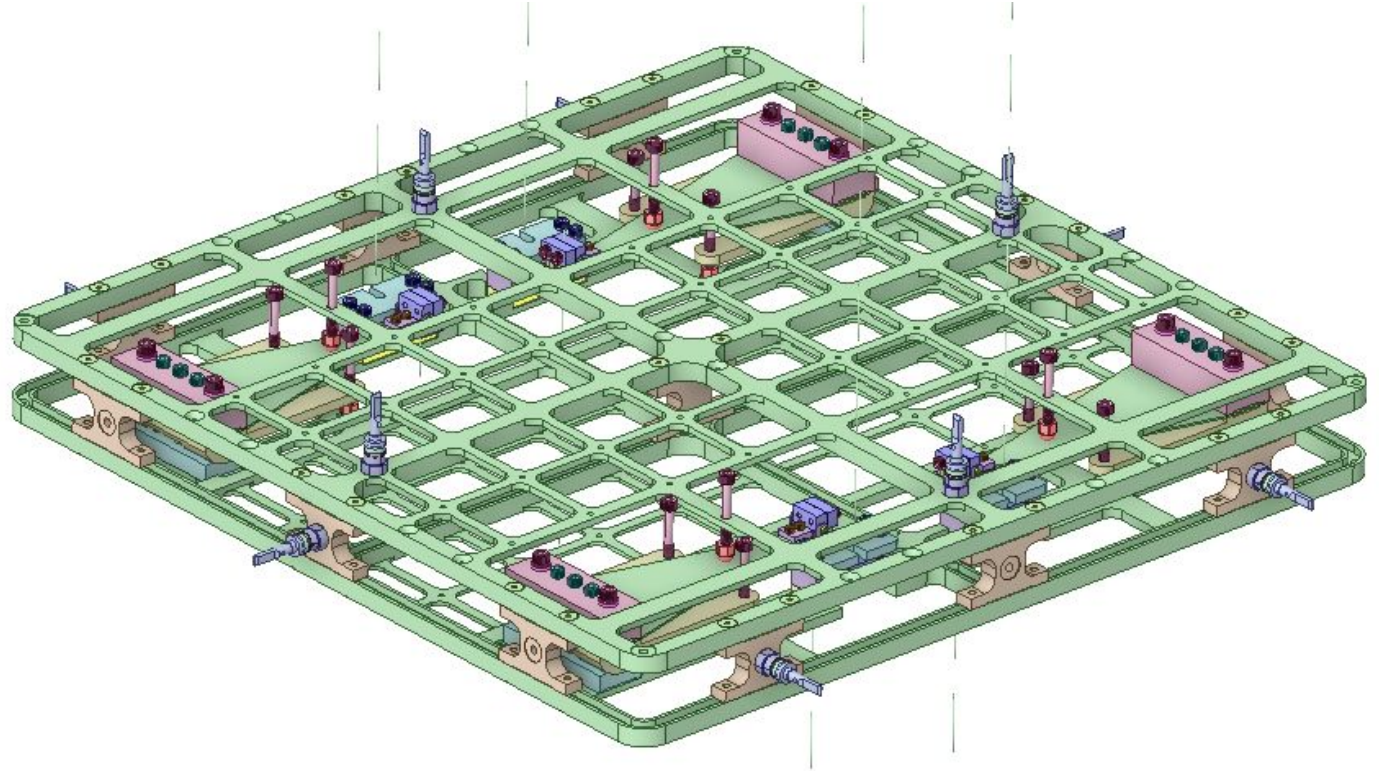


Current design review

Top Stage

TOP Mass

UIM Mass



Current design parameters: UIM Mass

Top Stage

TOP Mass

UIM Mass

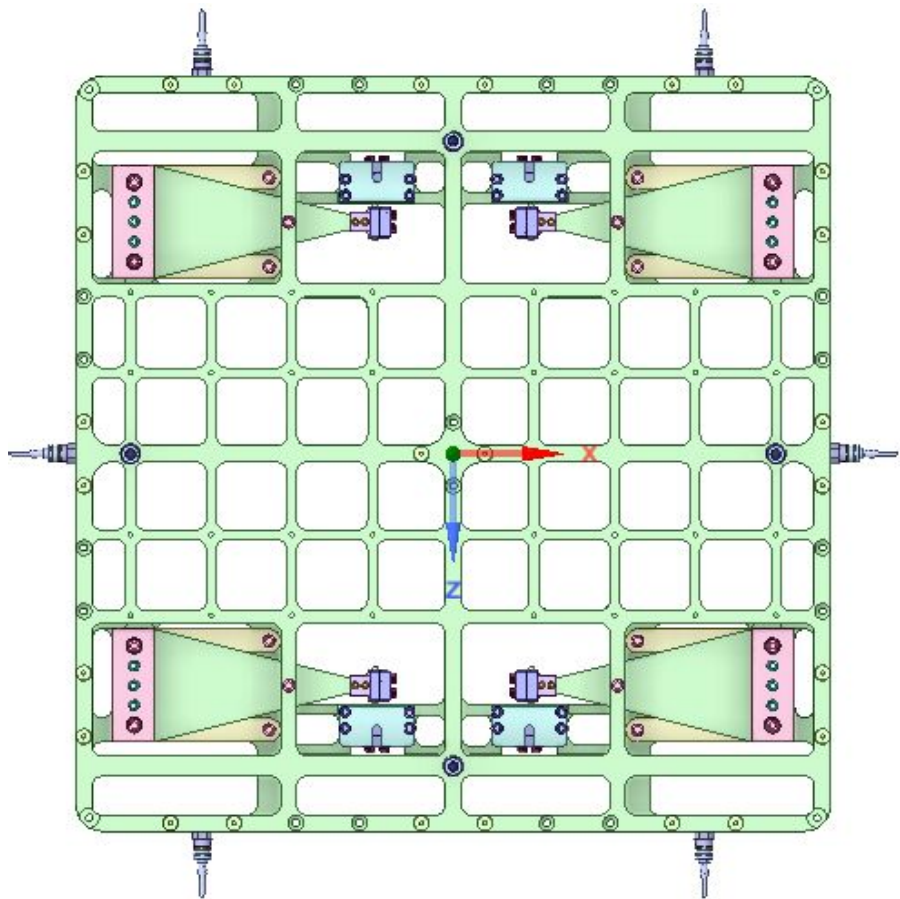
Parameter	Target	Achieved
Mass	9 960 g	9 967 g
Center of Mass offset	0 μm	49 μm
Yaw Moment of Inertia	0.47 kgm^2	0.50 kgm^2
Pitch Moment of Inertia	0.28 kgm^2	0.24 kgm^2
Roll Moment of Inertia	0.28 kgm^2	0.26 kgm^2

Current design review

Top Stage

TOP Mass

UIM Mass



Relevant documents

- LIGO D2400177

OLD/EXTRA SLIDES

Quotes

Blade Spring Assemblies:

- \$8,970.72 Instant quote after changing to 304 Stainless and ordering dimensional reports (foreign made)
- (Note: \$27,652.84 if we make it domestically)

Blade Springs:

- Still awaiting quotes but let's assume \$ 2 000 for all?

