p19-0 ring tubes side down anatomy

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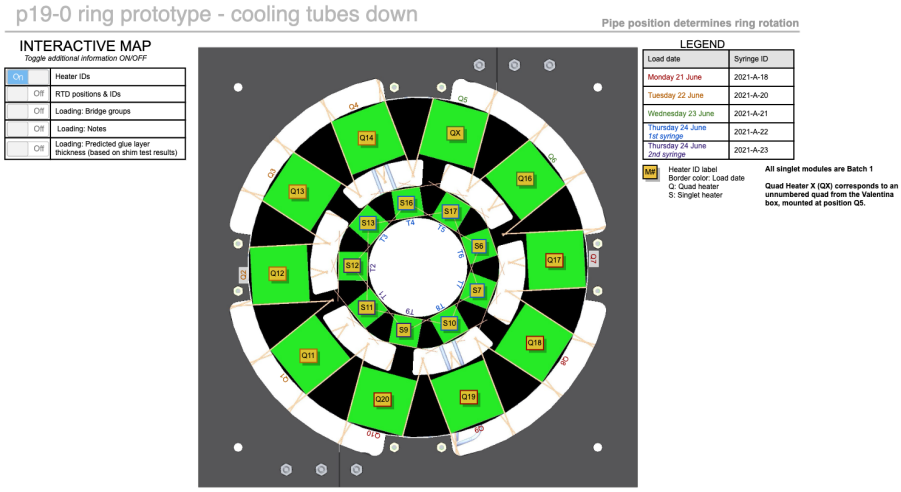
p19-0 ring tubes down interactive map

Welcome to the interactive map of the first thermomechanical ring prototype at SLAC. You can visit the Cooling Tubes Up map here.

To explore the ring map in interactive mode, use the buttons within the Gliffy diagram macro in the table on the left. **You may need to enter full screen**. Hover your mouse over the image to get the full screen menu option. Please note that this interactive map only includes loading information. Please visit the Metrology section for the Metrology results.



Screenshots from the Loading layers of the Interactive Map

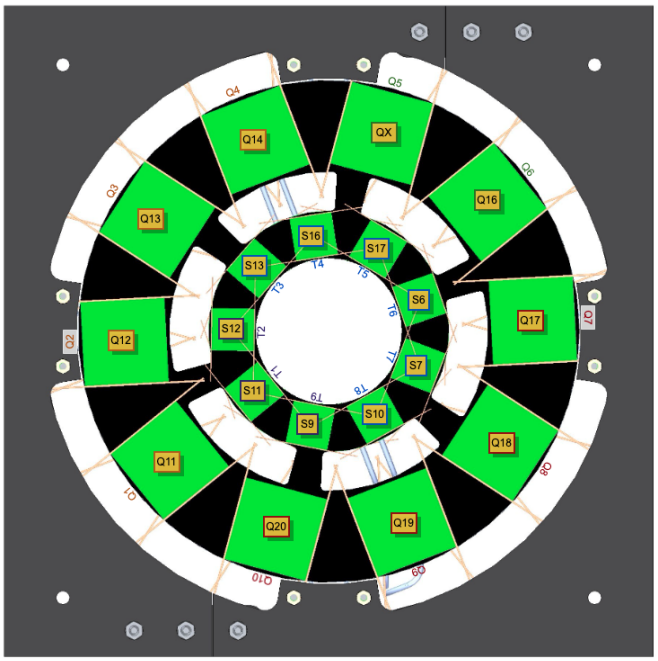
p19-0 ring prototype - cooling tubes down

Pipe position determines ring rotation

INTERACTIVE MAP

Toggle additional information ON/OFF

On		Heater IDs
	Off	RTD positions & IDs
	Off	Loading: Bridge groups
	Off	Loading: Notes
	Off	Loading: Predicted glue layer thickness (based on shim test results)



LEGEND

Load date	Syringe ID
Monday 21 June	2021-A-18
Tuesday 22 June	2021-A-20
Wednesday 23 June	2021-A-21
Thursday 24 June *1st syringe*	2021-A-22
Thursday 24 June *2nd syringe*	2021-A-23

M# Heater ID label
Border color: Load date
Q: Quad heater
S: Singlet heater

All singlet modules are Batch 1

Quad Heater X (QX) corresponds to an unnumbered quad from the Valentina box, mounted at position Q5.

