

# **QUAD Testing Outline, Phase 2B Fiber Lower “half” Build-up and Testing**

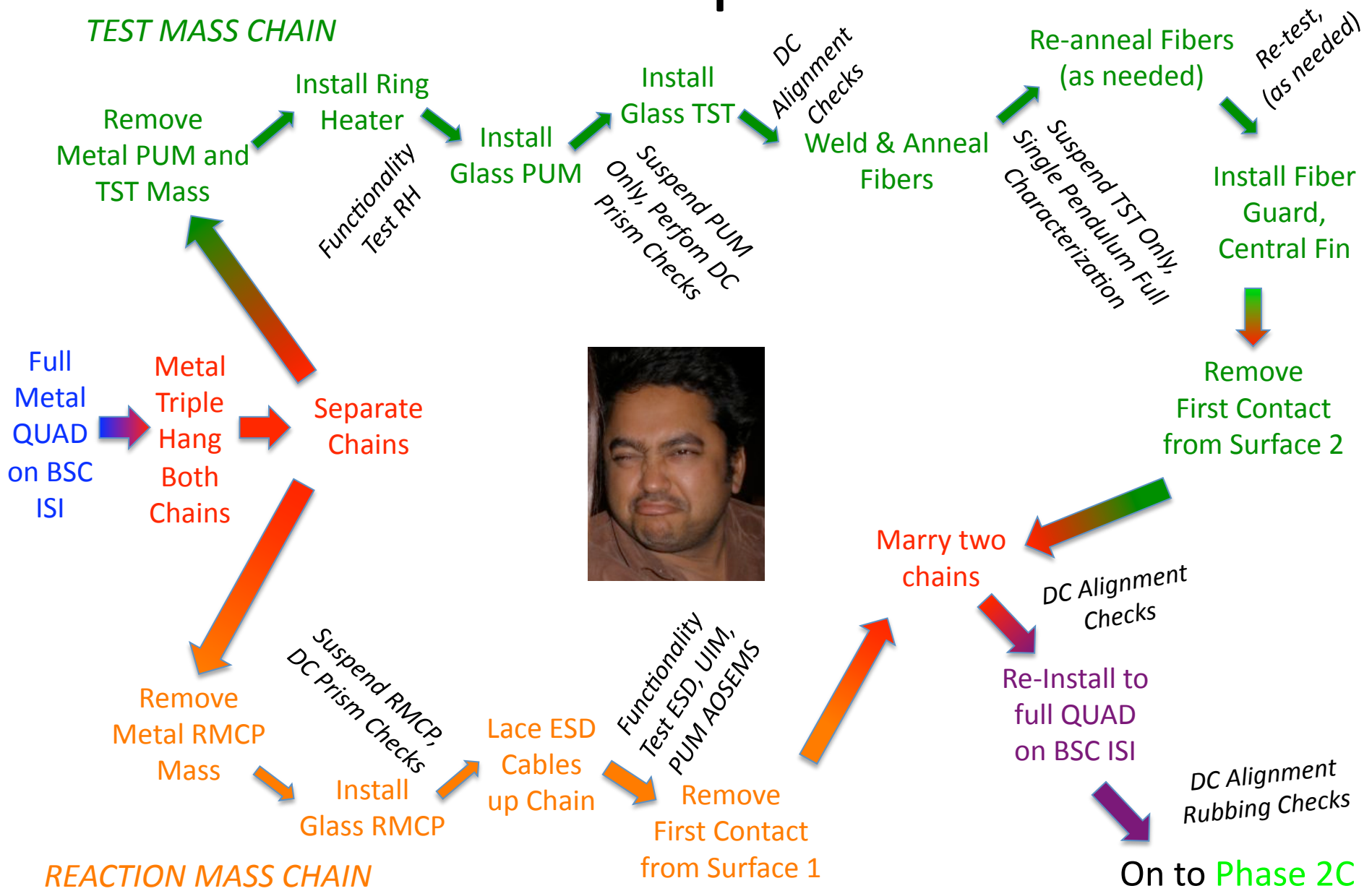
M. Barton, B. Bland, D. Cook, J. Kissel, N.  
Robertson, J. Romie, T. Sadecki, for the SUS team

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# Jargon

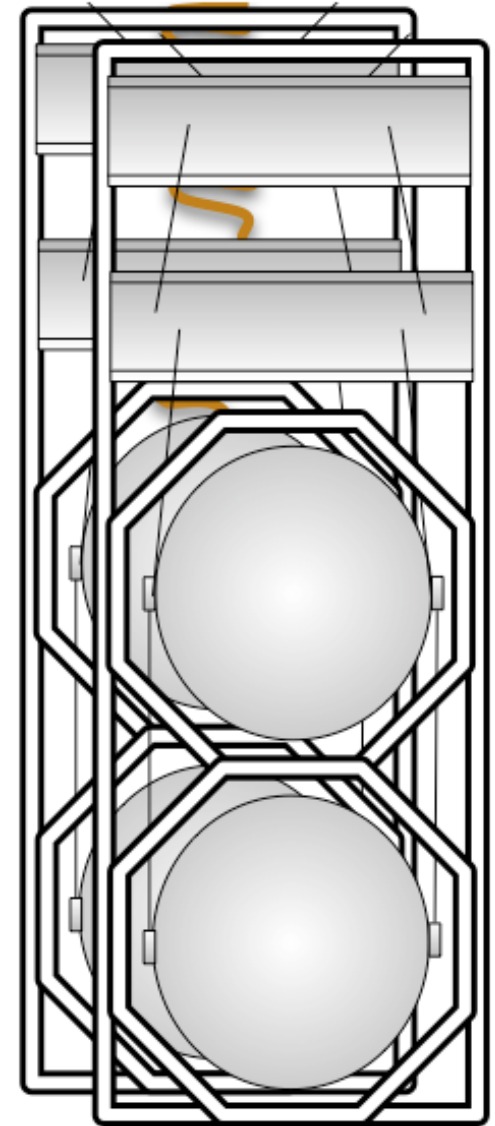
- Lower “half” / Upper “half”
- “Metal” or “Wire” hang vs. “Glass” or “Fiber” hang
- Fiducials / References
- Parallelism / Differential Pitch
- PUM and TST, RPUM and RMCP

