



CRaTER Thermal Analysis

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(Post PSR Addendum)

*Cosmic **RA**y Telescope for the **E**ffects of **R**adiation*



Contents

The results of the Thermal Balance Tests conducted at Lincoln Labs, compared with the Thermal Model predictions for those tests. Included are numbers for temperatures and heat flows.

The thermal model flight predictions, for hot case and cold case, including numbers for temperatures and heat flows.



Thermal Balance Tests

Cosmic RAY Telescope for the Effects of Radiation



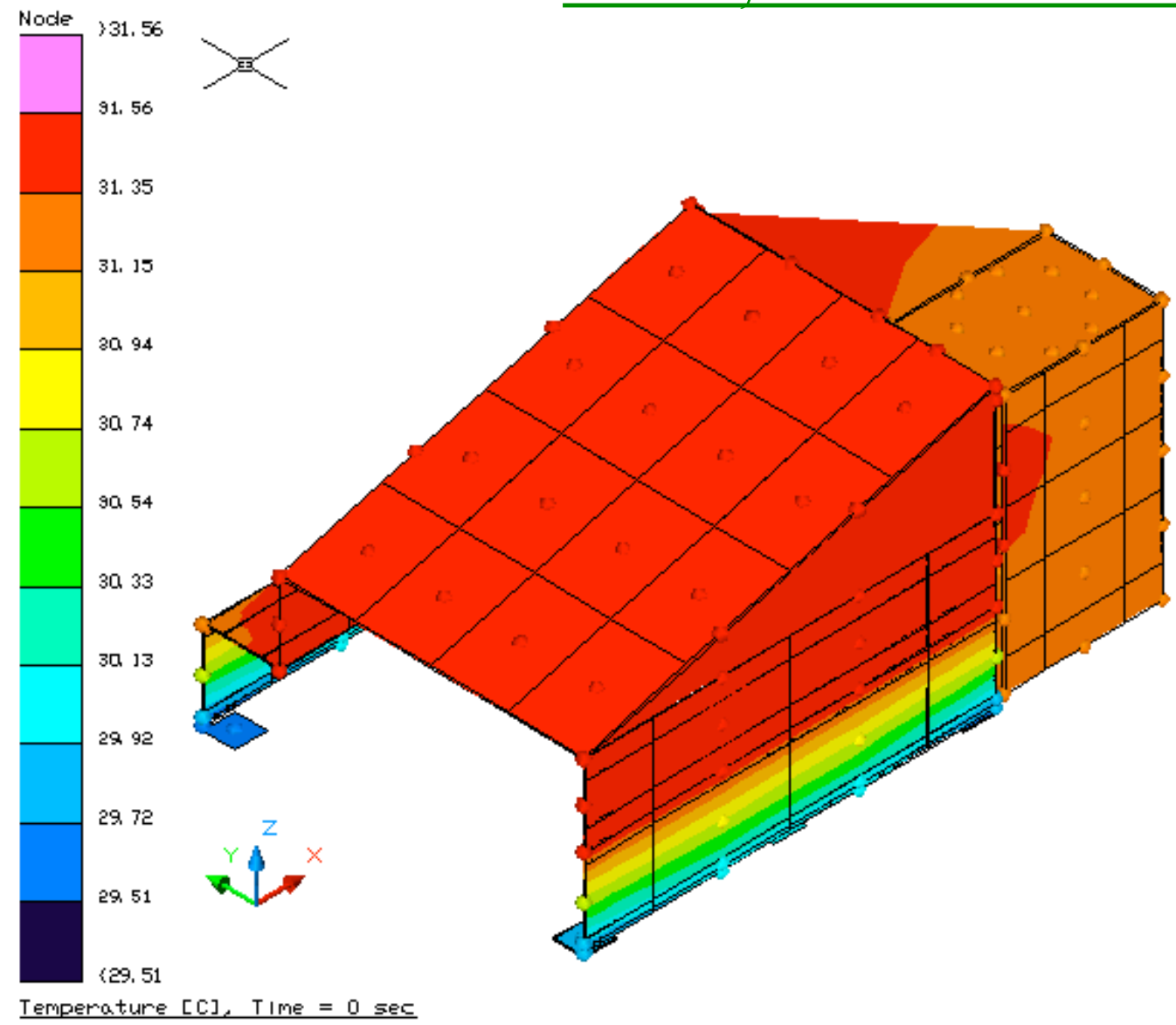
+29 C, Instrument On

- Shrouds: 29 C
- Plate: 29 C
- Box: 32.7 C model, 33 C test
- Scope: 32.5 model, 33 C test