p19-0 ring prototype - cooling tubes down

Pipe position determines ring rotation

INTERACTIVE MAP

Toggle additional information ON/OFF

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	Off	RTD positions & IDs
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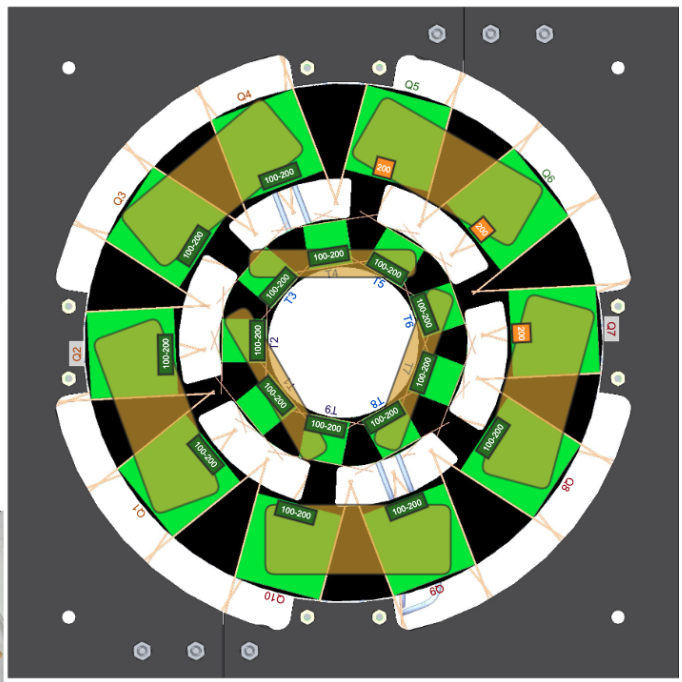
	Off	Loading: Notes
On		Loading: Predicted glue layer thickness (based on shim test results)



LEGEND

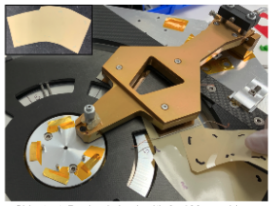
Load date	Syringe ID
Monday 21 June	2021-A-18
Tuesday 22 June	2021-A-20
Wednesday 23 June	2021-A-21
Thursday 24 June *1st syringe*	2021-A-22
Thursday 24 June *2nd syringe*	2021-A-23

100-200 Expected glue thickness within specifications
Passed 100-um & 200-um shim tests at loading time

200 Expected thickness ~200 um
Passed 100-um test; almost blocks 200-um shim

X Expected thickness >>200 um
Allowed 200-um shim between module & surface easily
X = best guess expected thickness derived from loading experience

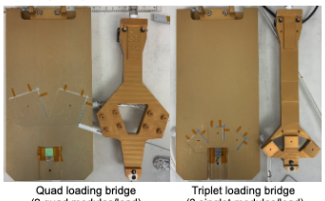
Shim testing during Loading
100-um shim test passed = shim slipped into module-ring gap
200-um test passed = shim blocked and cannot enter gap



Shim test: Dry-load check with 2x 100-um shims to spot check expected glue layer thickness.
One shim should slide underneath
(pass 100-um test)
while the second shim should get blocked
(pass 200-um test).