# Order of Operations



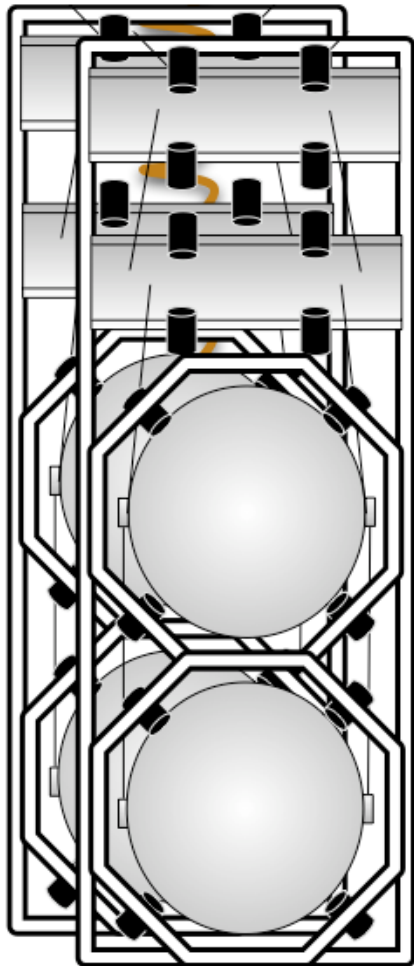
# Full Metal QUAD on BSC-ISI

- Install IAS Retro-reflector on Cage
- Gather fiducials of metal hang on BSC-ISI
  - Height between PUM and TST
  - Yaw of PUM and TST

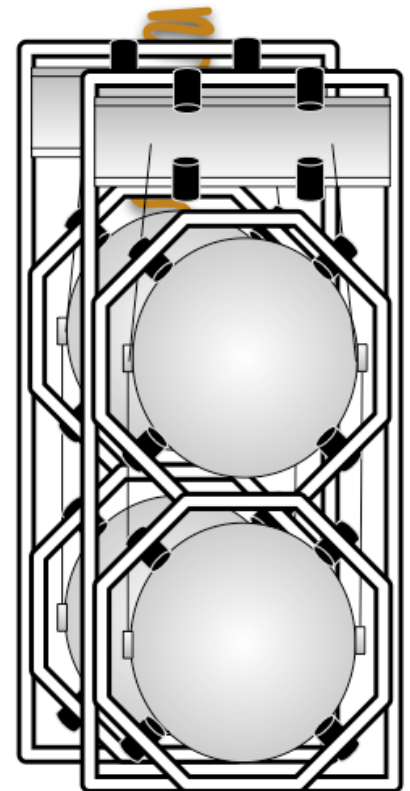


# Detach Lower “Half,” move to Triple Hang Tooling

- Lock Down Both Chains
- Prepare LSAT
- Detach lower half cabling fom reaction chain

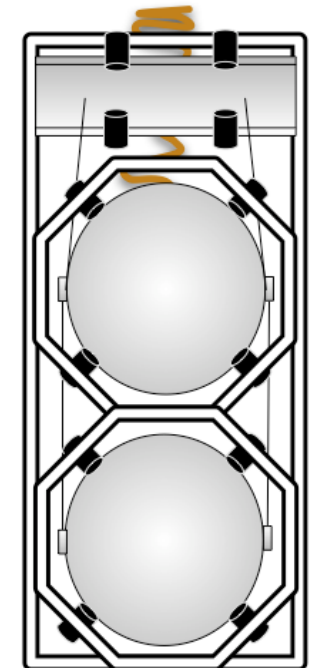
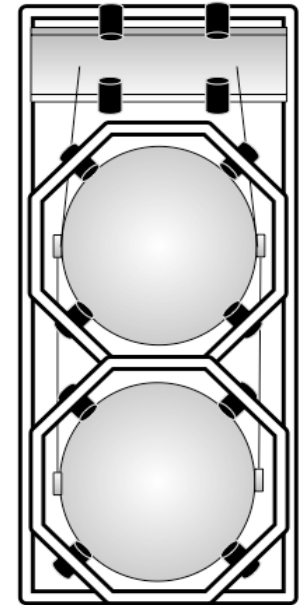
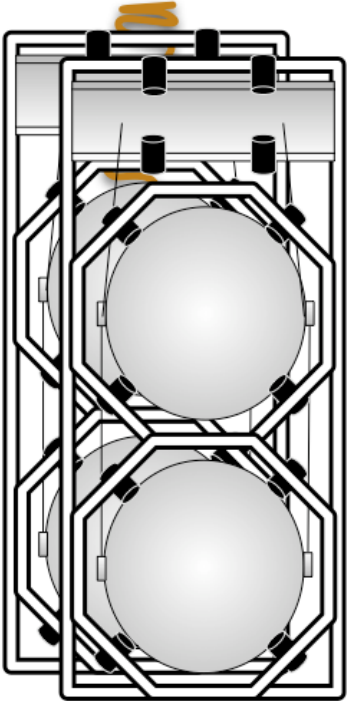