- + 6.60 W (internal power)
- - 6.41 W (to mounting plate)
- - 0.06 W (out apertures)
- - 0.13 W (out blankets)

*Cosmic **RA**y Telescope for the **E**ffects of **RA**diation*

+29 C, Instrument On



Cosmic RAY Telescope for the Effects of Radiation

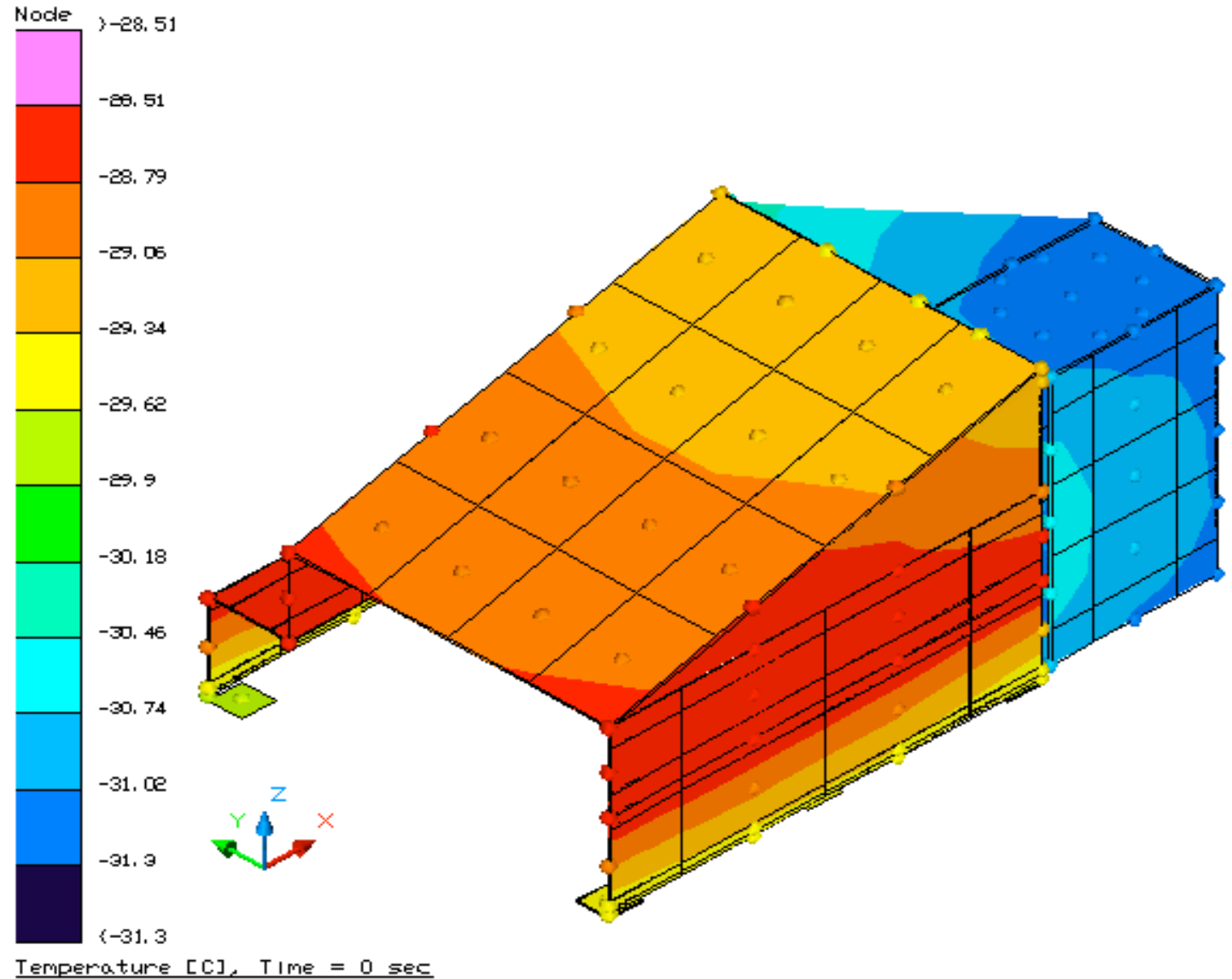


-30 C, Instrument On

- Shrouds: -190 C
- Plate: -30 C
- Box: -29 C model, -27 C test
- Scope: -31 model, -29 C test

