Location	Sch. Name	Color	DT-670	Serial	adc	ch
4K Series Array Board	60K DT 01	Red	C-CU	D6029761	adc2	2
60K Plate next to BluFors Therm.	60K DT 02	Blue	C-CU	D6029762	adc2	3
60K Plate Det. Feedthrough	60K DT 03	Yellow	C-CU	D6029759	adc2	4
60K Plate Hous. Feedthrough	60K DT 04	Green	C-CU	D6039760	adc2	5
60K Radiation Shield 3/3 146.7 cm	60K DT 05	Red	C-CU	D6032465	adc2	6
60K Radiation Shield 2/3 96.0 cm	60K DT 06	Blue	C-SD	D6031606	adc2	7
60K Radiation Shield 1/3 52.0 cm	60K DT 07	Yellow	C-SD	D6032235	adc2	8
60K Radiation Shield 3/3 0.0 cm	60K DT 08	Green	C-CU	D6029765	adc2	9
Free Float	60K DT 09	White	C-SD	D6032233	adc2	10
Thermal Filter Stack	60K DT 10	Black	C-CU	D6032664	adc2	11
Cal Plate	4K DT 01	Red	B1-CU	D6031017	adc1	0
Cal Plate	4K DT 02	Blue	B1-CU	D6031033	adc1	1
SA Heat Sink	4K DT 03	Yellow	B1-CU	D6030649	adc1	2
BF Wire Feedthrough	4K DT 04	Green	B1-CU	D6030521	adc1	3
4K Radiation Shield 3/3 141.0 cm	4K DT 05	Red	B1-CU	D6030622	adc1	4
4K Radiation Shield 2/3 91.5 cm	4K DT 06	Blue	B1-SD	D6033167	adc1	5
4K Radiation Shield 1/3 48.0 cm	4K DT 07	Yellow	B1-SD	D6033534	adc1	6
4K Radiation Shield 0/3 0.0 cm	4K DT 08	Green	B1-CU	D6030627	adc1	7
Free Float	4K DT 09	White	B1-SD	D6033628	adc1	8
Thermal Filter Stack	4K DT 10	Black	B1-CU	D6030628	adc1	9
100k Res	4K DT 11	Red-Blk	B1-CU	n/a	adc1	10
SHA-D01 LK	4K DT 12	Blu-Blk	B1-CU	n/a	adc1	11
Short	4K DT 13	Yel-Blk	B1-CU	n/a	adc2	0
1K Lens Dummy	4K DT 14	Grn-Blk	B1-CU	D6030589	adc2	1

Table 1: Map of diode locations and sleipnir corrosponding channels.

1 Load Tests

To understand the thermal performance of the cryostat I measured and calculated the thermal conductivity of the various stages. To do this I lump the length, area, and thermal conductivity into one constant, G. It is important to be aware that G may not be constant with temperature.

$$P = G * \Delta T \quad \text{with} \quad G \approx 2\frac{\mathrm{W}}{\mathrm{K}} \tag{1}$$

We note that the 4.8 K offset indicates an inherent load of 5.889 W. Finally we note that we observed roughly half a kelvin drif in temperature between the two sets of measurments. This drift was almost three Kelvin at the Top of the Radiation Shield. Realizing that the total tempterature increase of the 60 K plate was six Kelvin and 14 K at the top of the Radiation Shield, I think it wise to attach a 20% error on all calculations.

Location	a	b	c
4K Thermal Filter Stack	-9×10^{-5}	0.0370	2.5798
4K Can 3/3	-4×10^{-5}	0.0228	2.6890
4K Can 2/3	-4×10^{-5}	0.0194	2.0648
4K Can 1/3	-2×10^{-5}	0.0117	2.5165
4K Can 0/3	-5×10^{-5}	0.0051	3.2076
SA Heat Sink	-5×10^{-6}	0.0047	2.5081

Table 2: Fit Coefficients of 4K thermometers.

