

DMRadio 50L Cold Snout

DMRadio Collaboration Meeting

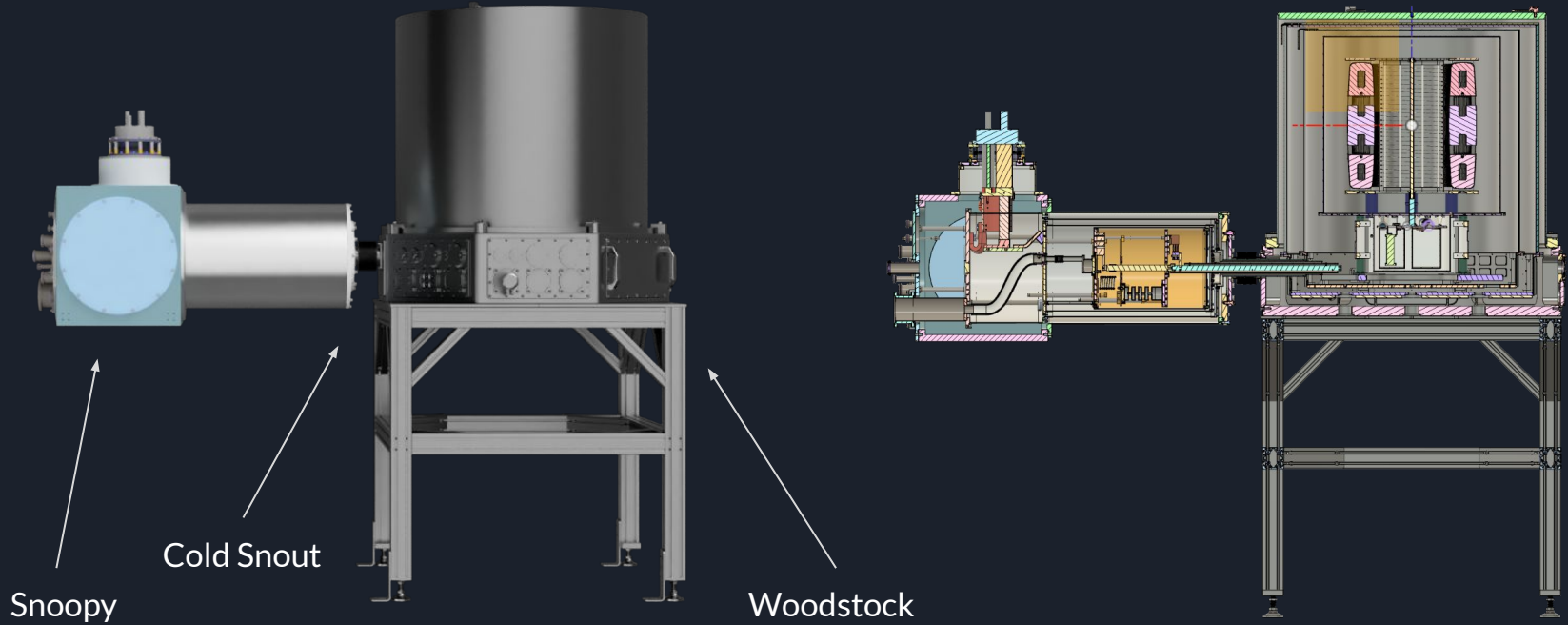
August 5th, 2024

Outline

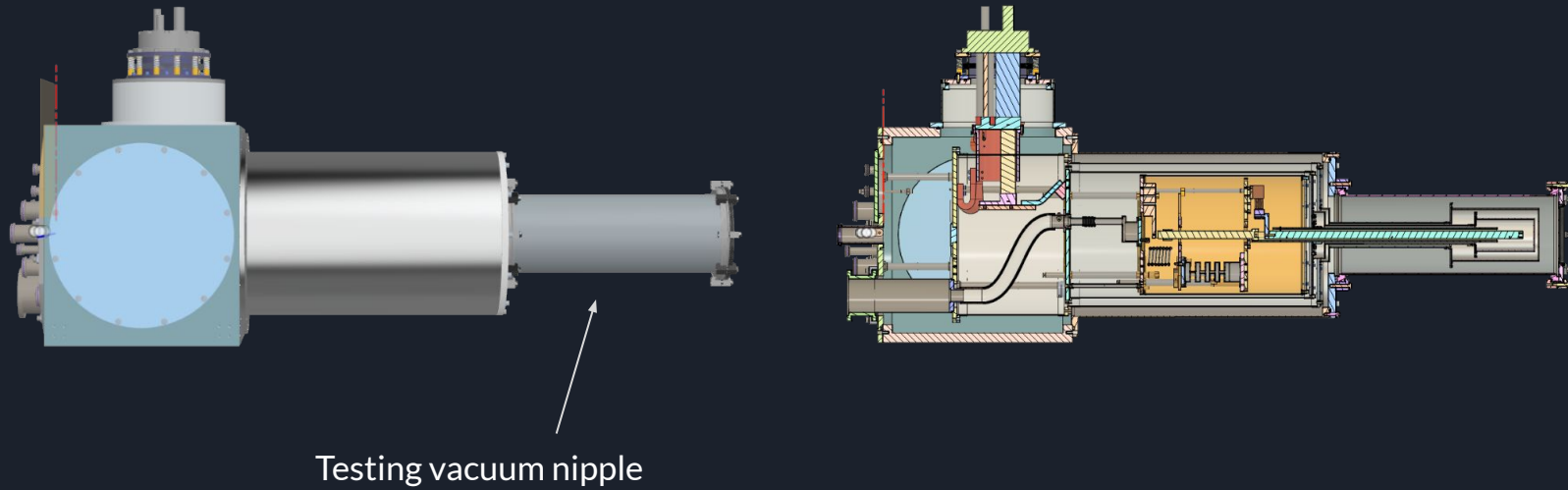
1. Setup & Goals
2. Cooldown 1
3. Cooldown 2
4. Cooldown 3
5. Future & Schedule