- + 6.60 W (internal power)
- - 3.97 W (to mounting plate)
- - 0.74 W (out apertures)
- - 1.89 W (out blankets)

-30 C, Instrument On



Cosmic RAY Telescope for the Effects of Radiation



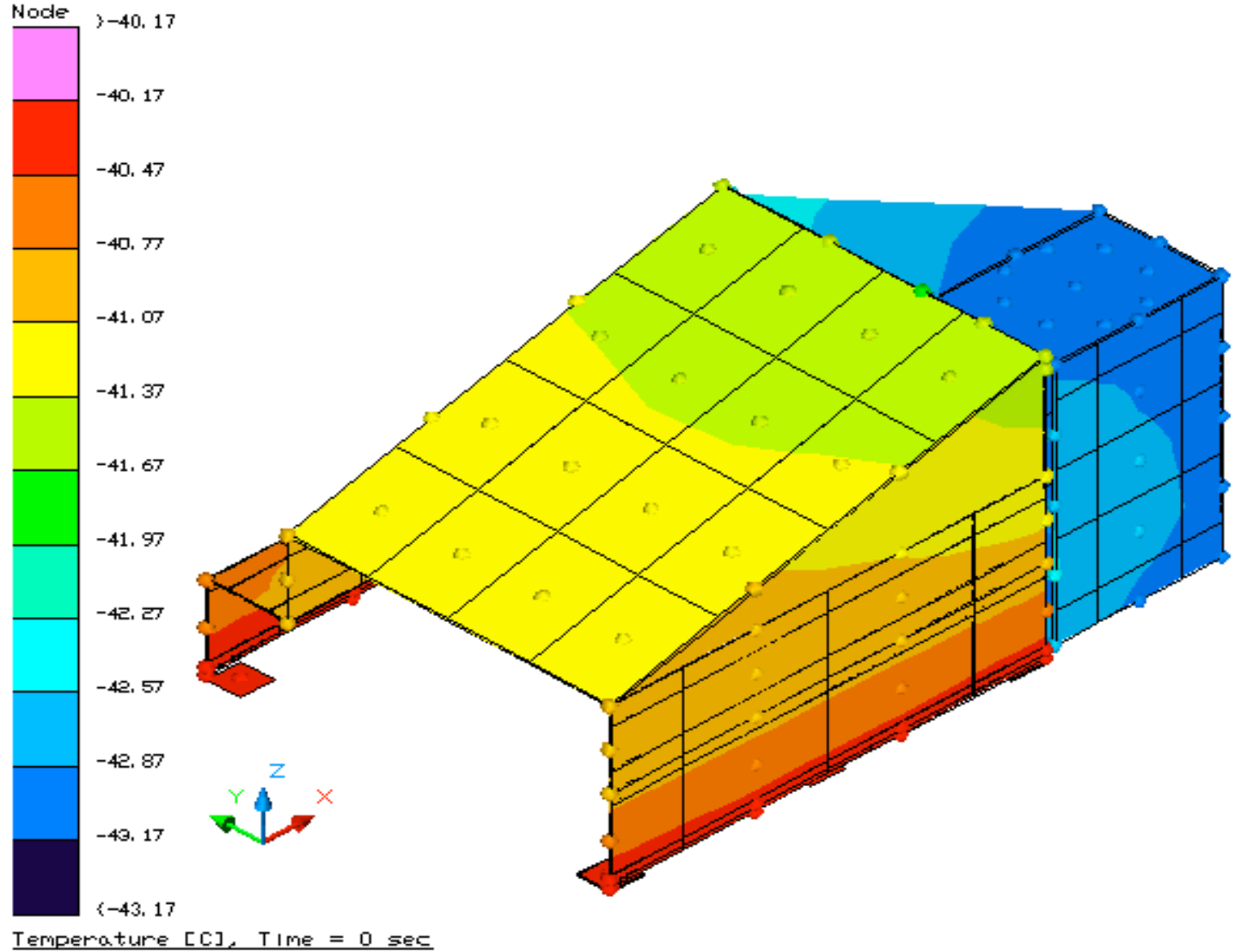
-40 C, Instrument Off

- Shrouds: -190 C
- Plate: -40 C
- Box: -41.3 C model, -41 C test
- Scope: -43 C model, -43 C test