1.1 60K Load Test

$$G \approx 2\frac{K}{\mathrm{W}} \tag{2}$$

Loading the top of the $60\mathrm{K}$ can is expected to produce G values which monotonically decrease according to distance away from the cooling reservoir. That is, the $60\mathrm{K}$ plate should show the smallest response in temperature, while the top of the can should exhibit the largest. If there are no relative errors or relative loading

1.2 4K Load Test

$$G \approx 37\frac{mK}{\mathrm{mW}} \tag{3}$$

1.3 1K Load Test

$$G \approx 22\frac{mK}{\mu\mathrm{W}} \tag{4}$$

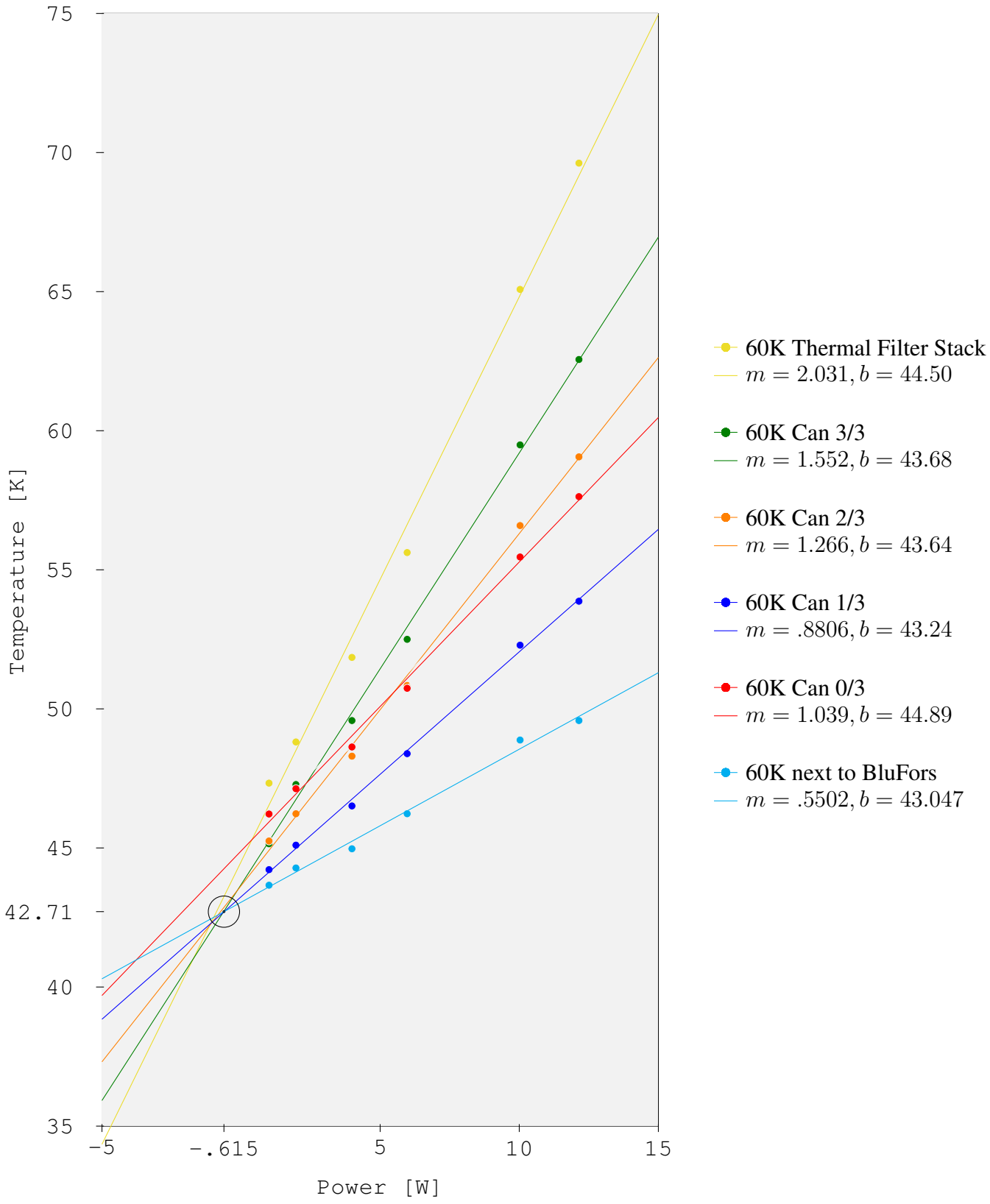

Figure 1: These are the results of the second loading test. Performed on Cryo One in April 2014.