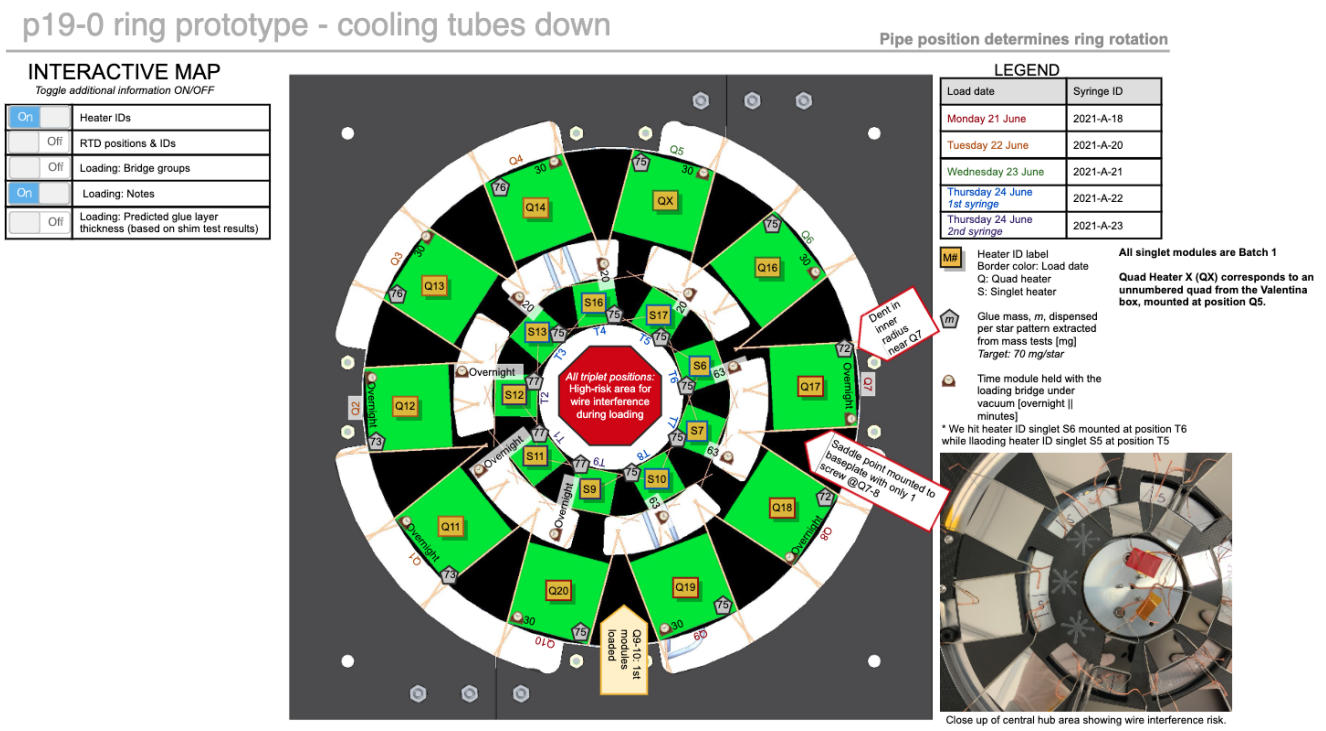
For the p19-0 ring loading, we have two bridges. One bridge loads 2 quads at a time, and the other loads 3 singlets at a time (a triplet).
Quad pair positions:
- Q9-Q10
- Q1-Q2
- Q3-Q4
- Q5-Q6
- Q7-Q8

Triplet set positions:
- T9-T1-T2
- T3-T4-T5
- T6-T7-T8



Quad loading bridge
(2 quad modules/load)

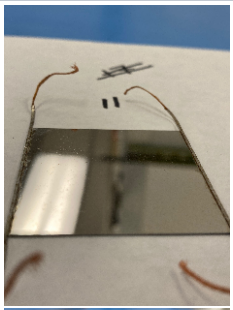
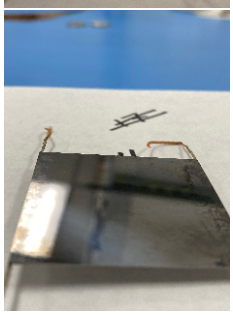
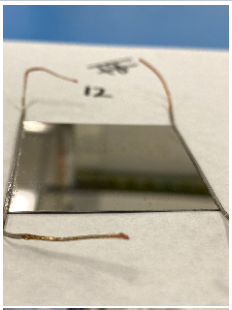
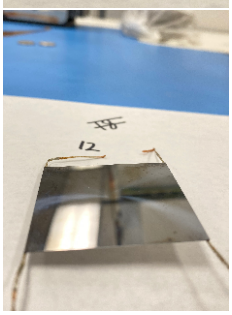
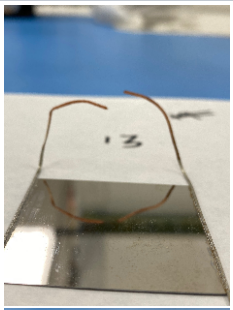
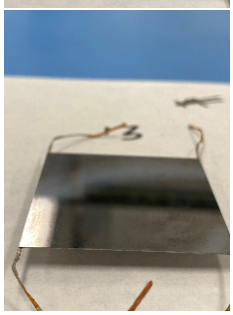
Triplet loading bridge
(3 singlet modules/load)

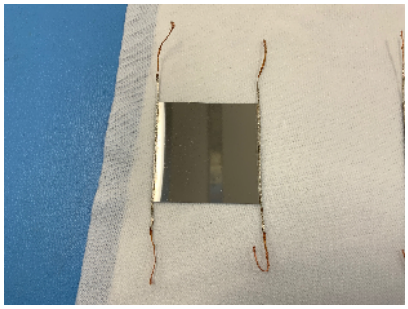
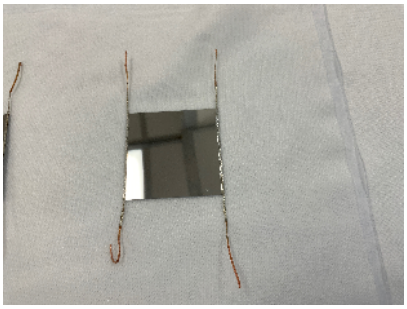
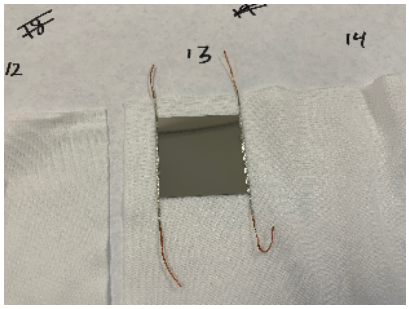