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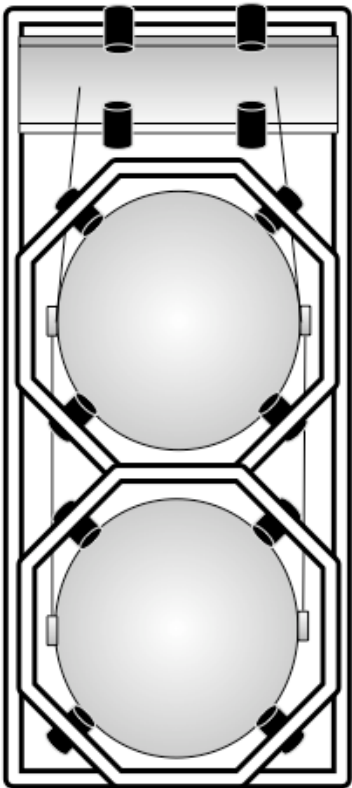
# Separate Chains

- Move separated chains from LSAT to leveled granite / optical table

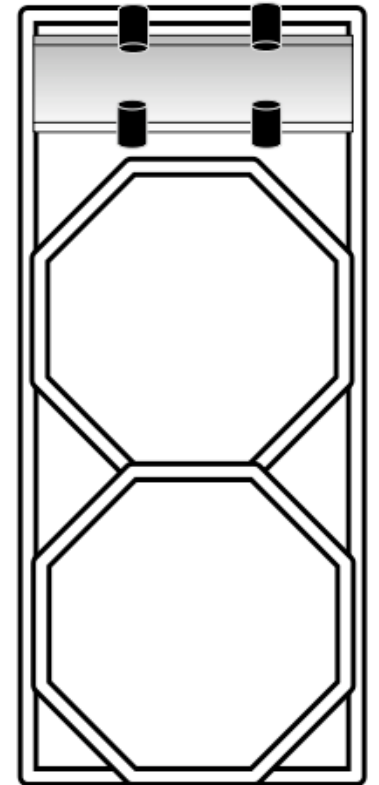


# *TEST MASS CHAIN*

## Remove Metal PUM and TST

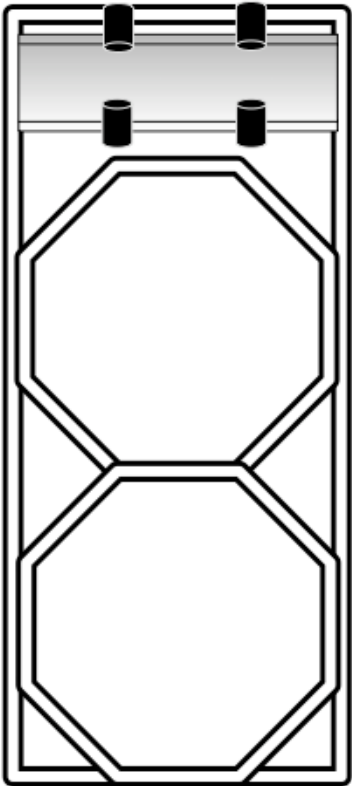


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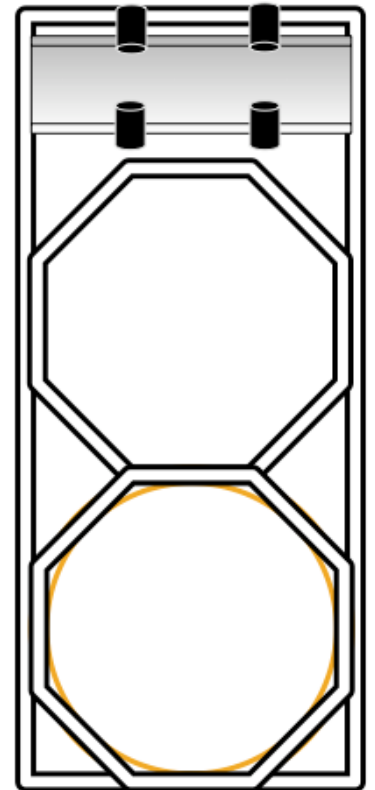
# *TEST MASS CHAIN*

## Install and Test Ring Heater



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- Test ring heater functionality