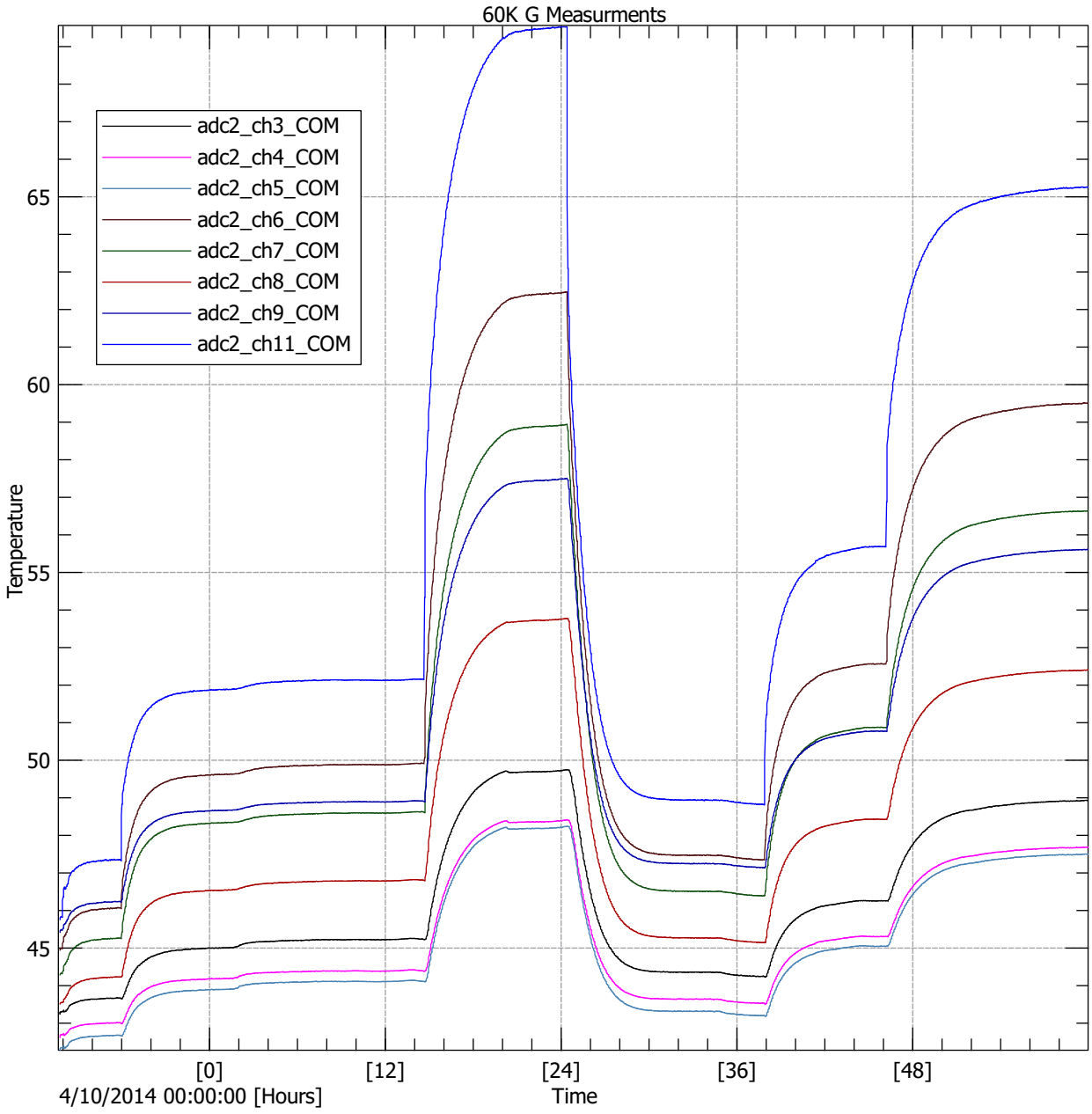

Figure 2: Temperature data collected on April 10^{th} 2014. The plots show time, in hours since 0000 GMT, vs. Temperature, in Kelvin. This Plot was produced using KST2.