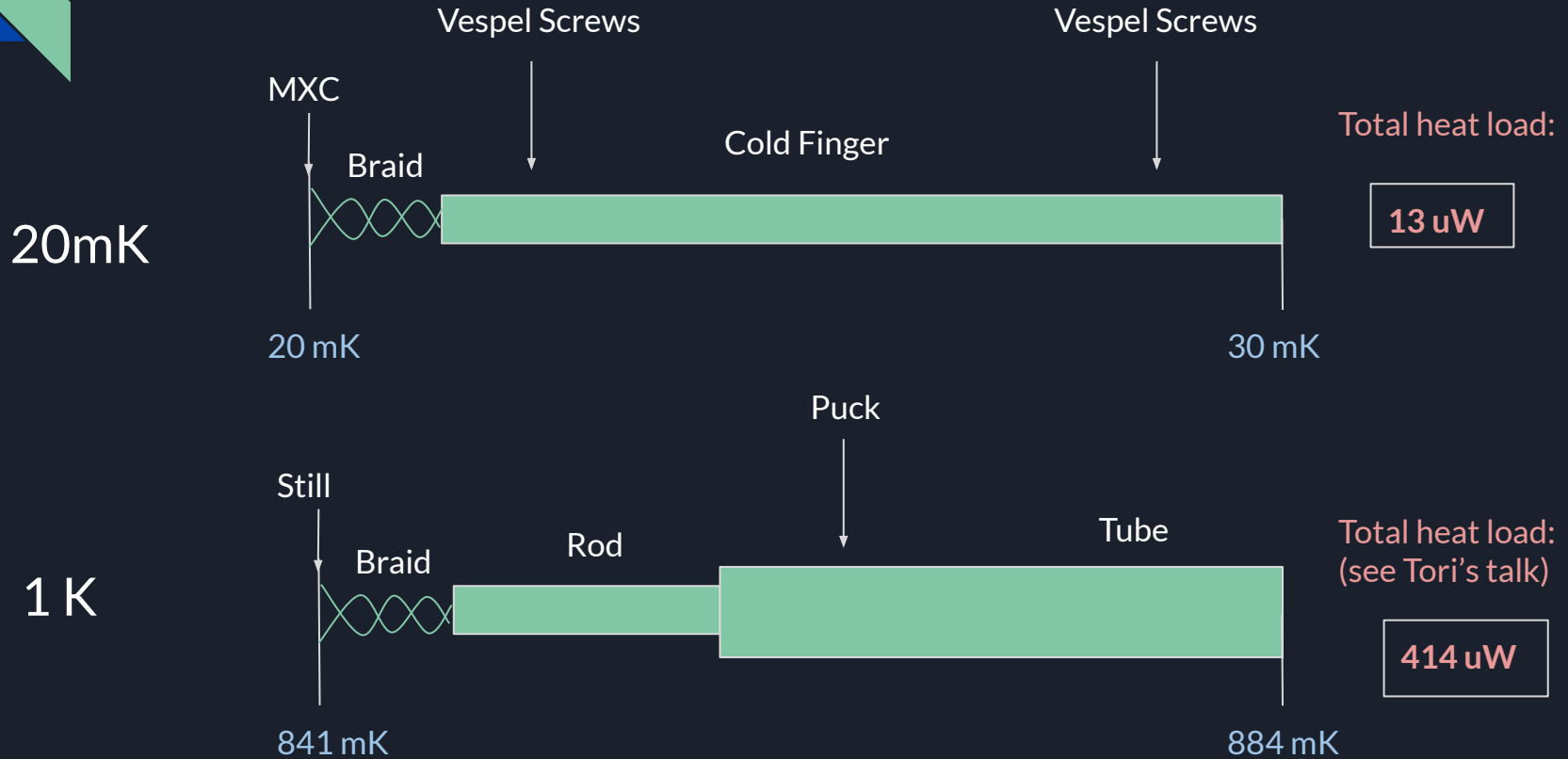
Setup - Woodstock Configuration



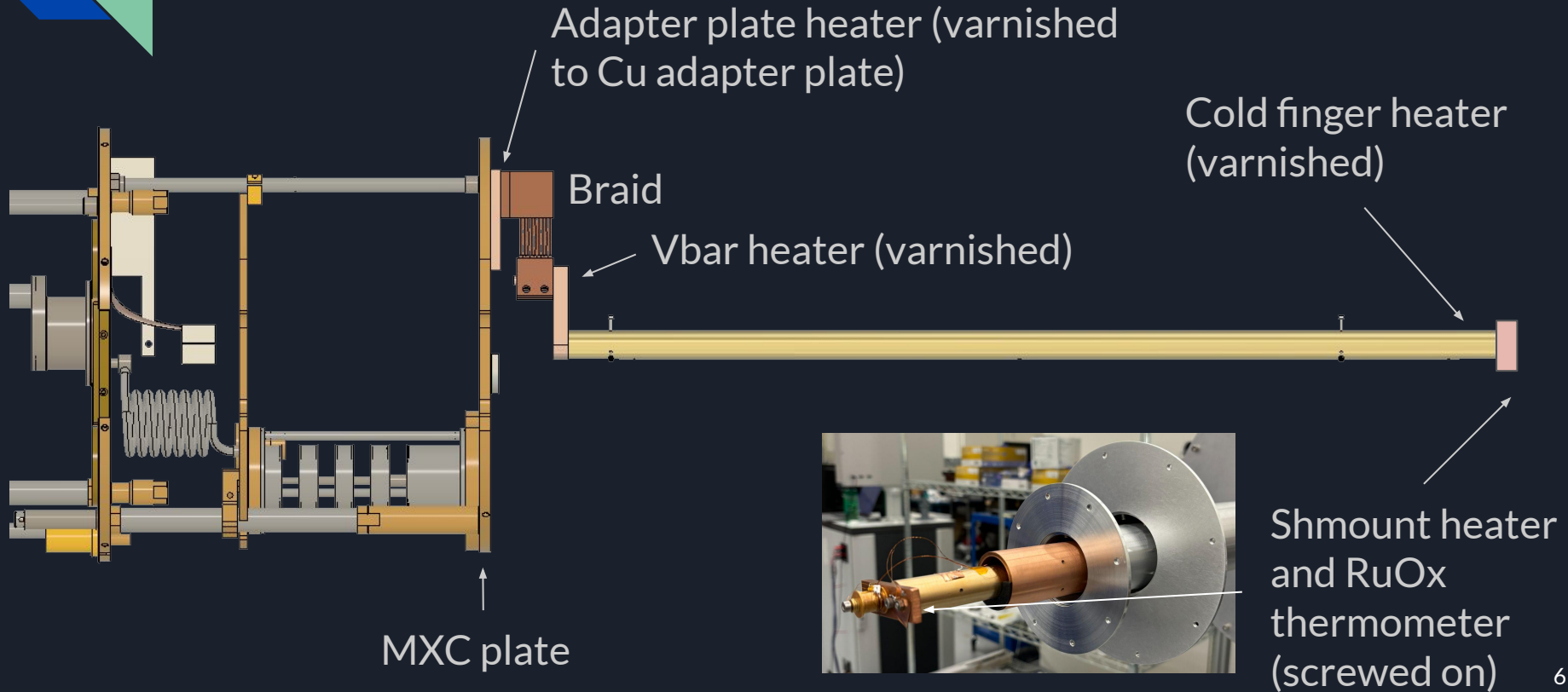
Setup - Snoopy Configuration