TOP Mass:

- \$4,256.51 Instant quote (foreign made - subject to change. ~\$13,000 to make it domestically)

UIM Mass:

- Work in progress but let's assume the same as the TOP Mass

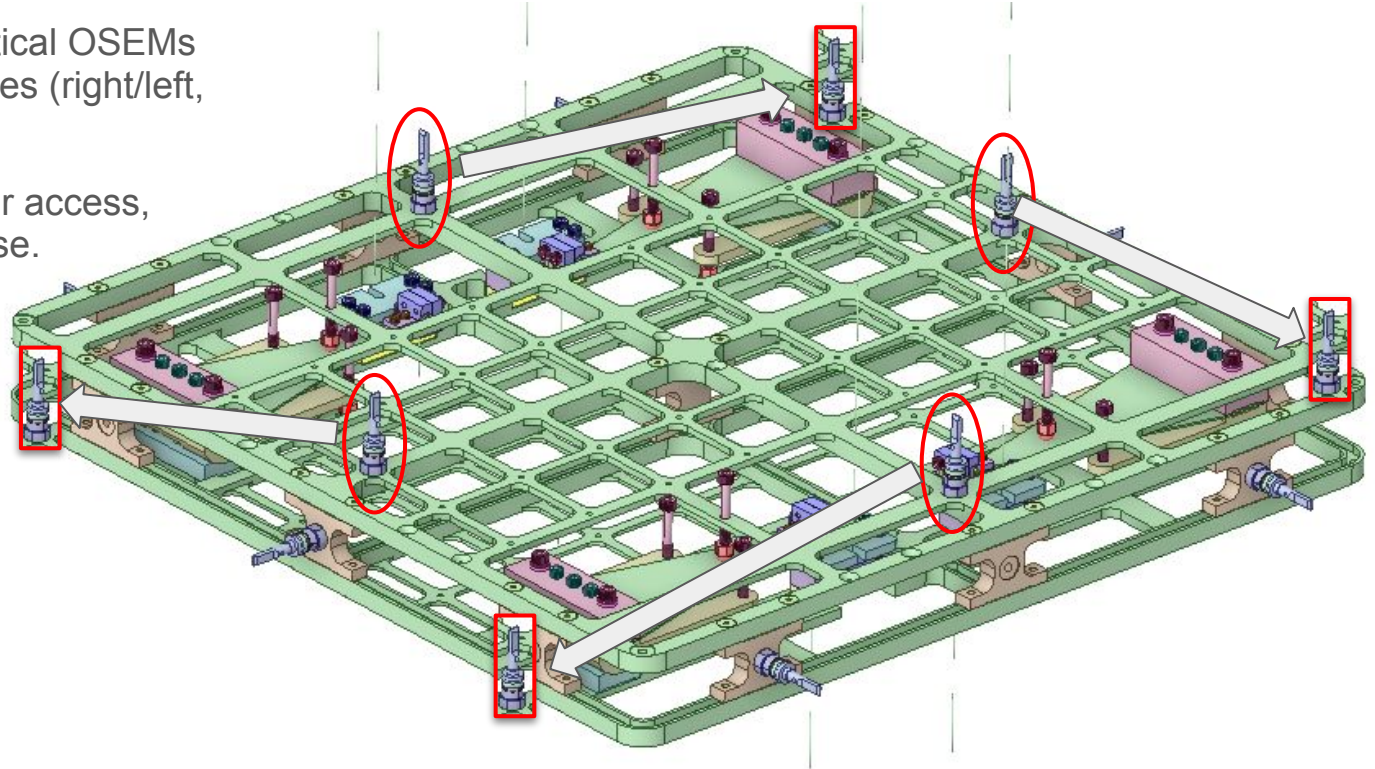
Extras not accounted for (fasteners, assembly jigging, mistakes, etc.)

TOTAL = ~ \$18,457.74

Brian comment

Can we move the vertical OSEMs from the top to the sides (right/left, not front/ back)?

This should give better access, and slightly better noise.