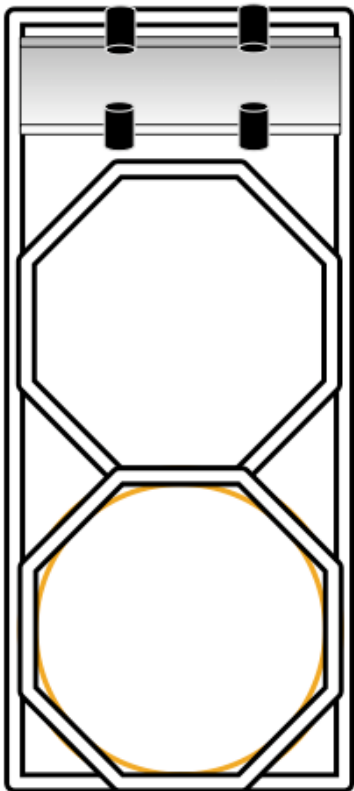




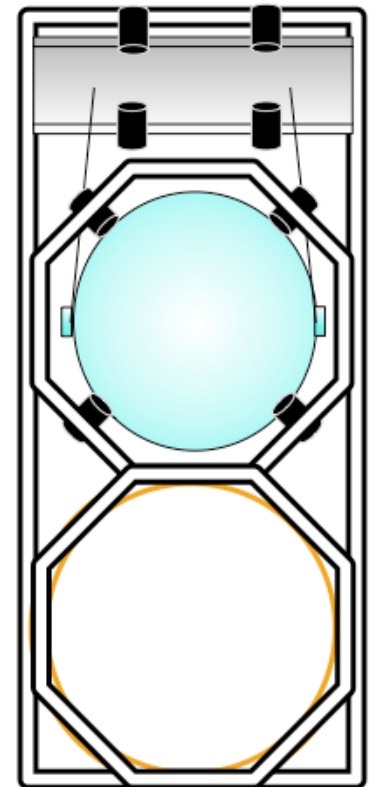
# TEST MASS CHAIN

## Install Glass PUM

- DC Alignment checks



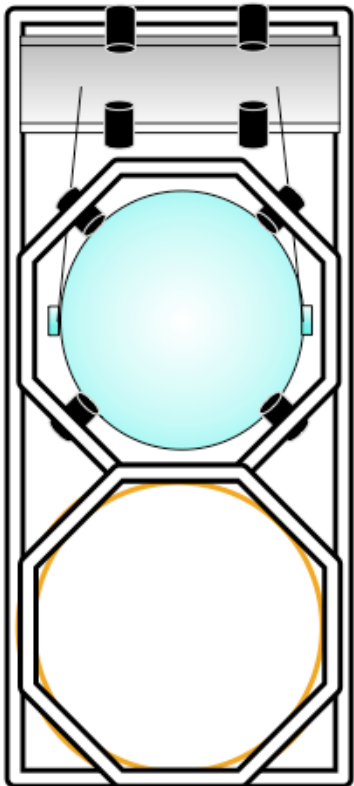
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# TEST MASS CHAIN

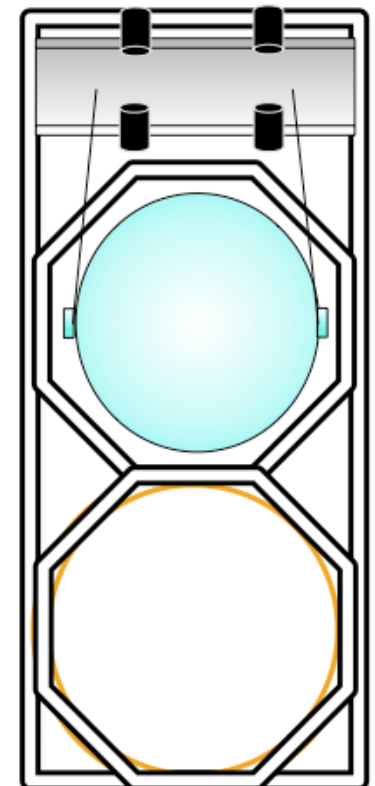
## Suspend PUM, Check DC Alignment

- With UIM to PUM Blades EQ stopped, free up PUM
- Check prism functionality
- Compare DC alignment to metal references
- Redo loops, as necessary



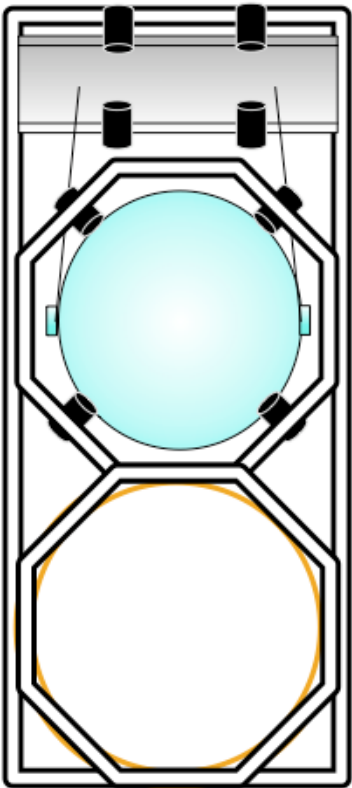
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- Re-lock PUM

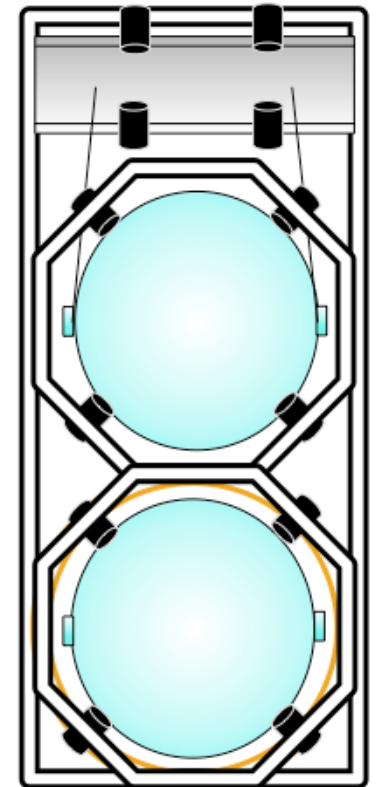


# *TEST MASS CHAIN*

## Install Glass Test Mass



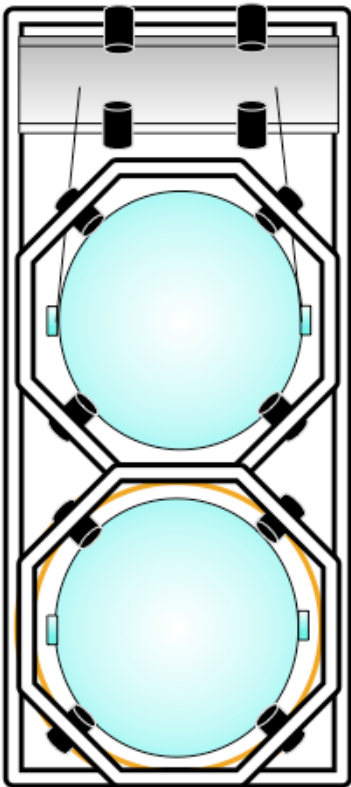
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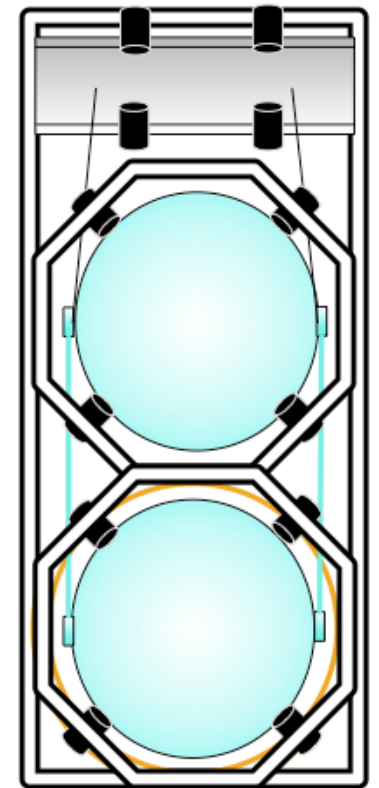
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# TEST MASS CHAIN