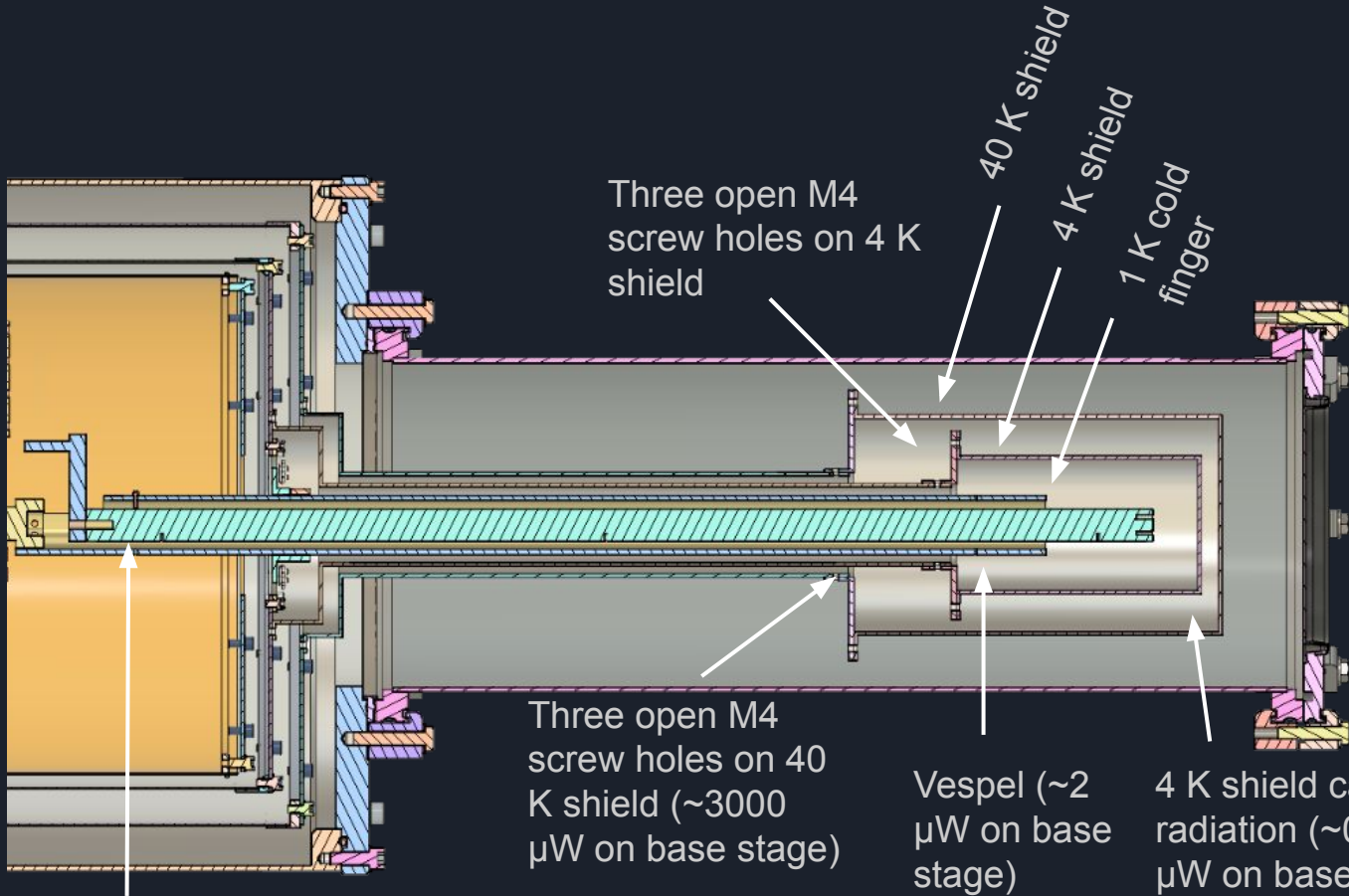


Expected Thermal Gradients



Cooldown 1





Vespel (~2 μW on base stage)