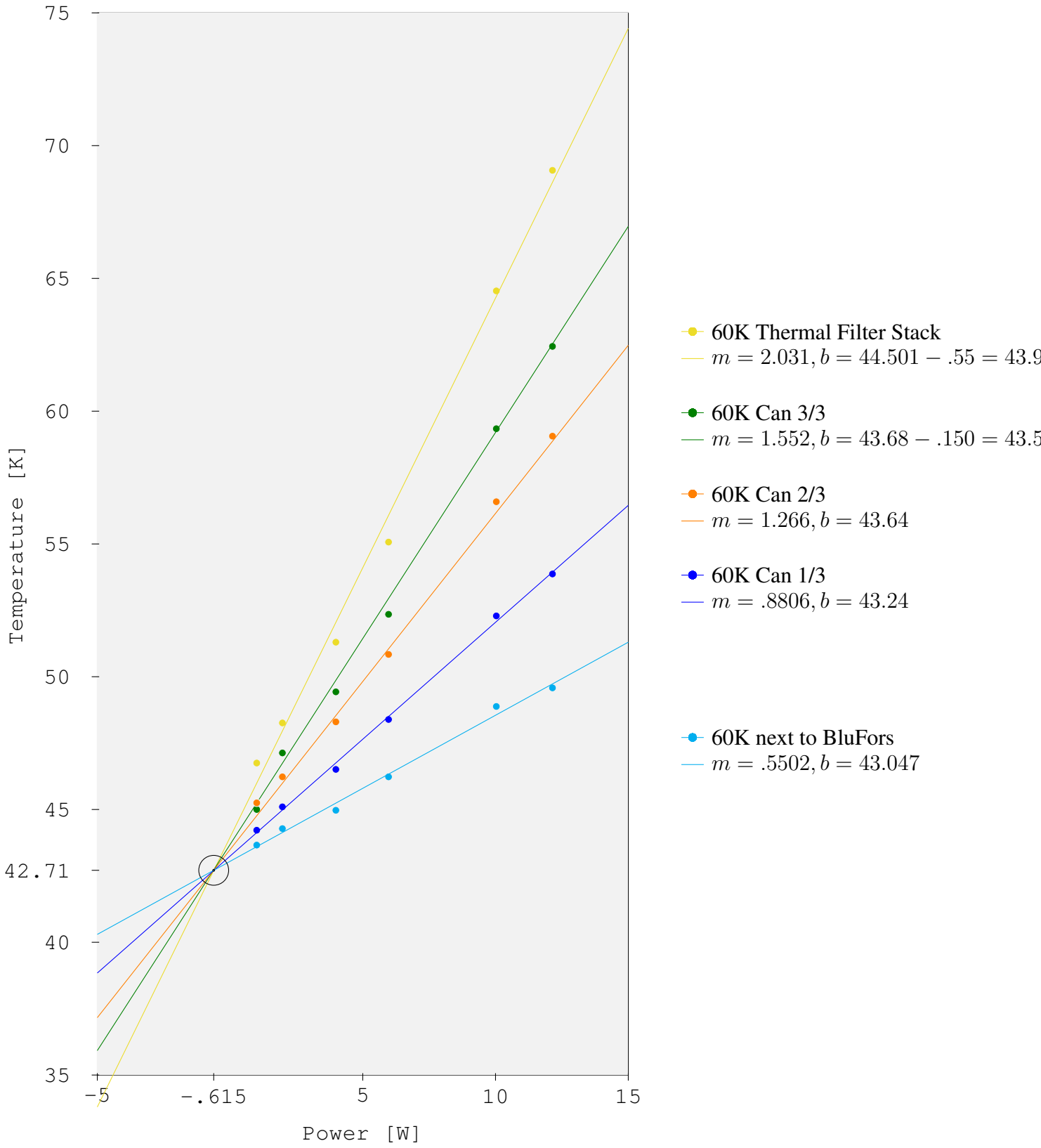

Figure 3: Relative calibration performed on 60K Diodes.