Observations, properties, and measurements by Heater ID

Properties: Quads

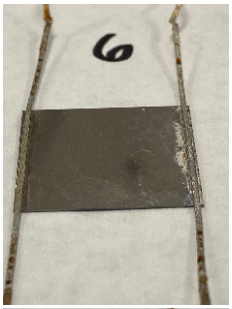
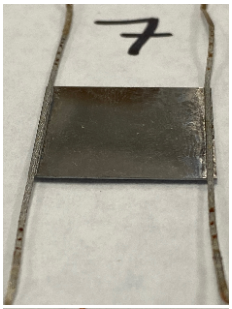
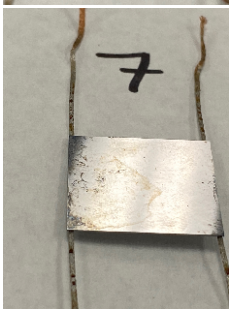
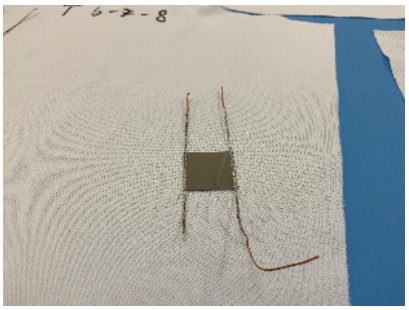
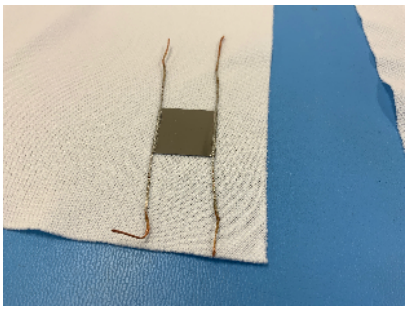
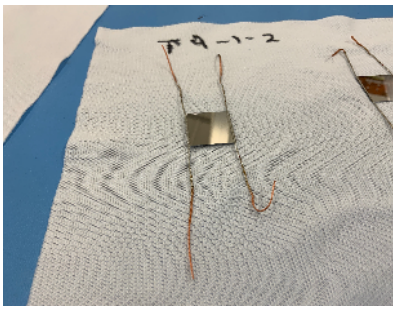
Properties – Heater ID: Quad, batch	#11	#12	#13
Length (cm)	4.108	4.107	4.100
Width (cm)	4.259	4.248	4.259
Thickness (m)	312	312	315
Resistance when wires first bonded ()	2.5	2.4	2.4
Resistance: mounted on ring, before spray painting ()			
Mass (g)	1.521	1.545	1.568
Module thickness at center, measured with micrometers (m)	302	303	303

Wire thicknesses, measured with calipers (mm)	0.70, 0.69, 0.70, 0.72 (clockwise from top left in post-wash picture)	0.68, 0.73, 0.71, 0.69 (clockwise from top left in post-wash picture)	0.72, 0.70, 0.69, 0.72 (clockwise from top left in post-wash picture)
Visual Inspection before loading	**#11**	**#12**	**#13**
Before IPA wash & dry rag polish	 	 	 

After IPA wash & dry rag polish			
Retrieved from storage	06/22 11 AM	06/22 11 AM	06/22 11 AM
Washing time	06/22 11:15 AM Nico	06/22 11:15 AM Nico	06/22 11:15 AM Nico
Comments	Fine	Fine	Best-looking of #11-14
Loading experience	**#11**	**#12**	**#13**
Load date (mounting time)	06/22 5:21 PM	06/22 5:21 PM	06/22 4:35 PM
Load position	QD1	QD2	QD3
Shim testing results	**#11**	**#12**	**#13**
Expected glue layer thickness (m)	100-200	100-200	100-200
100-m shim	Enters	Enters	Enters
200-m shim	Blocked	Blocked	Blocked
Glue batch	**#11**	**#12**	**#13**
Syringe ID	2021-A-20	2021-A-20	2021-A-20
Date dispensed	06/22 5:16 PM	06/22 5:16 PM	06/22 4:30 PM
Dispensing	**#11**	**#12**	**#13**
Estimated glue mass per star (mg)	73.4	73.4	76
Averaged mass tests	#11-15	#11-15	#7-9
Time elapsed since syringe fully thawed (minutes)	102	102	56
Minutes module held under vacuum (Hold time)	Overnight	Overnight	30