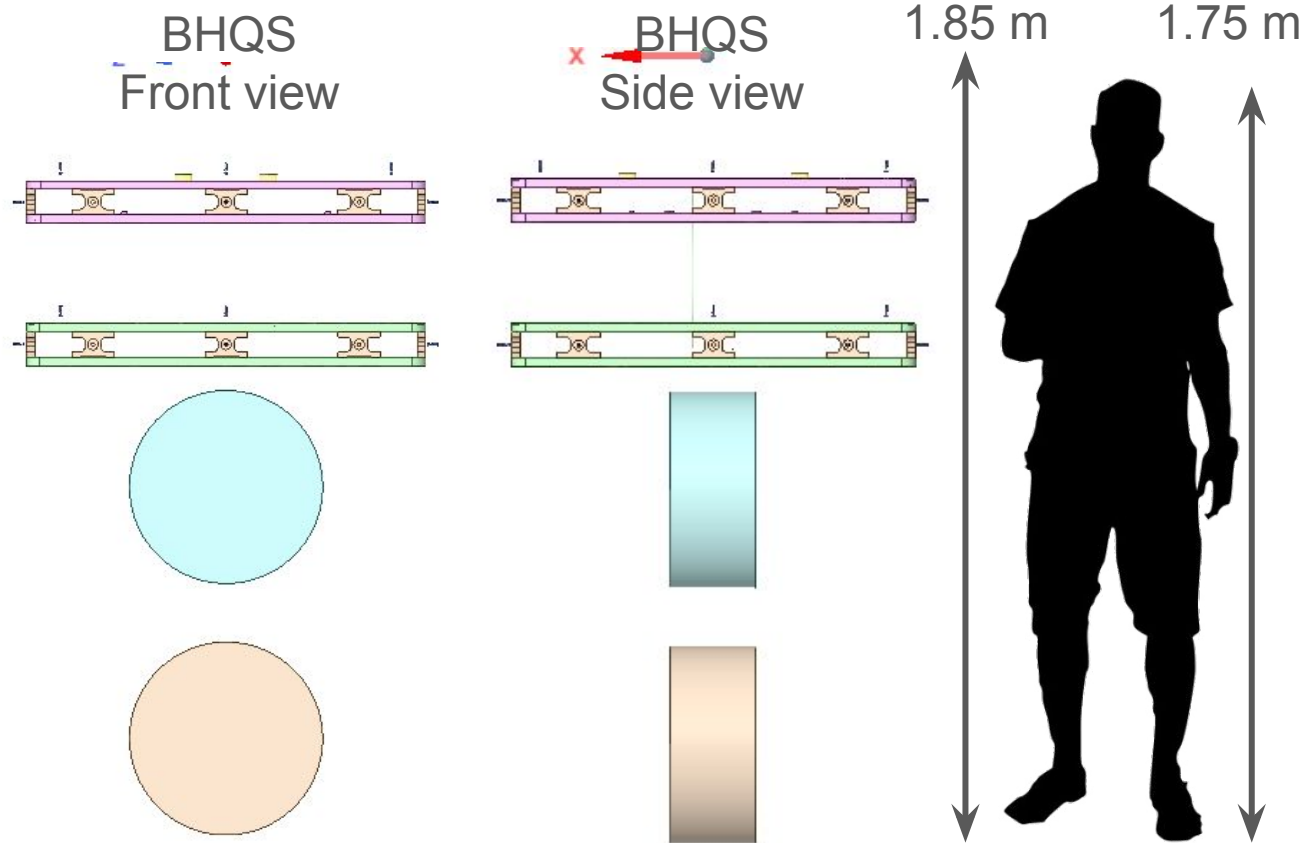


SCREENSHOTS

BHQS Layout

Actual scale for
TOP and UIM Mass

Human for scale
(height ~1.75m)