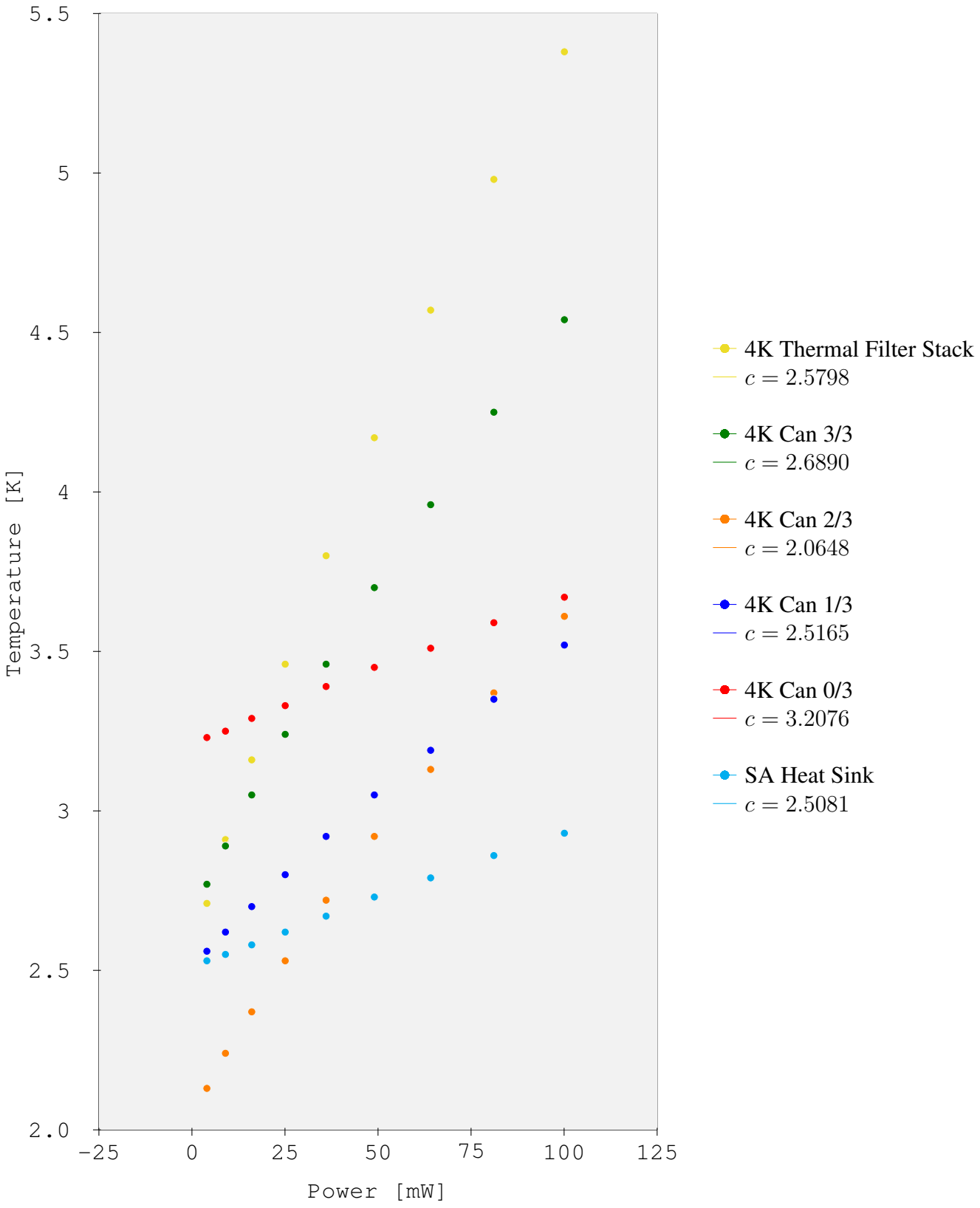

Figure 4: These are the results of the second loading test. Performed on Cryo One in April 2014.

