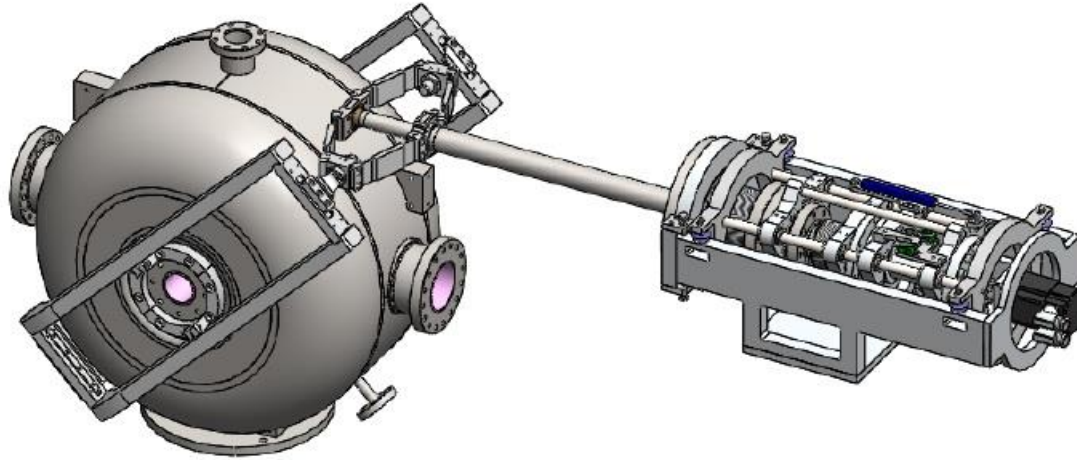


# Engineering Design and Fabrication Process of SSR1/2 Tuner

Myung Ook Hyun / SCL Development Team

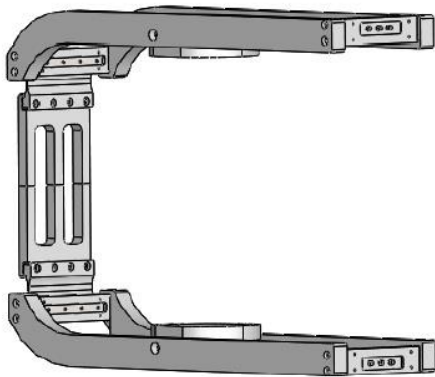
2023.03.01.

# SSR1 Tuner Design – Warm Motor



Nutcracker

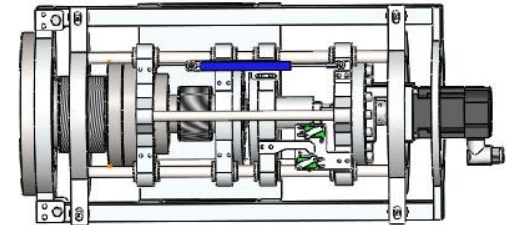
Scissor



Drive Tubes



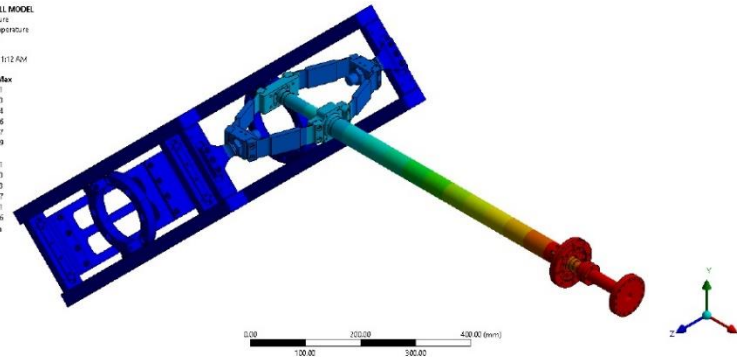
Warm motor



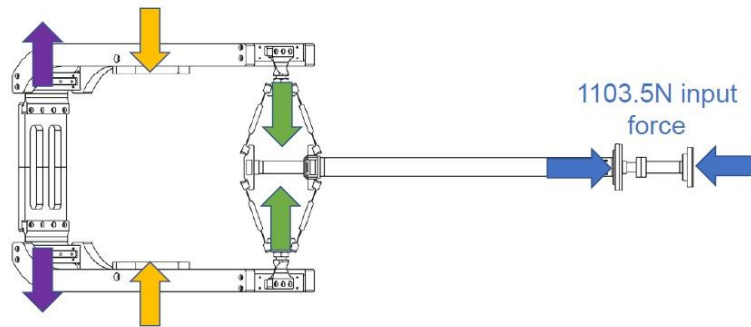
# SSR1 Tuner Analysis – Structural/Thermal