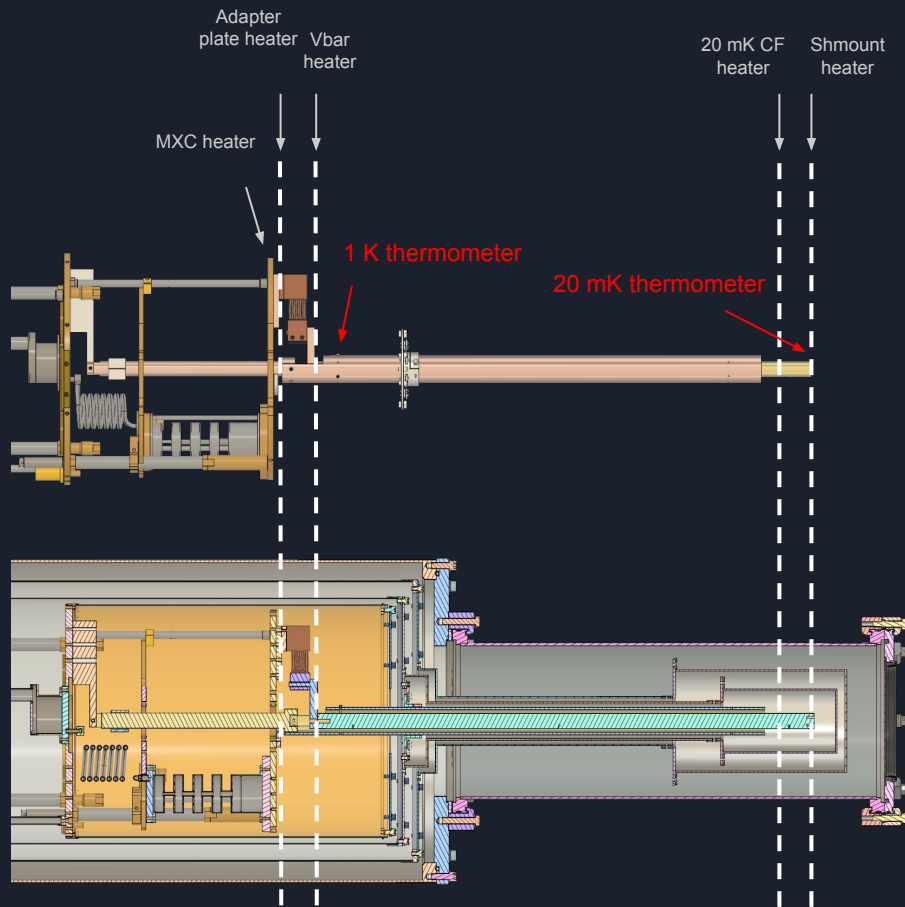
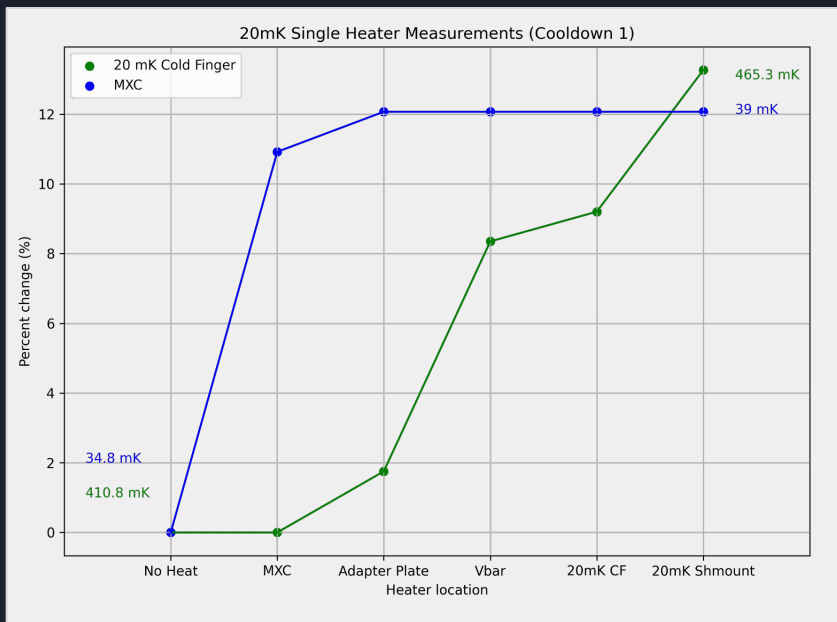
Cooldown 1 Results