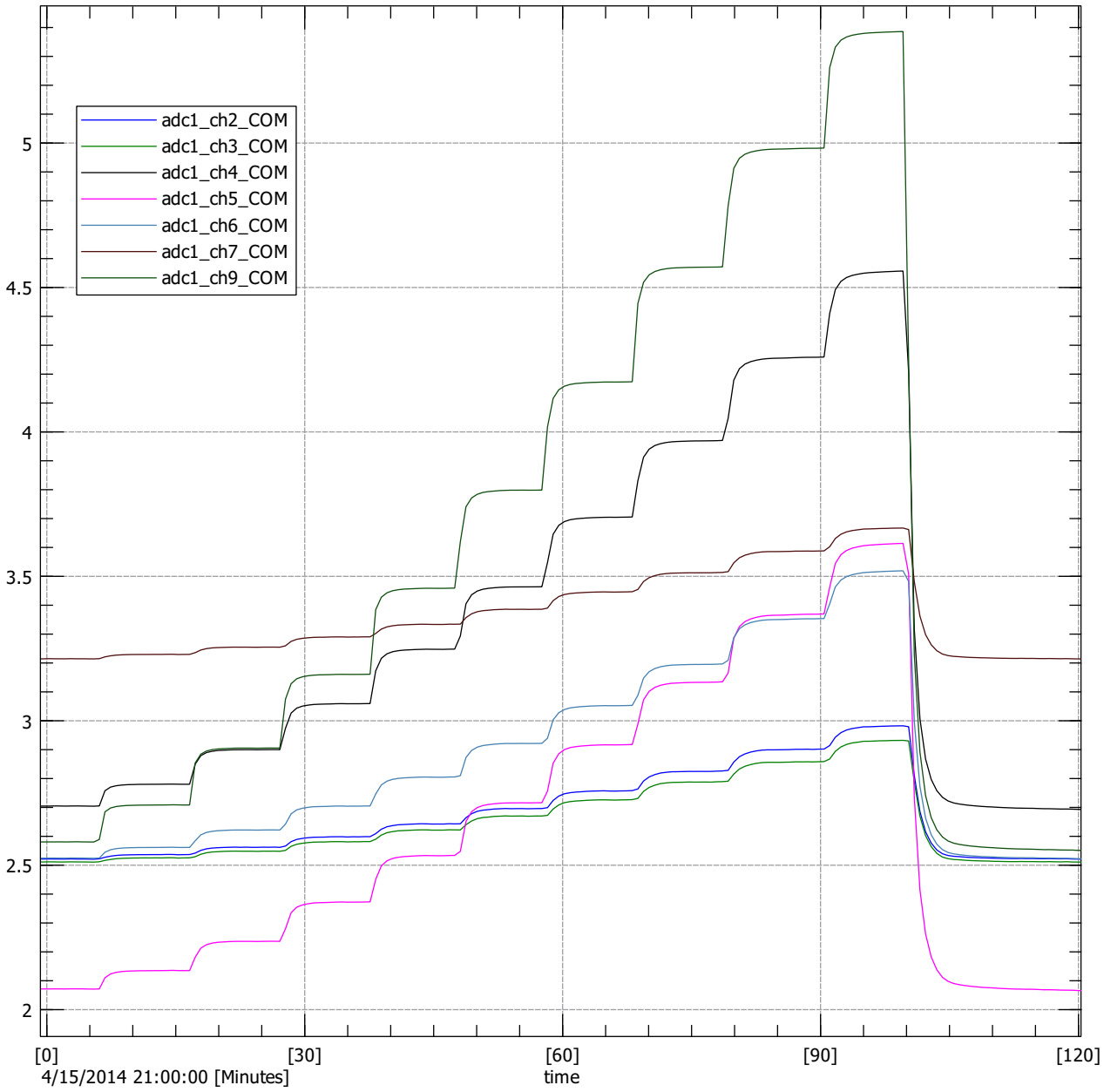

Figure 5: Temperature data collected on April 15^{th} 2014. This plot shows time, in minutes, since 2100 GMT, vs. Temperature, in Kelvin. This Plot was produced using KST2.