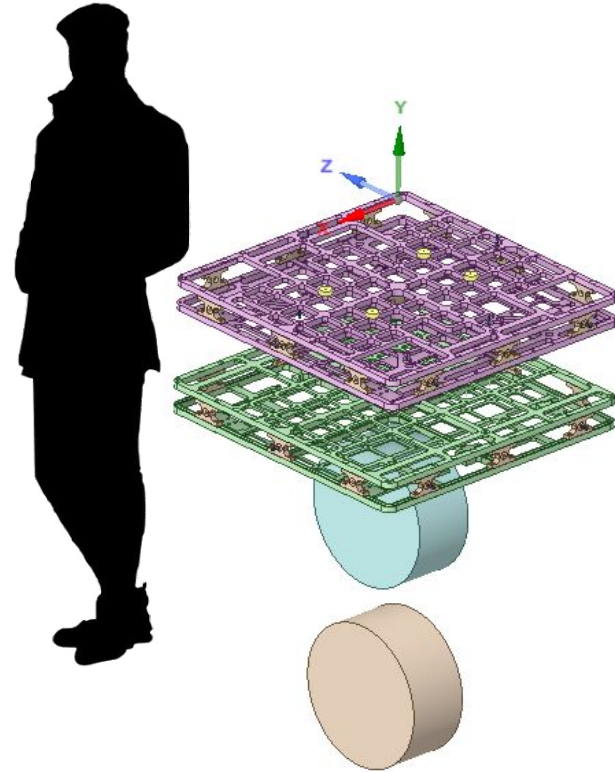


Top view (Actual scale)