## Weld and Anneal Fibers



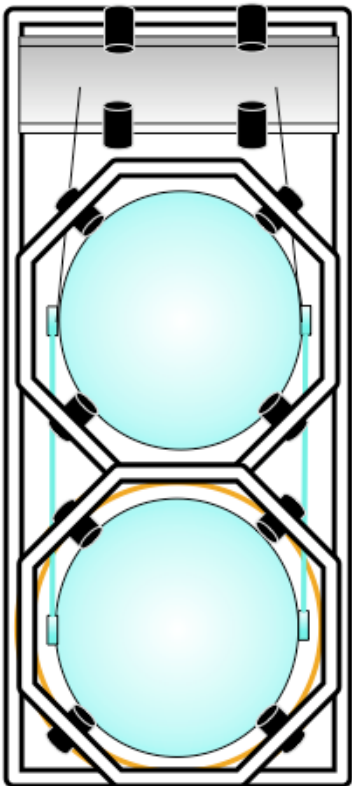
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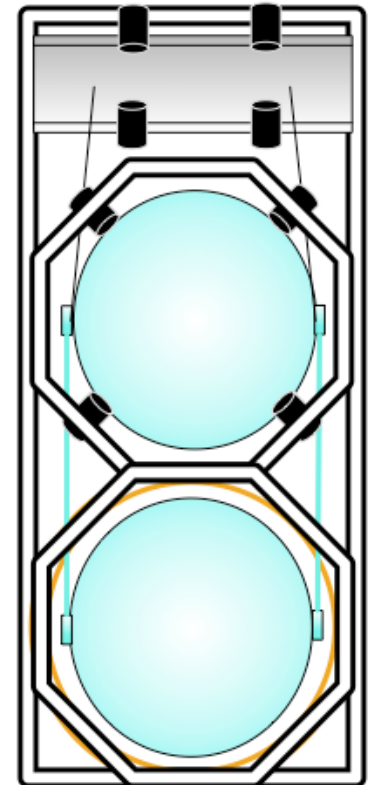
# TEST MASS CHAIN

## Full Fiber Single Pendulum Characterization

- With PUM still on line stops, Unlock TST
- Check DC Alignment, compare against metal references
- Check PUM / TST Surface 1 parallelism / differential pitch
- Measure Pitch and Yaw modes w/ spectra of optical lever
- Measure Vertical and Violin Modes with shadow sensor



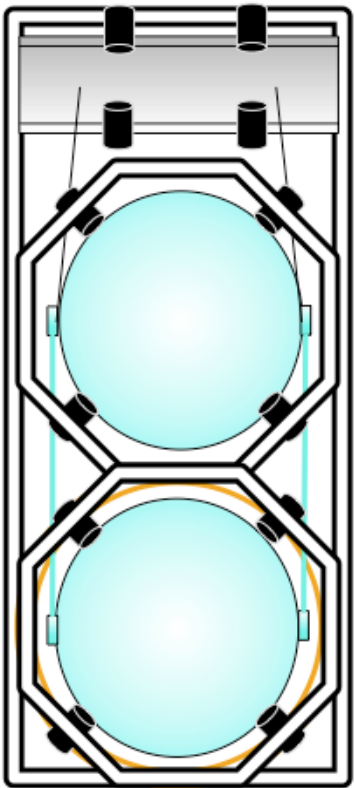
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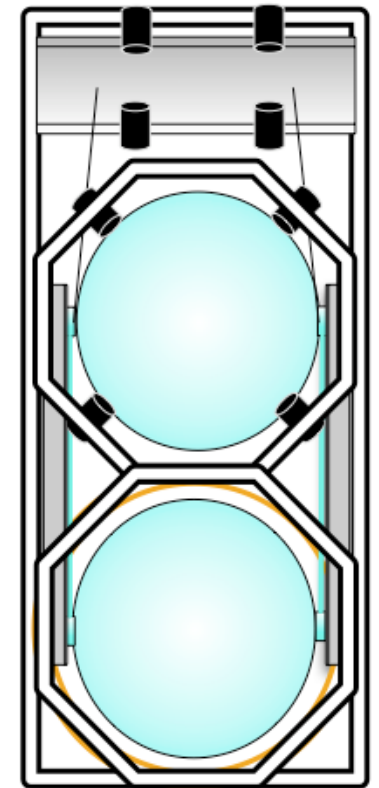
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# TEST MASS CHAIN