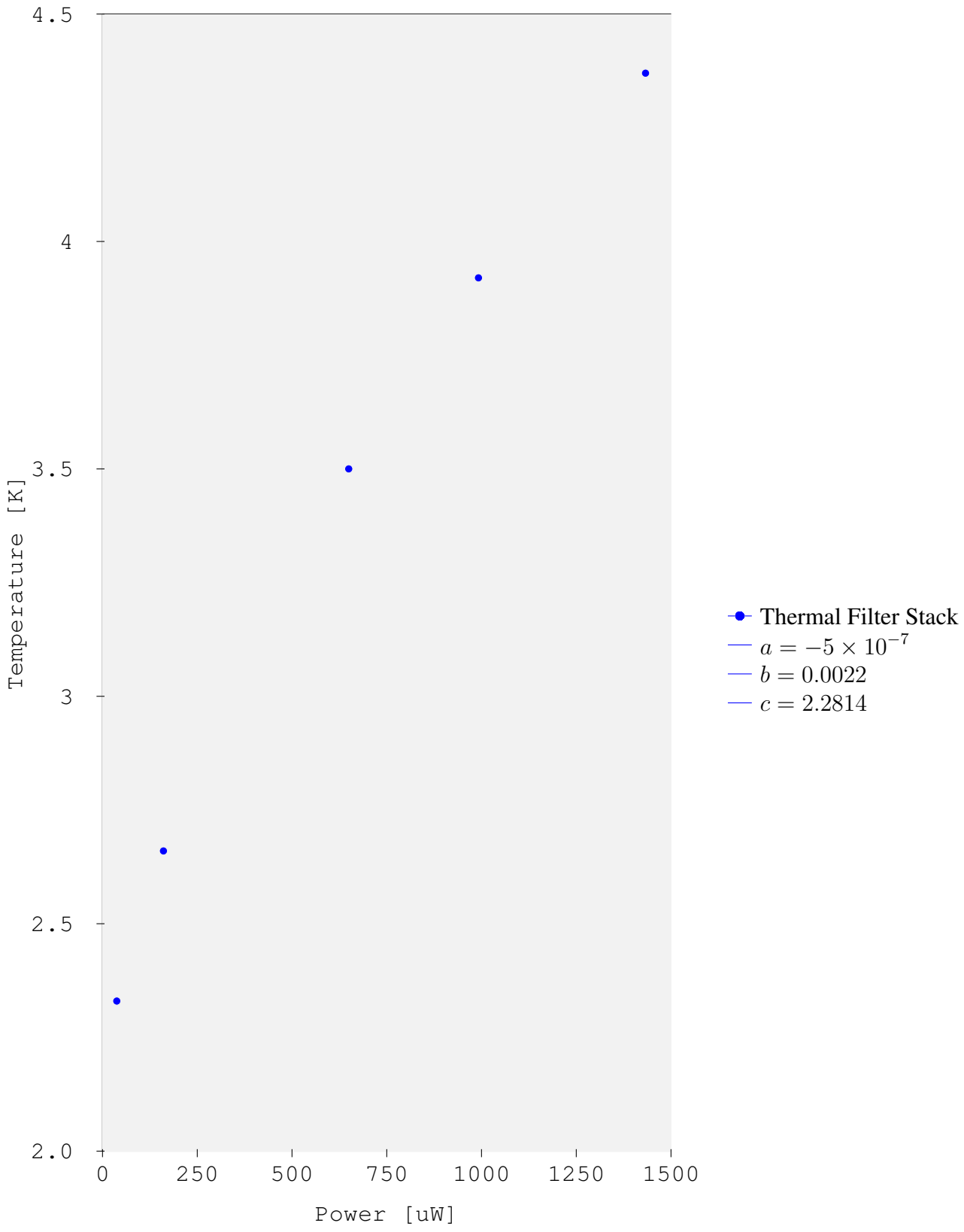

Figure 6: These are the results of the second loading test. Performed on Cryo One in April 2014.