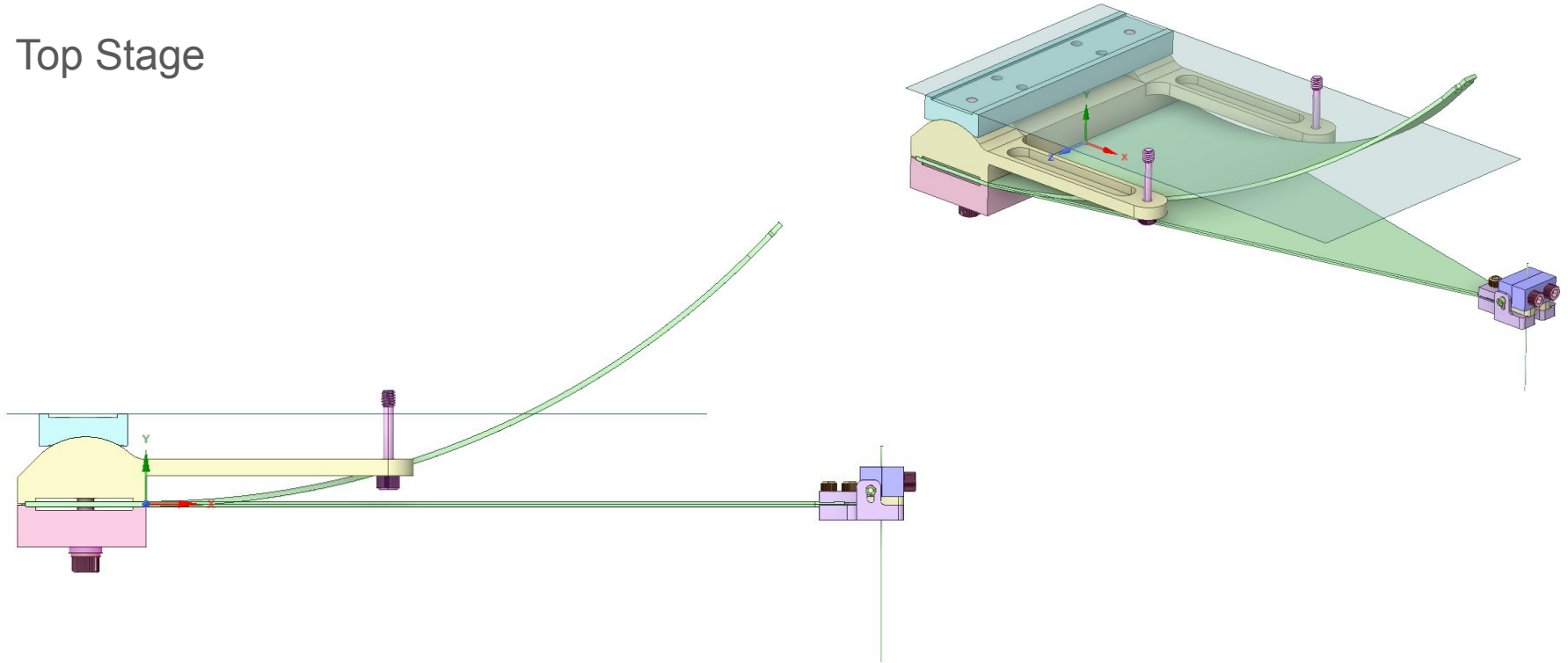
BHQS Schematic Layout

Isometric view



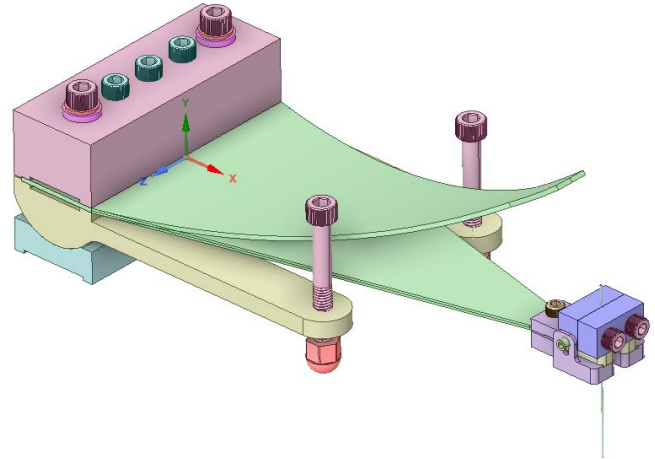
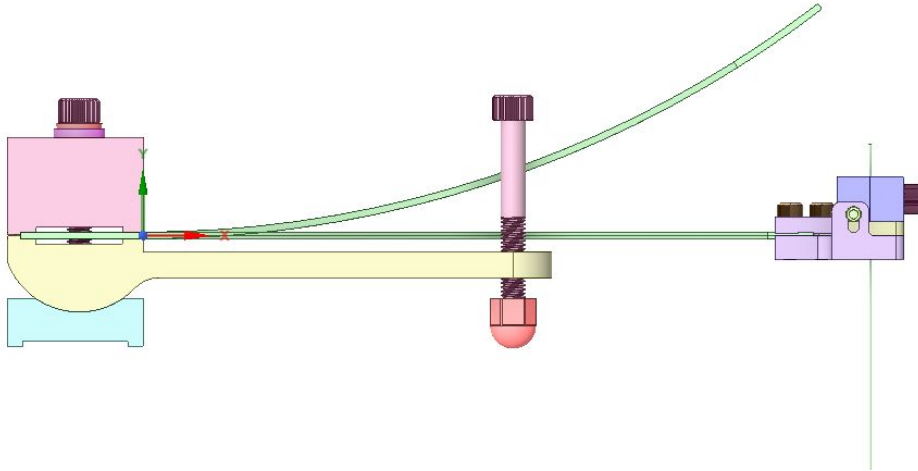
Blade Springs (mBHQS Scale)

Top Stage



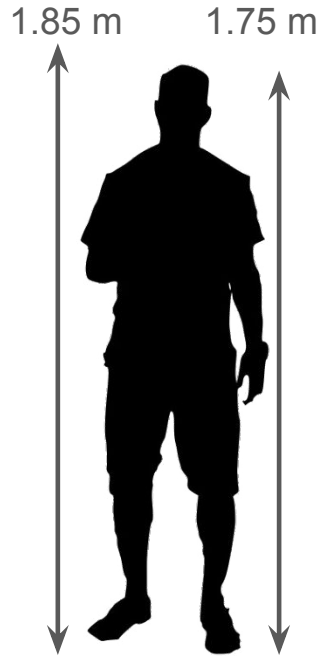
Blade Springs (mBHQS Scale)