## Install Fiber Gaurds



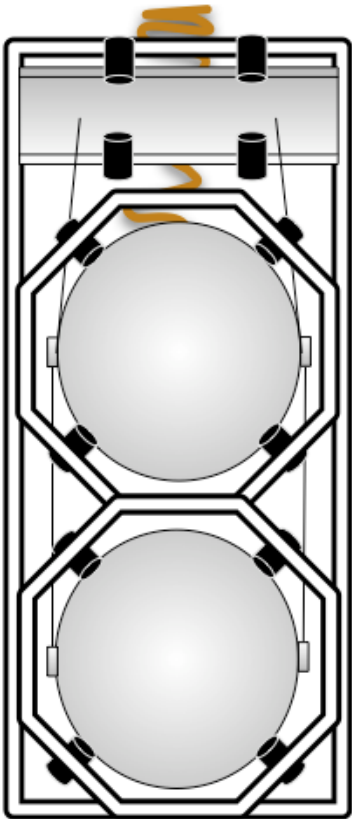
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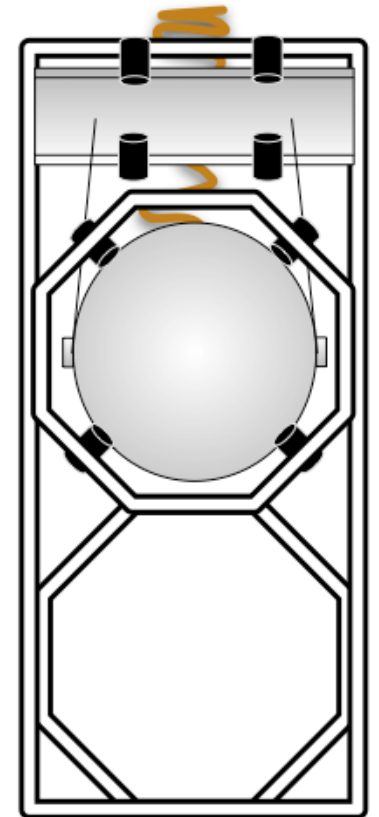
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# REACTION MASS CHAIN

## Remove Metal RMCP



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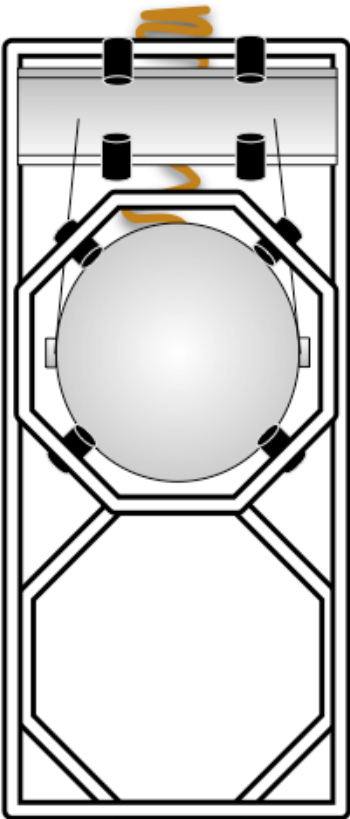


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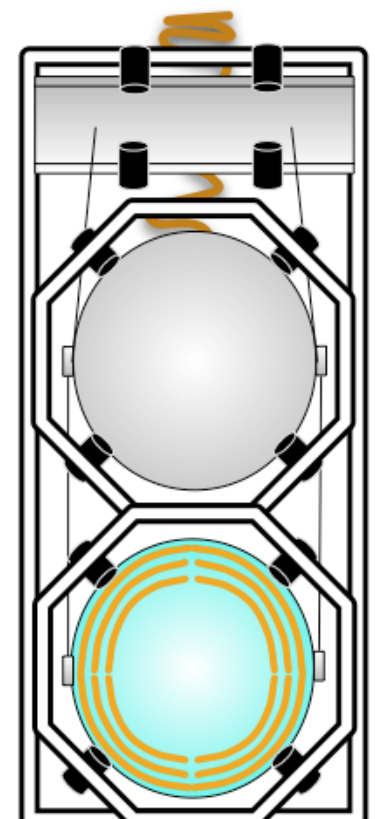
# REACTION MASS CHAIN

## Install Glass RMCP

- Check ESD functionality / electrical properties up to cable break off before installing
  - Continuity
  - Capacitance



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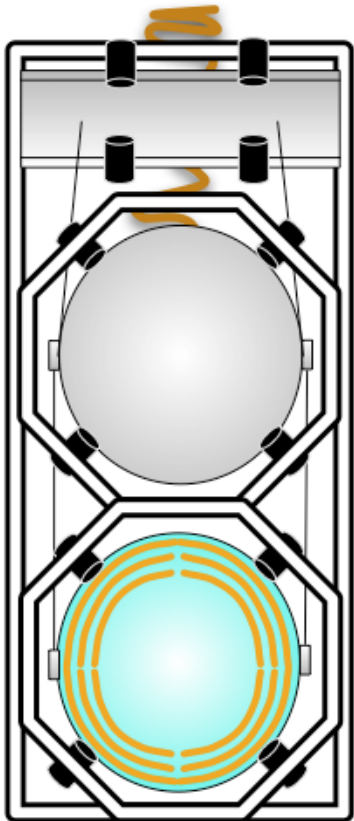
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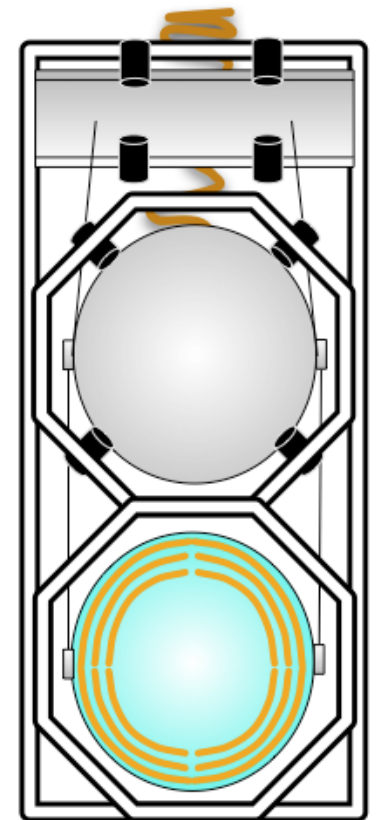
# REACTION MASS CHAIN