- + 0 W (internal power)
- - +2.14 W (from mounting plate)
- - 0.60 W (out apertures)
- - 1.54 W (out blankets)

*Cosmic **RA**y Telescope for the **E**ffects of **R**adiation*

-40 C, Instrument Off





Flight Predicts

Cosmic RAY Telescope for the Effects of Radiation



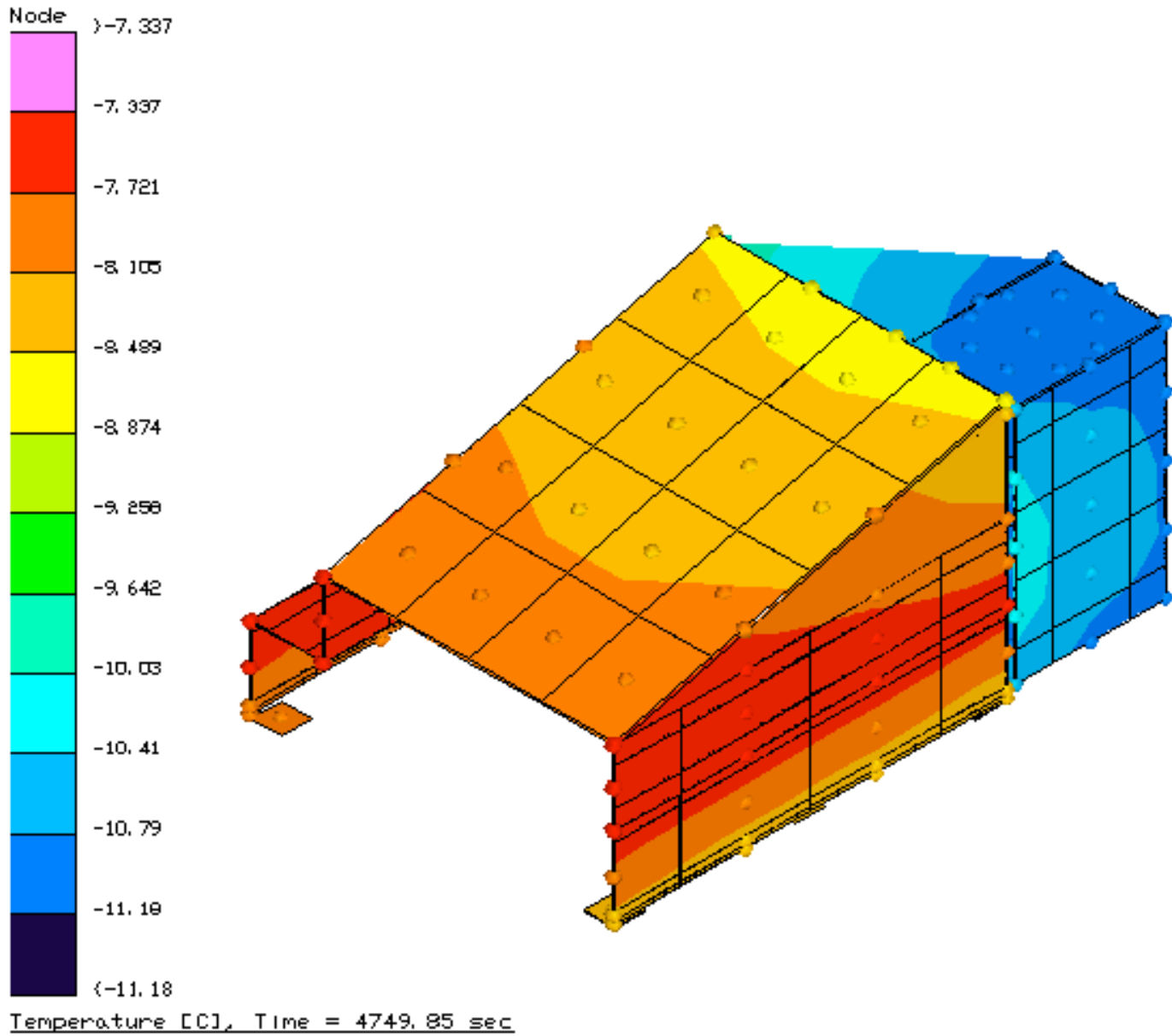
Cold Case

- Boundary Nodes: -270.15 C
- Spacecraft Interface: ~ -8 C
- Box: -7.0 C to -8.6 C
- Scope: -9.6 C to -11.2 C