Properties: Triplets

Properties – Heater ID: Triplet, Batch 1	**#6**	**#7**	**#9**

Length (cm)	2.050	2.050	2.050
Width (cm)	2.131	2.131	2.131
Thickness (m)	310	310	310
Resistance when wires first bonded ()	2.6	2.6	2.6
Resistance: mounted on ring, before spray painting ()			
Mass (g)	0.585	0.579	0.636
Module thickness at center, measured with micrometers (m)	303	303	302
Wire thicknesses, measured with calipers (mm)	0.69, 0.67, 0.68, 0.68 (clockwise from top left in post-wash picture)	0.71, 0.69, 0.72, 0.71 (clockwise from top left in post-wash picture)	0.71, 0.69, 0.71, 0.70 (clockwise from top left in post-wash picture)
Visual Inspection before loading	**#6**	**#7**	**#9**
Before IPA wash & dry rag polish	 	 	
After IPA wash & dry rag polish			
Retrieved from storage	06/24 9 AM	06/24 9 AM	06/24 9 AM
Washing time	06/24 9:34 AM	06/24 9:38 AM	06/24 9:40 AM

Comments	Bottom left wire snapped after the soldered length	Seems great. Nico bent bottom left wire	Nico bent bottom right wire. Backface left side has several small chips along wired side. Super long wires. No pre-wash pictures.
Loading experience	**#6**	**#7**	**#9**
Load date (mounting time)	06/24 3:17 PM	06/24 3:17 PM	06/24 4:49 PM
Load position	TD6	TD7	TD9
Shim testing results	**#6**	**#7**	**#9**
Expected glue layer thickness (m)	100-200	100-200	100-200
100-m shim	Surfs	Surfs	Surfs
200-m shim	Blocked	Blocked	Blocked
Glue batch	**#6**	**#7**	**#9**
Syringe ID	2021-A-22	2021-A-22	2021-A-23
Date dispensed	06/24 3:15 PM	06/24 3:15 PM	06/24 4:47 PM
Dispensing	**#6**	**#7**	**#9**
Estimated glue mass per star (mg)	74.7	74.7	76.5
Averaged mass tests	#10-12	#10-12	#20'-21'
Time elapsed since syringe fully thawed (minutes)	90	90	52
Minutes module held under vacuum (Hold time)	63	63	Overnight

Loading experience

Loading order (QD = "Quad down"; TD = "Triplet down")

Date	Personnel	Syringe ID	Modules	Photo album	Records
2021-06-21	Rachel, Nico, Josh (observing)	2021-A-18	quad #19 : QD9 & quad #20 : QD10 quad #17 : QD7 & quad #18 : QD8	https://photos.app.goo.gl/9TjMexS3qjaFo5Mi8	https://atlascr.slac.stanford.edu:8080/Clean+Room+Activities/74

2021-06-22	Hannah, Nico, Josh (observing)	2021-A-20	quad #13 : QD3 & quad #14 : QD4 quad #11 : QD1 & quad #12 QD2	https://photos.app.goo.gl/jv9XFrViMNAmFj2H6	https://atlascr.slac.stanford.edu:8080/Clean+Room+Activities/75 
2021-06-23	Rachel, Nico	2021-A-21	quad X : QD5 & quad 16 : QD6	https://photos.app.goo.gl/JC9KY44MKsRAjGWK9	https://atlascr.slac.stanford.edu:8080/Clean+Room+Activities/76
2021-06-24	Hannah, Nico, Joshua (observing)	2021-A-22, 2021-A-23	All triplets T345 B1 #13 : TD3, B1 #16 : TD12, B1 #17 : TD5 T678 B1 #6 : TD6, B1 #7 : TD7, B1 #10 : TD8 T912 B1 #9: TD9, B1 #11 : TD1, B1 #12 : TD2	https://photos.app.goo.gl/pE2V1kYvqVuwVrGRA	https://atlascr.slac.stanford.edu:8080/Clean+Room+Activities/77 

Metrology

Link to slides showing results of heater x,y measurements https://docs.google.com/presentation/d/1ZdiT7JzgxqH46K8tOTxdChammp0vxplUcT0MfgkjaGo/edit?usp=sharing

Thermal imaging