Still Temperature: 880 mK

MXC Temperature: 32.9 mK

20mK Shmount Temperature: 393 mK

Cooldown 1 - 20 mK Interfaces



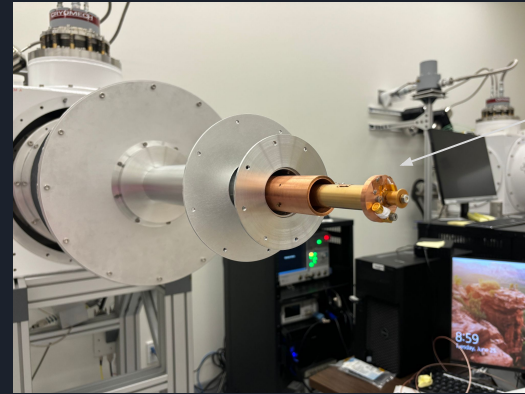
Cooldown 2

Improvements

Cover holes in 4K and 40K shields

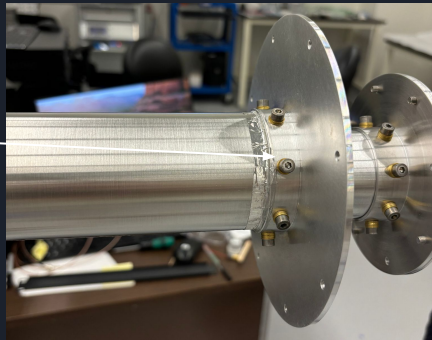
Improve 20mK shmount to make assembly easier

Add 1K shmount

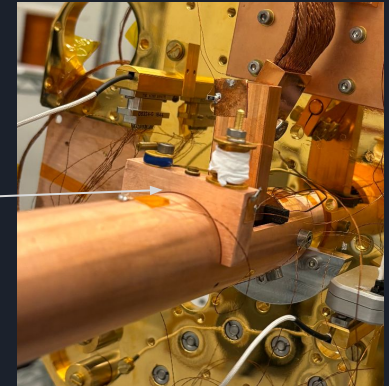


20mK shmount

Covered holes in
40K and 4K shields

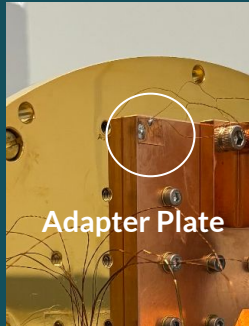
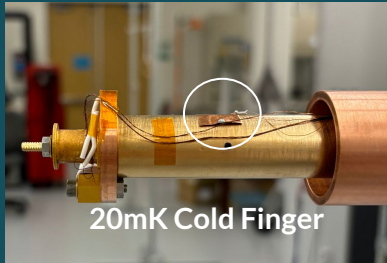


1K shmount

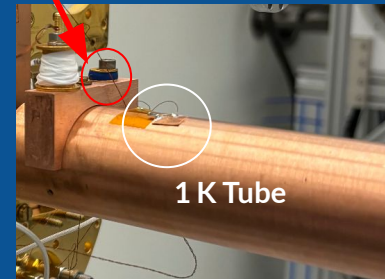
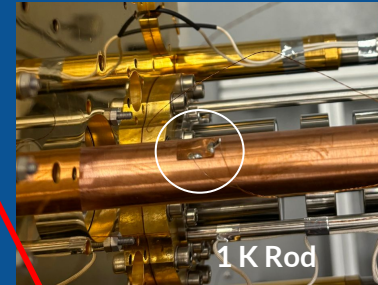