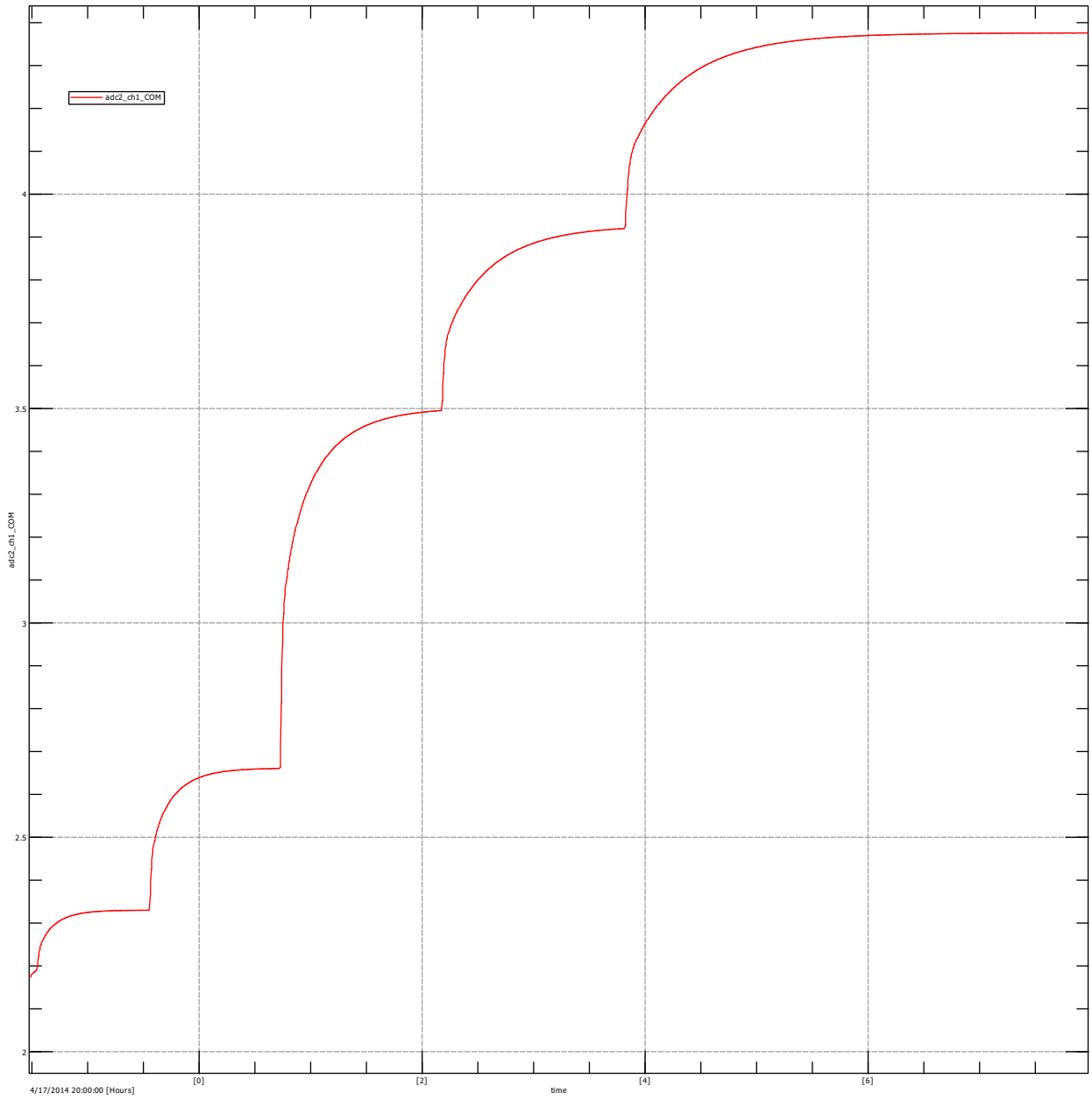

Figure 7: Temperature data collected on April 15^{th} 2014. This plot shows time, in minutes, since 2100 GMT, vs. Temperature, in Kelvin. This Plot was produced using KST2.

"Goodbye, have a beautiful time!"