## Suspend RMCP, Check DC Alignment

- Check DC alignment against references
- Check prism functionality
- Redo loops if necessary



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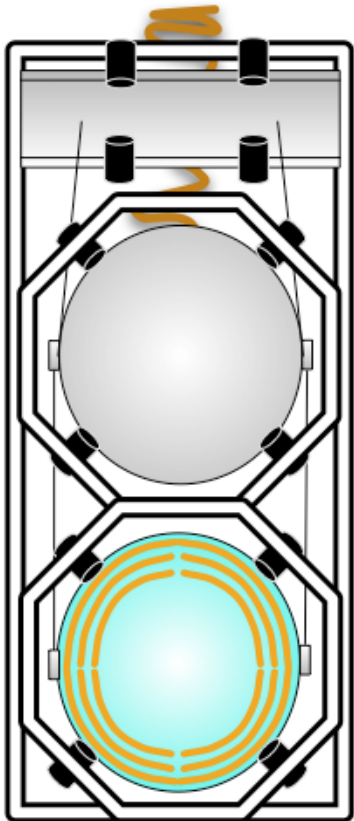


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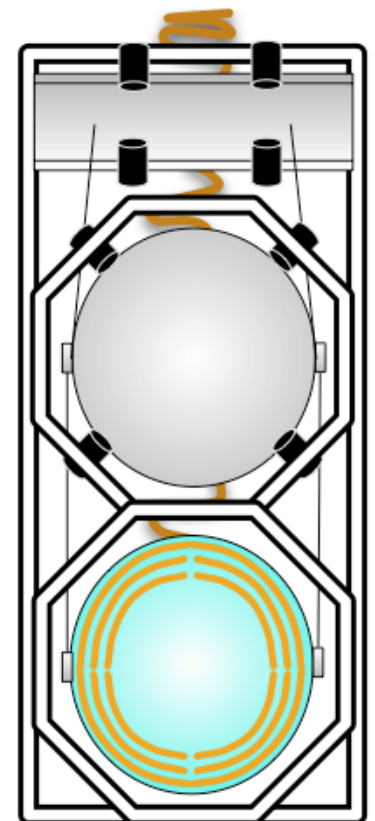
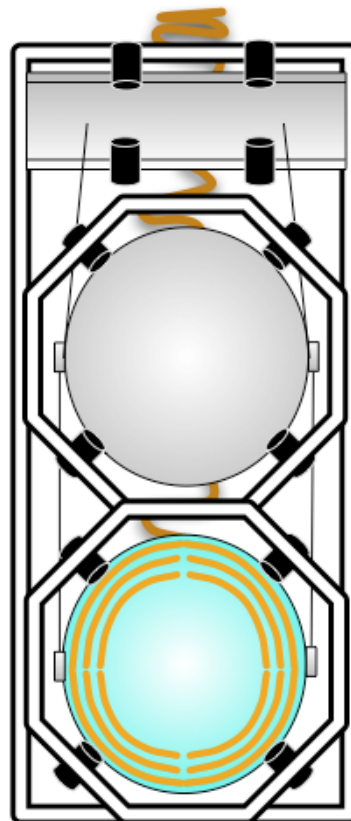
# REACTION MASS CHAIN

## Lace Up RMCP Cables

- Check ESD functionality / electrical properties at RMCP Break off (again)
- Lace cables up through remainder of the reaction chain
- Check ESD functionality / electrical properties at top the chain

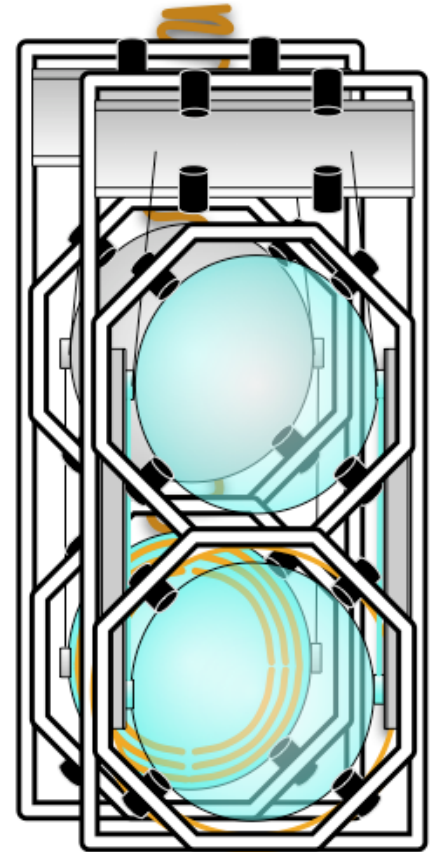
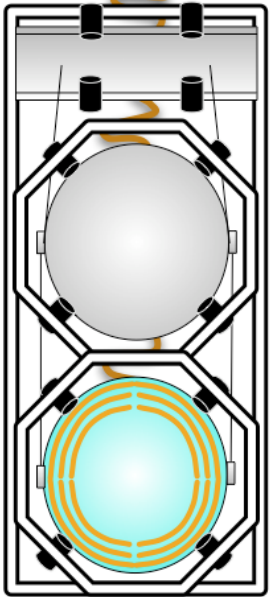
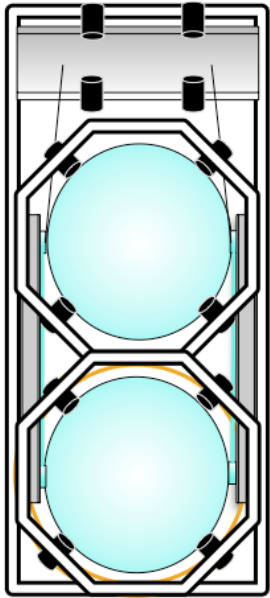