	Heat Load (W)
<b>2K Total</b>	<b>-0.58</b>
50K Outer Tube	-0.95
50K Inner Tube	-0.32
<b>50K Total</b>	<b>-1.27</b>
300K Outer Tube	1.24
300K Inner Tube	0.60
<b>300K Total</b>	<b>1.84</b>

IB SET FULL MODEL  
 Temperature  
 Type: Temperature  
 Units: C  
 Time: 1  
 5/7/2018 11:12 AM



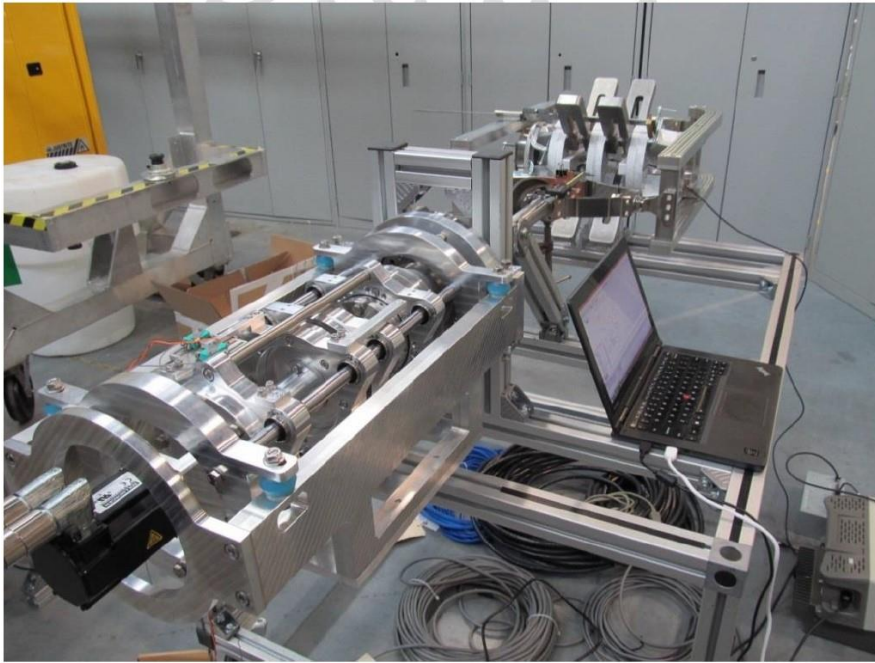
Temperature Plot



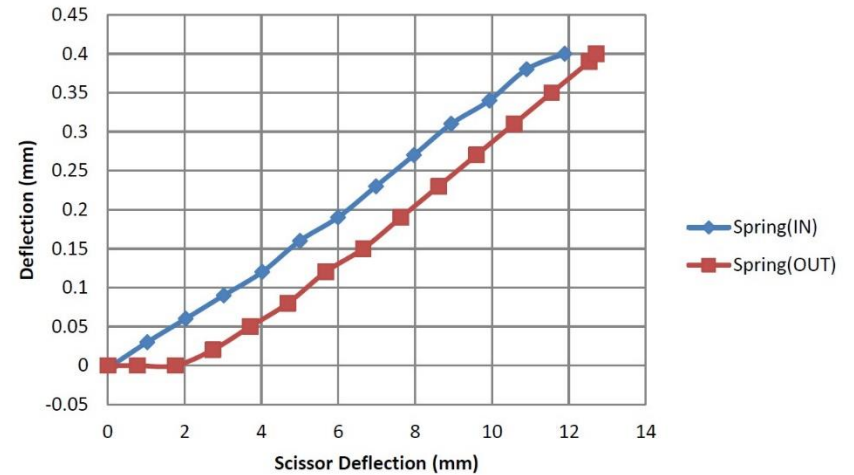
Result	Step 1	Step 2
Force at beam flange (Cavity spring reaction)	0N	5599.5N
Force at scissor flexure	13.6N	2508.5N
Force at fulcrum flexure	19.5N	3093.3N