Cooldown 2 - Heaters & Thermometers

20 mK



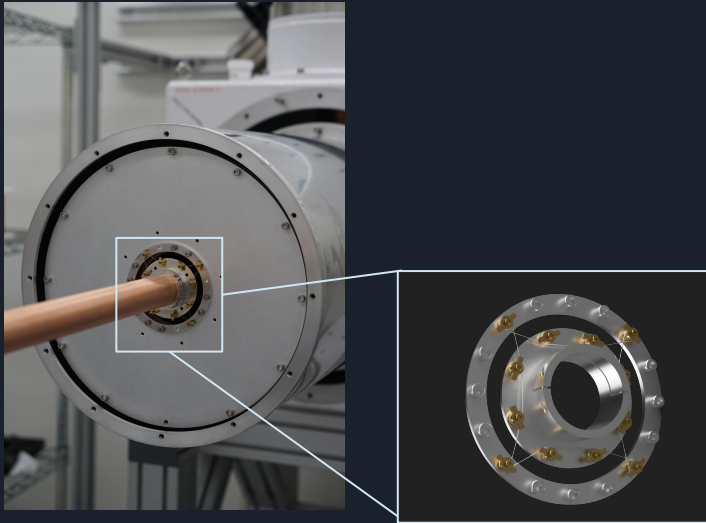
1 K



Thermometers

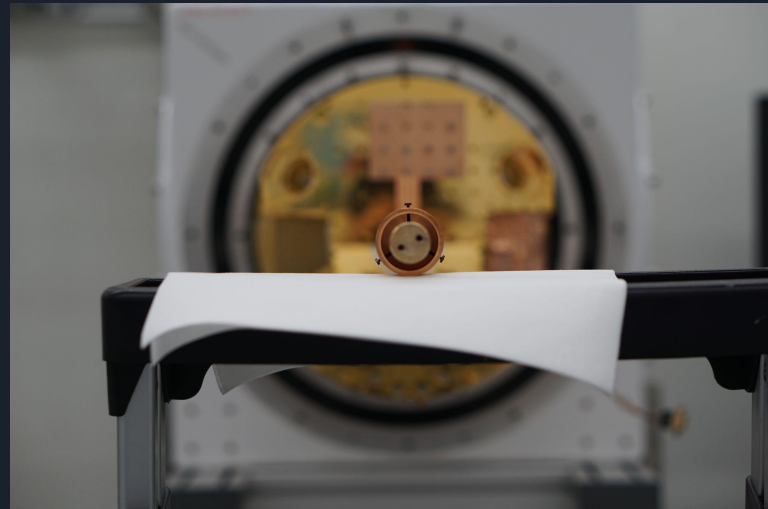
Cooldown 2 - Insulating Connections

Puck



1 K \rightarrow 4 K

Vespel Screws



20mK \rightarrow 1 K



Cooldown 2 Results - Temperatures

Cooldown 1

Still Temperature: 880 mK

MXC Temperature: 32.9 mK

20mK Shmount Temperature: 393 mK

Cooldown 2

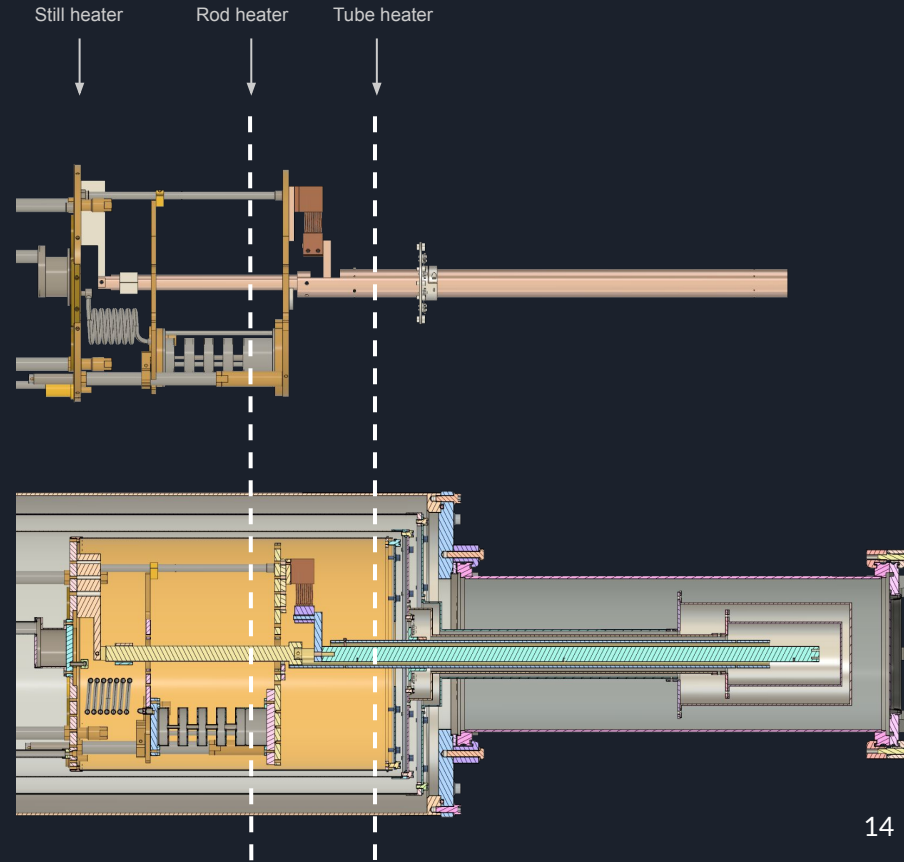
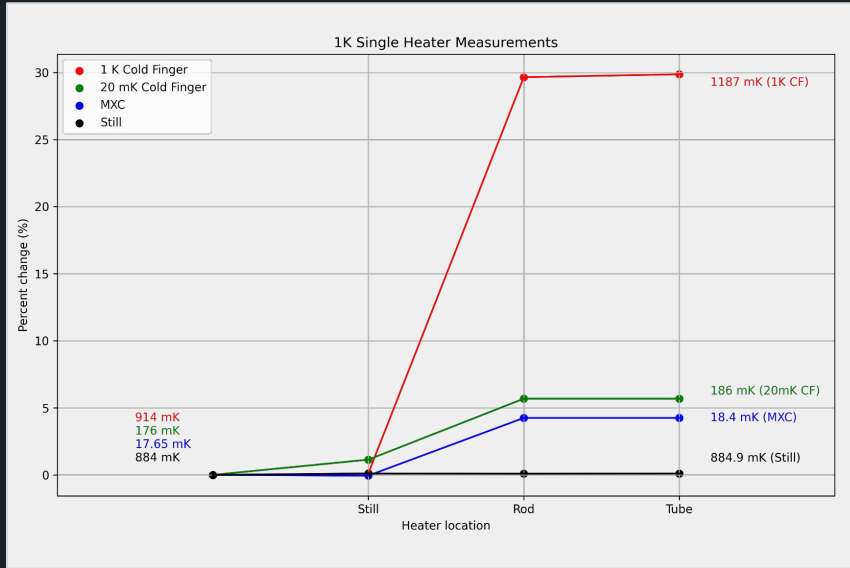
Still Temperature: 884 mK