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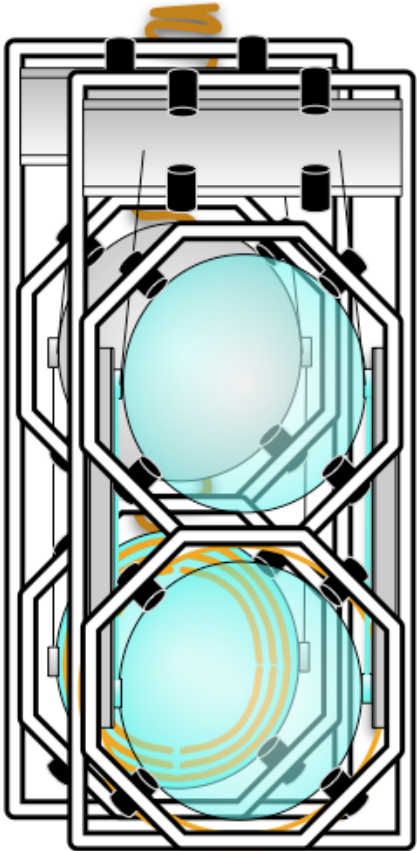


# Marry Chains

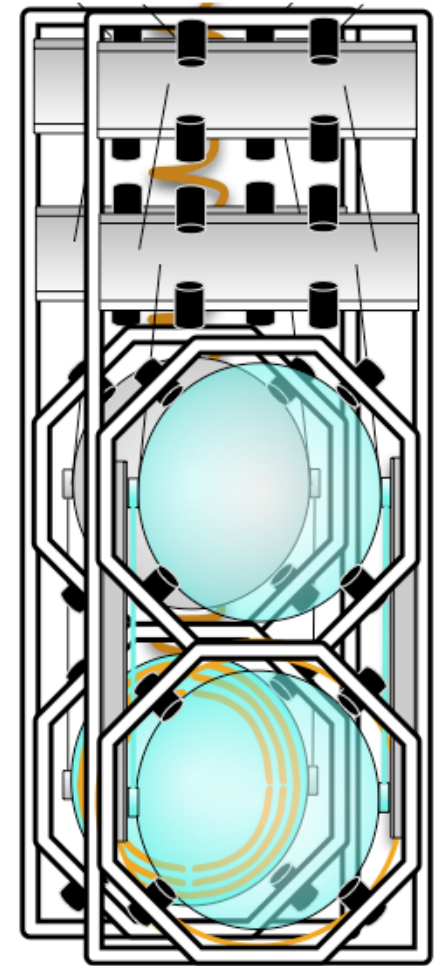
- Remove First Contact from Test Mass' Surface 2 (AR Coating), and RMCP Surface 1 (AR / Gold Coating)



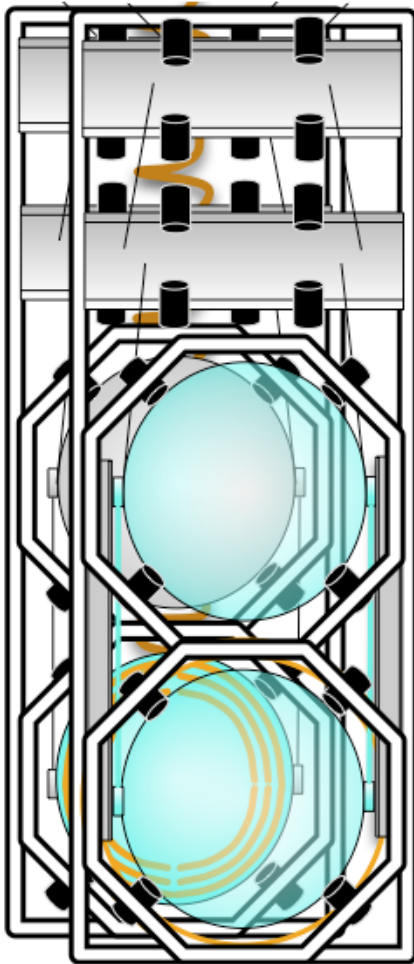
# Reinstall to full QUAD on BSC ISI



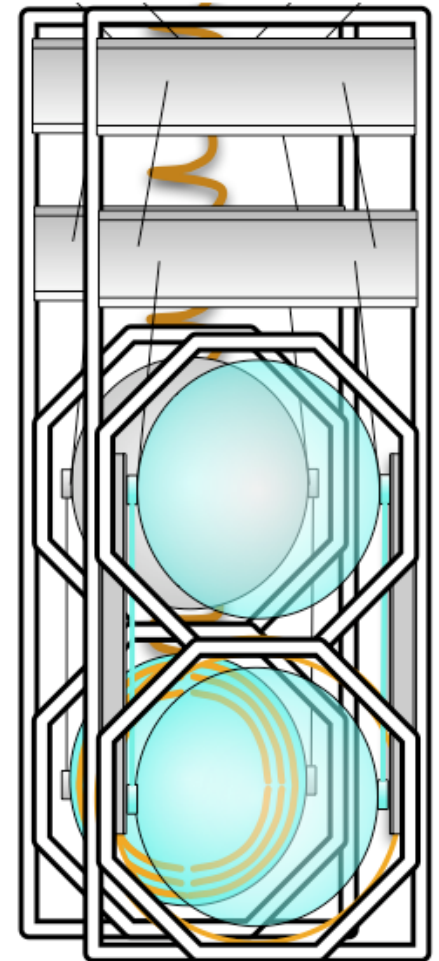
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# DC Alignment, Rubbing Checks of Both Chains



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