Force results are from force reaction probes of the cavity spring and flexure contacts

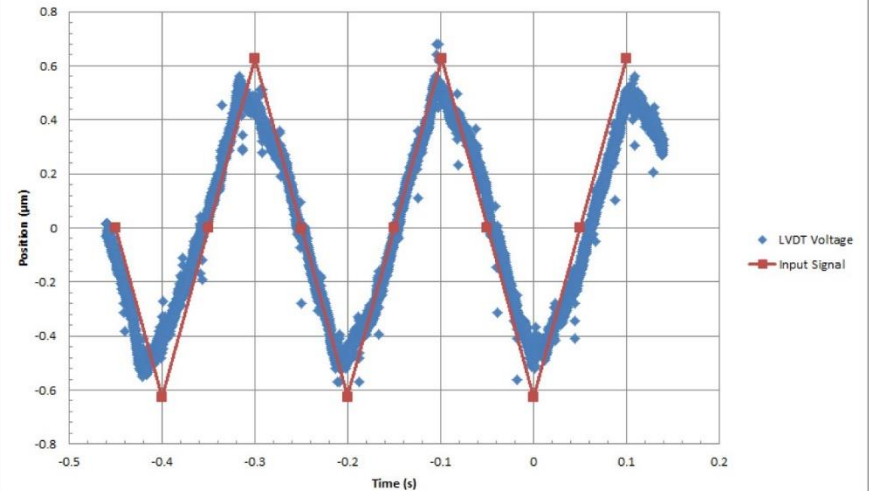
# SSR1 Tuner Operation Test