Top Stage

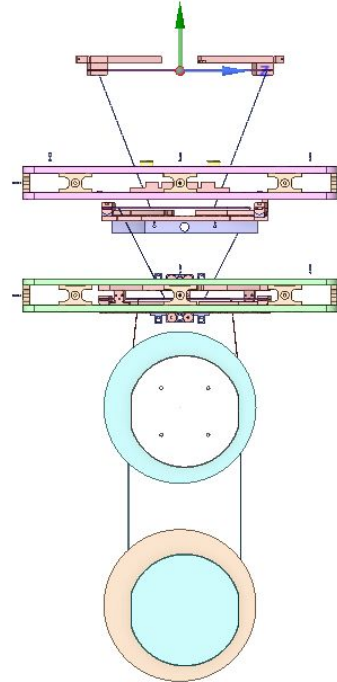


BHQS Schematic Layout with A+ QUAD

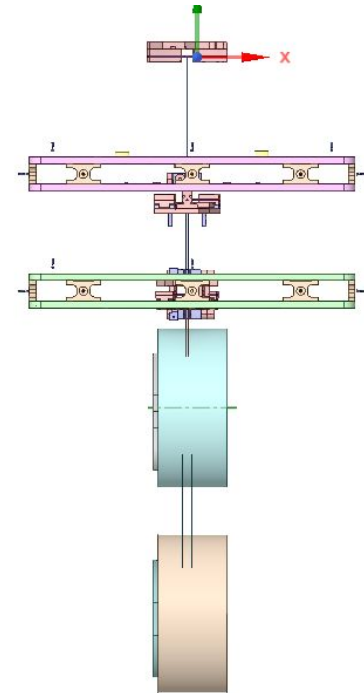
**Actual scale for
TOP and UIM Mass**



BHQS + QUAD
Front view