MXC Temperature: 17.65 mK

20mK Shmount Temperature: 176 mK

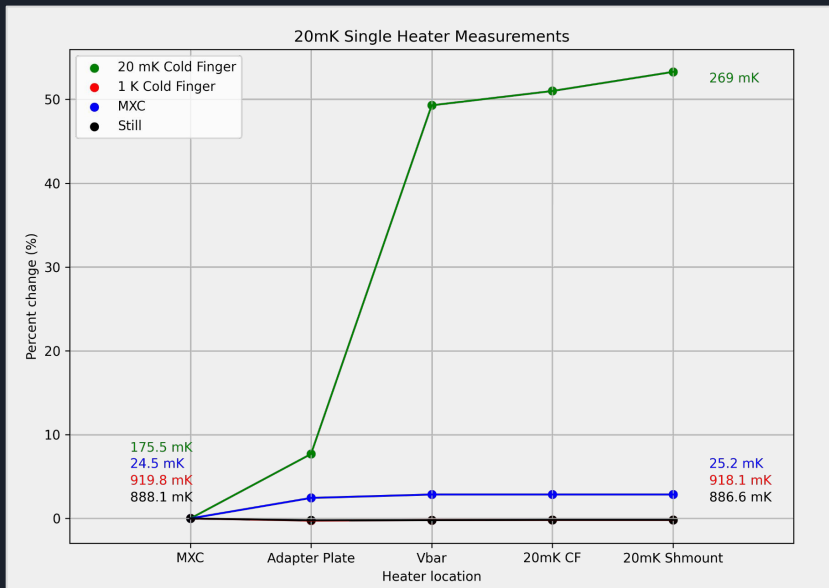
1K Shmount Temperature: 914 mK

Cooldown 2 Results - 1 K Interfaces

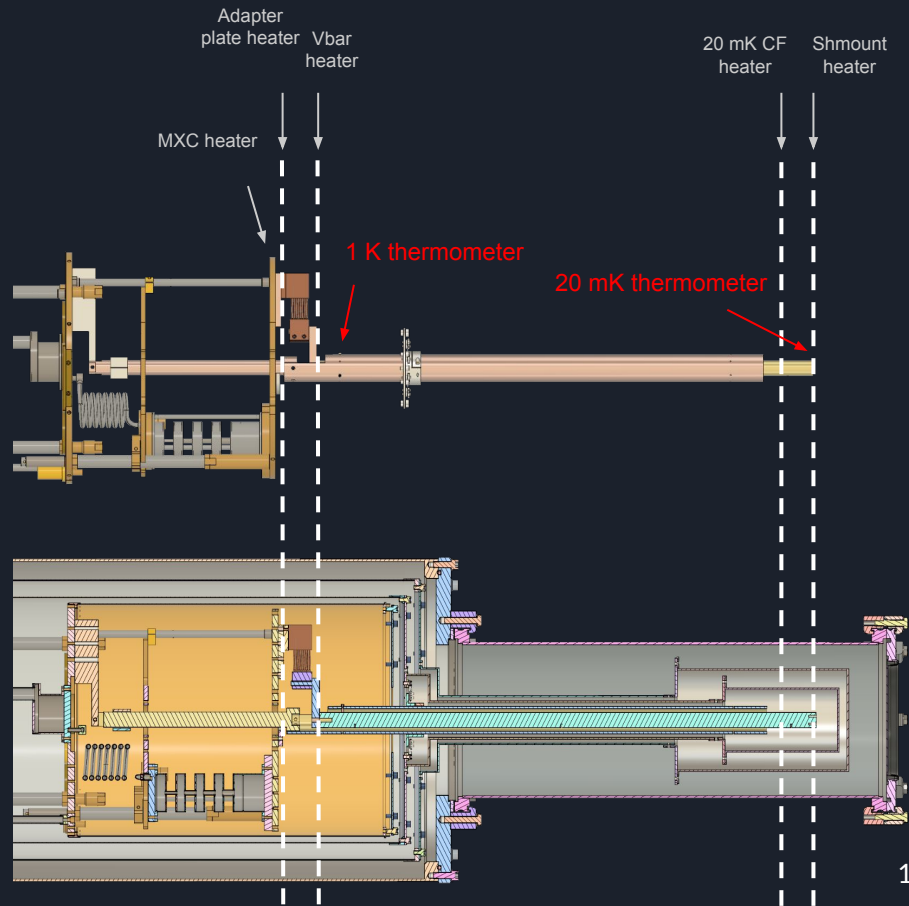


Takeaway: Still-to-Rod interface is weakest

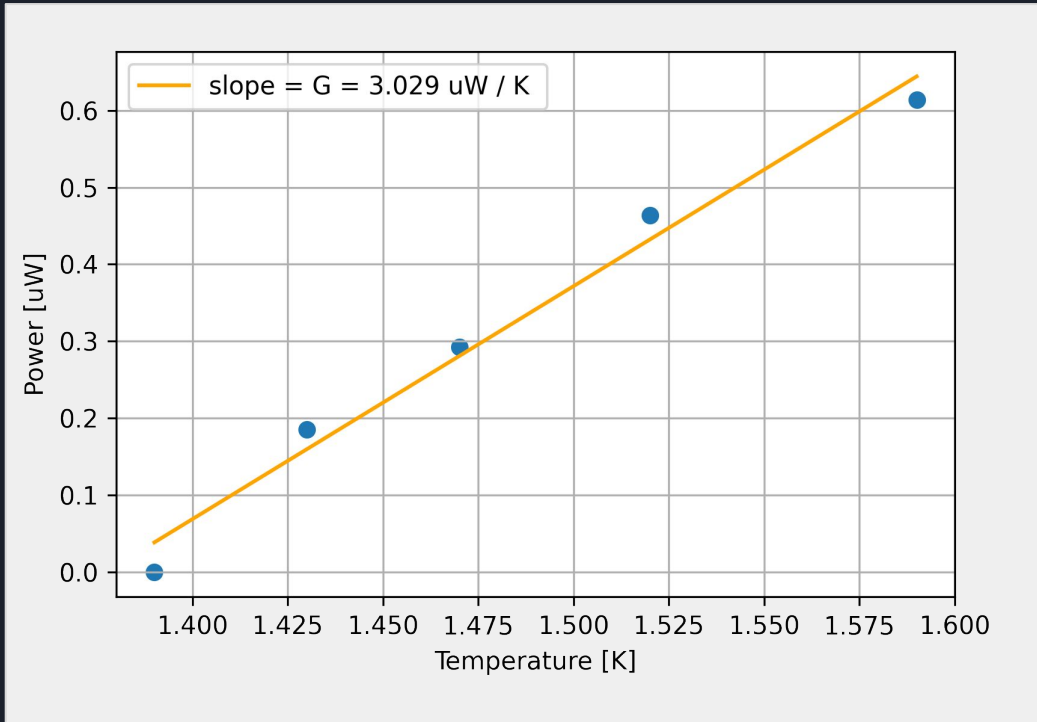
Cooldown 2 Results - 20mK Interfaces



Takeaway: Adapter Plate-to-Vbar interface is weakest



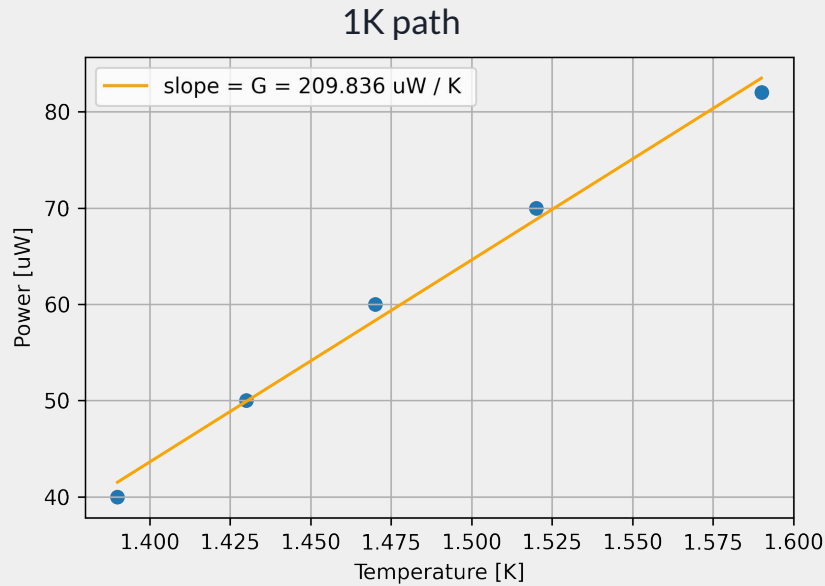
Cooldown 2 - Vespel Screws