### Scissor Vs Cavity Deflection

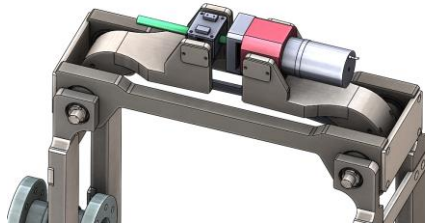
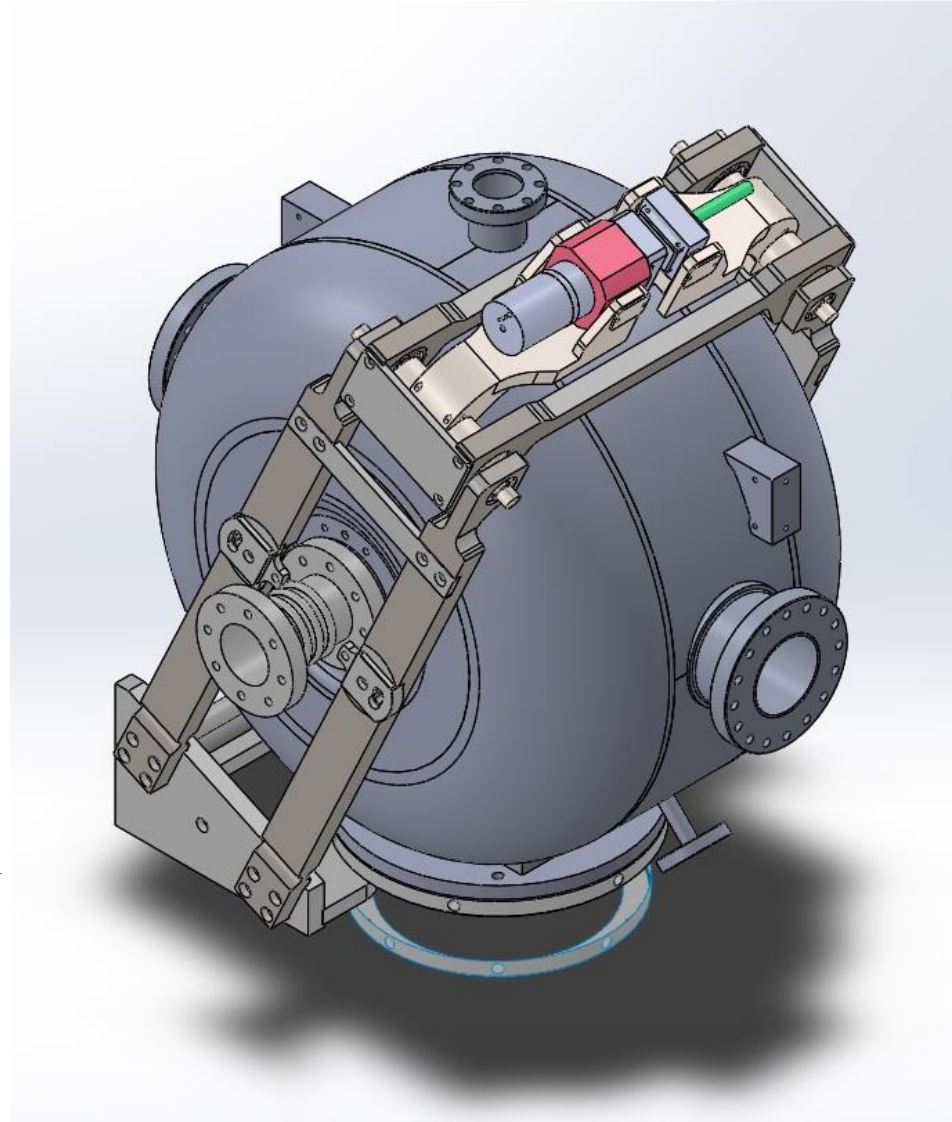
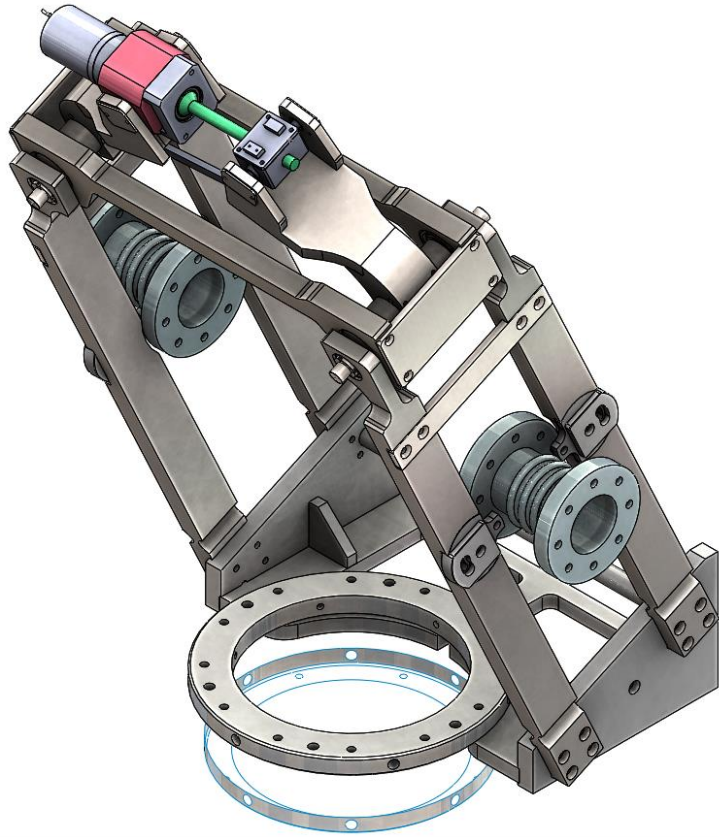