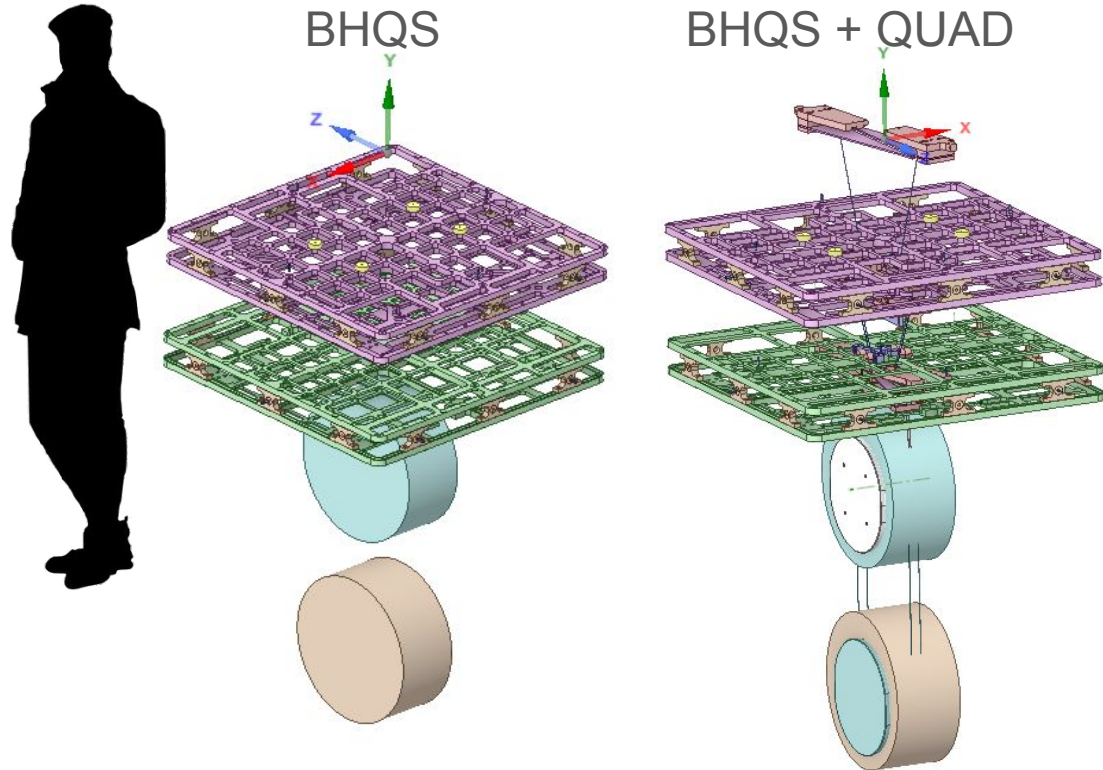


BHQS + QUAD
Side view



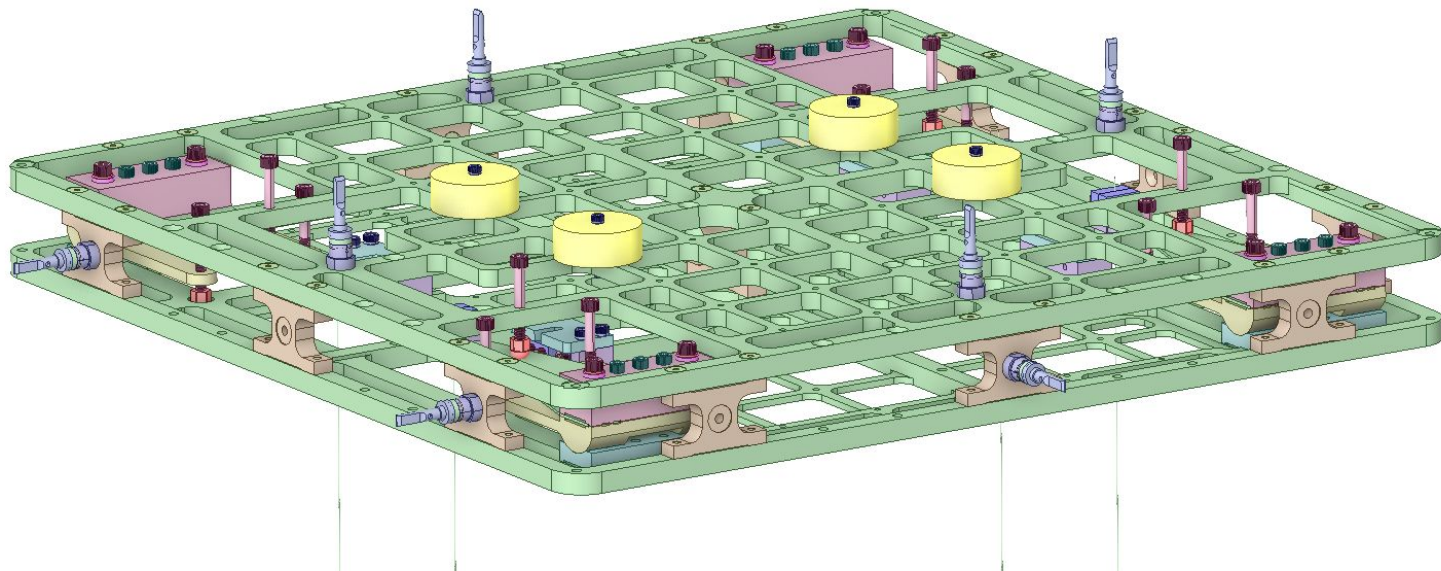
BHQS Schematic Layout with A+ QUAD

Isometric view



TOP Mass (mBHQS scale)

TOP Mass



TOP Mass (mBHQS scale)

UIM Mass