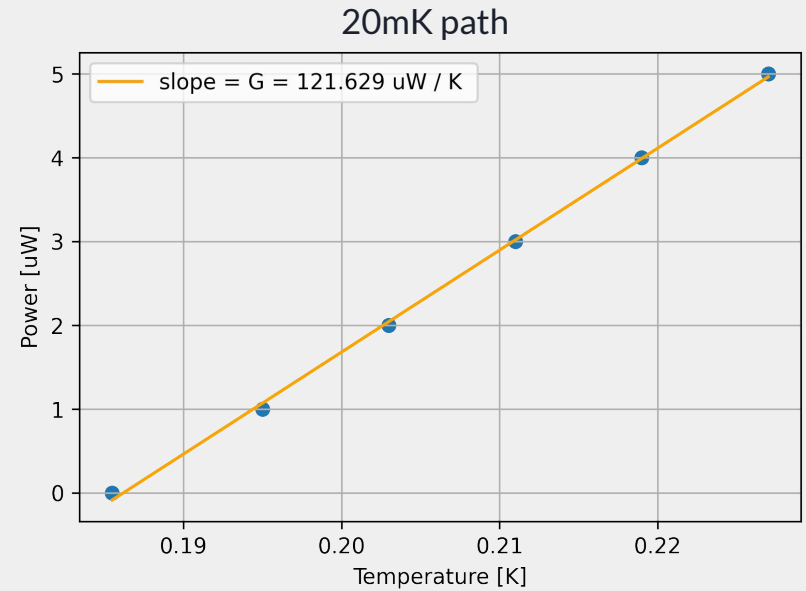
Expected: 4 uW/K

Measured: 3 uW/K

Cooldown 2 - Heat Loads



Heat Load: 4 uW



Heat Load: 10 uW

Cooldown 3

Improvements

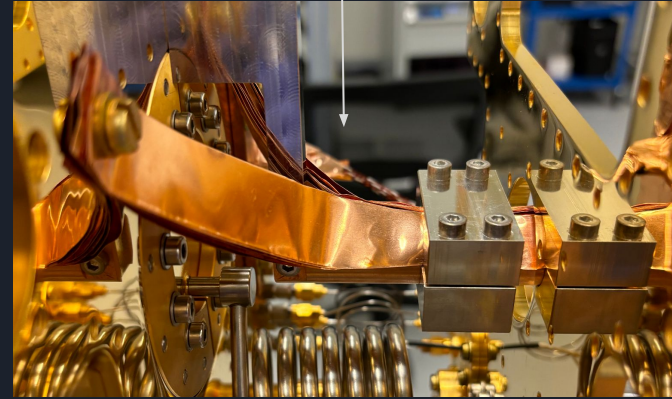
1K thermal straps (increase number and improve contact area)

Vbar-to-braid fit (new vbar with better fit)

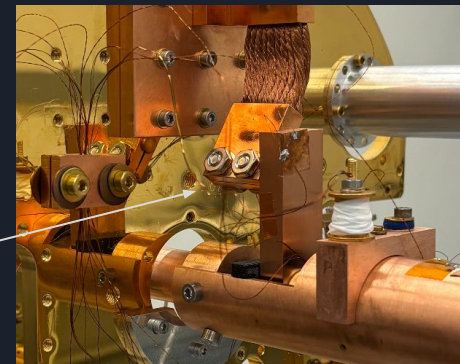
Al tape over seams

4K thermometer on the end of the shield

Better 1 K straps



Vbar-to-braid clamp



Schedule & Goals