### Hysteresis Curve

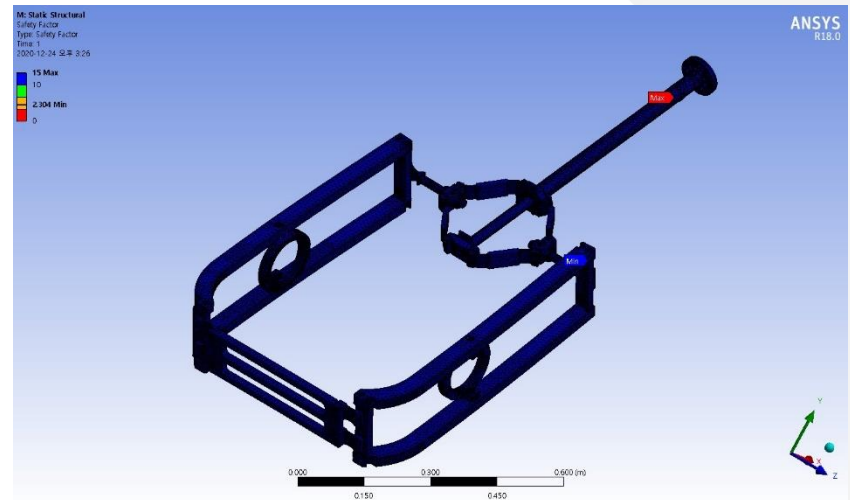
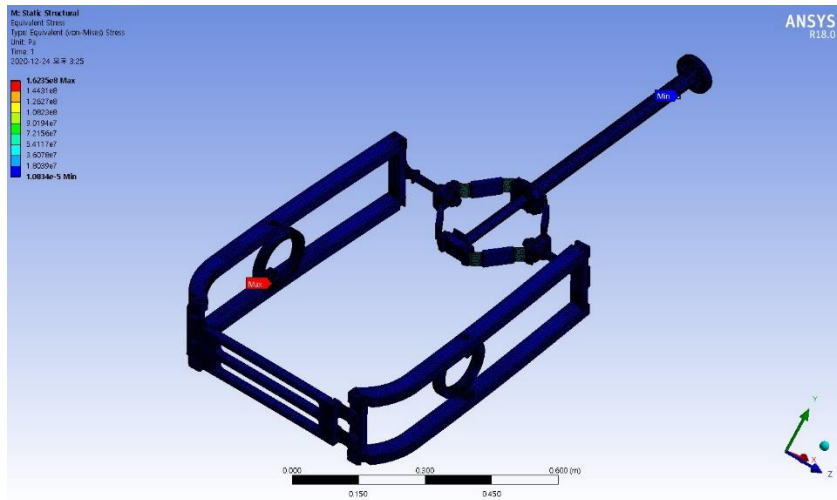
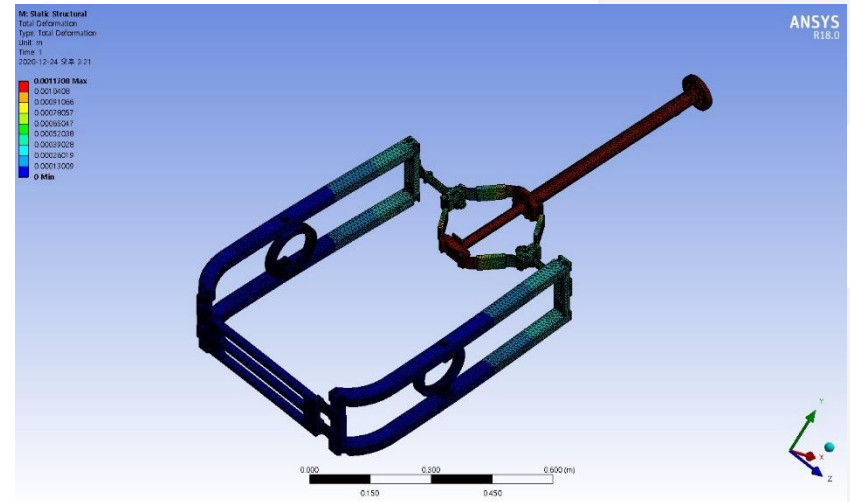
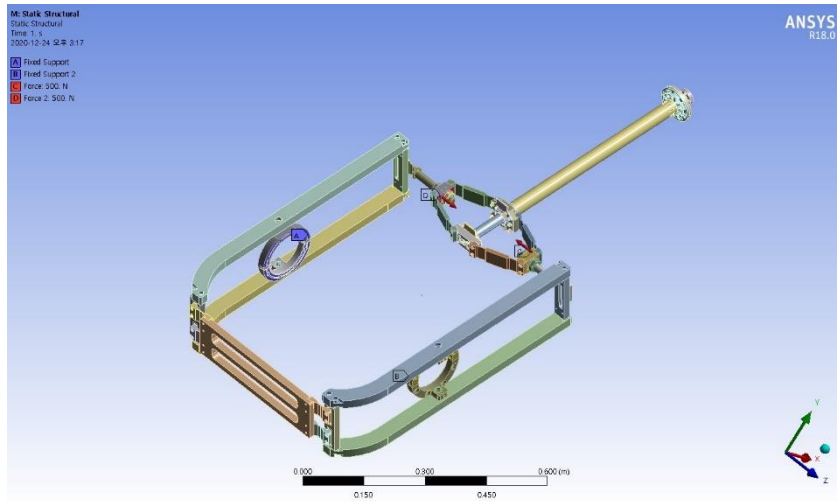




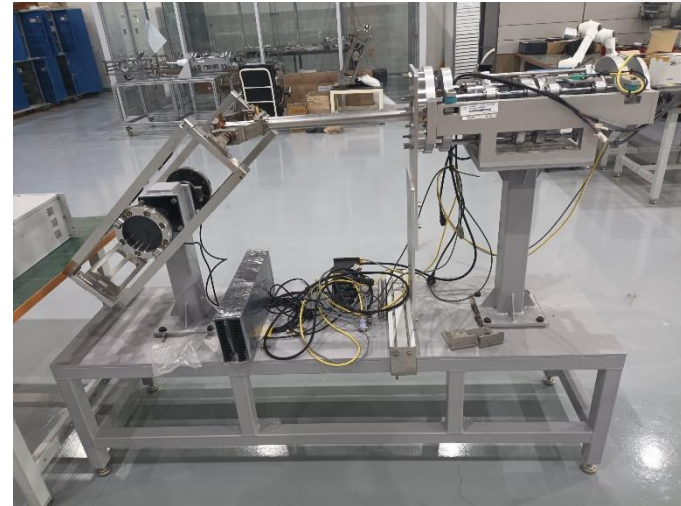
# SSR1 Tuner Design – Cryogenic Motor



# SSR2 Tuner Analysis - Structural



# SSR1 Tuner Assembly



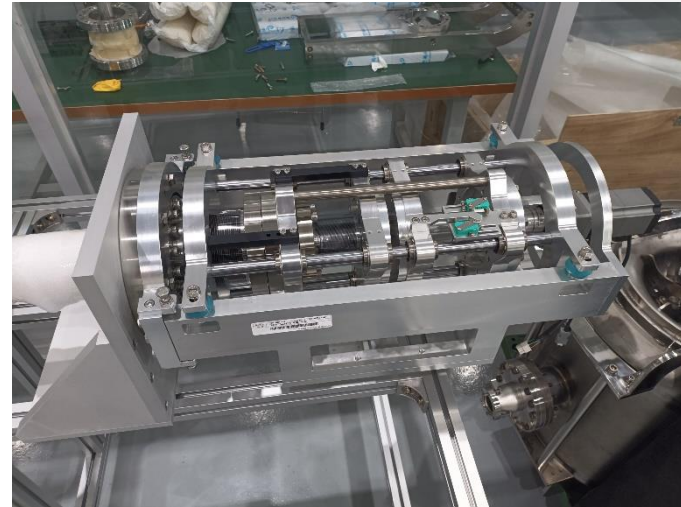
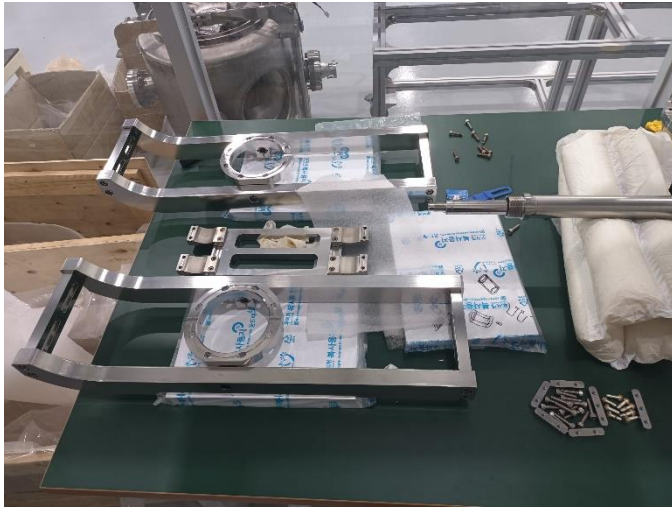


# SSR1 Tuner Assembly - Cryomodule





# SSR2 Tuner Assembly



# SSR2 Tuner Assembly - Cryomodule





# References

---

1. RISP SSR1 Tuner Design Review (TRIUMF SRF Group, 2018)
2. RISP SSR1 Tuner Test Report (Doc.#171362, 2019)
3. Fabrication Report of SSR1 Tuner Prototype by Montrol Co. (2019)
4. Fabrication Report of SSR2 Tuner Prototype by Montrol Co. (2019)
5. Mechanical Tuner for a 325MHz Balloon Single Spoke Resonator (R.E.Laxdal et al, SRF2019, TUP106)