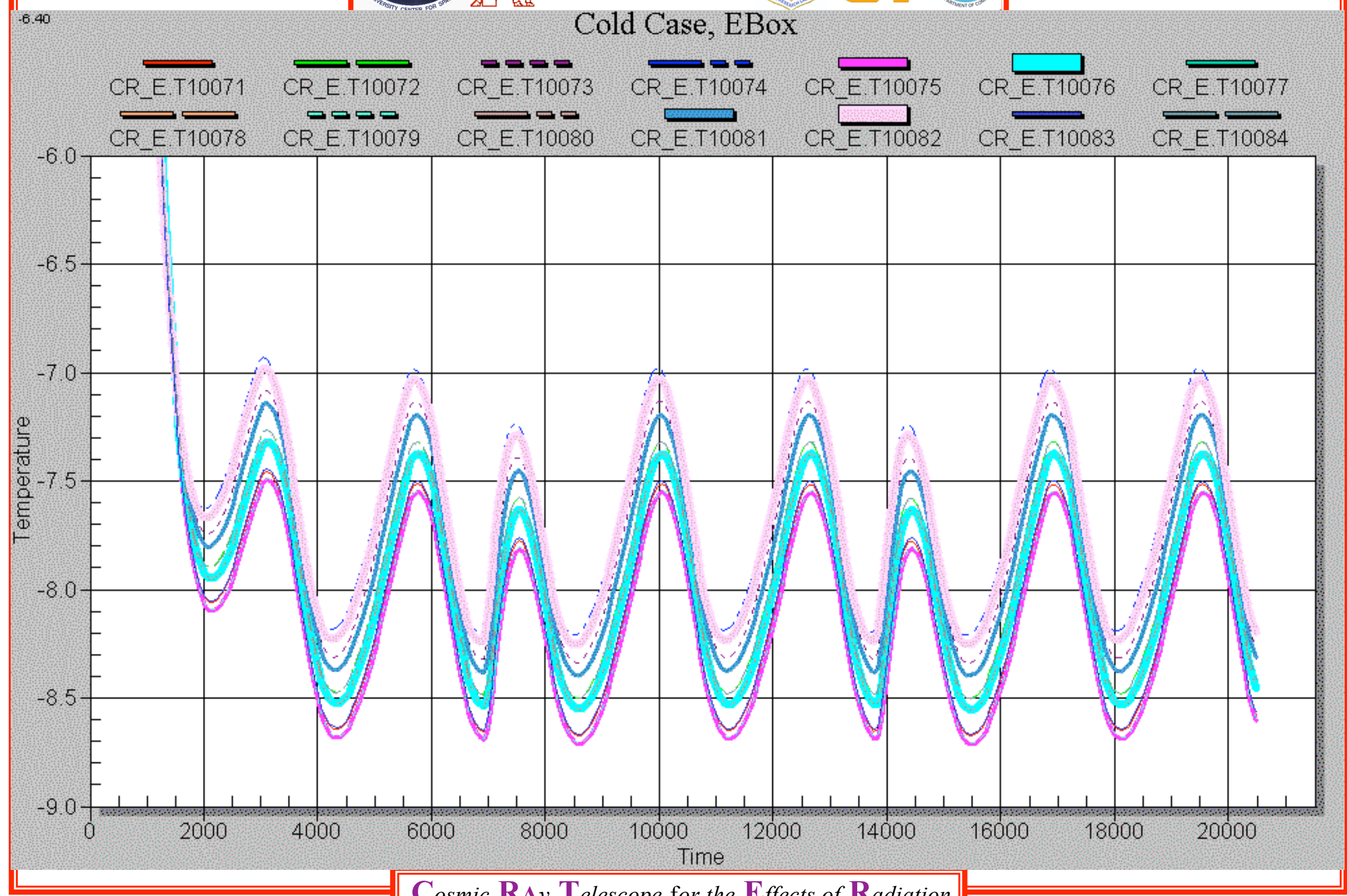
- + 6.6 W (internal power)
- - 4.07 W (to spacecraft interface)
- - 1.04 W (out apertures)
- - 1.49 W (out blankets)

*Cosmic **RA**y Telescope for the **E**ffects of **R**adiation*

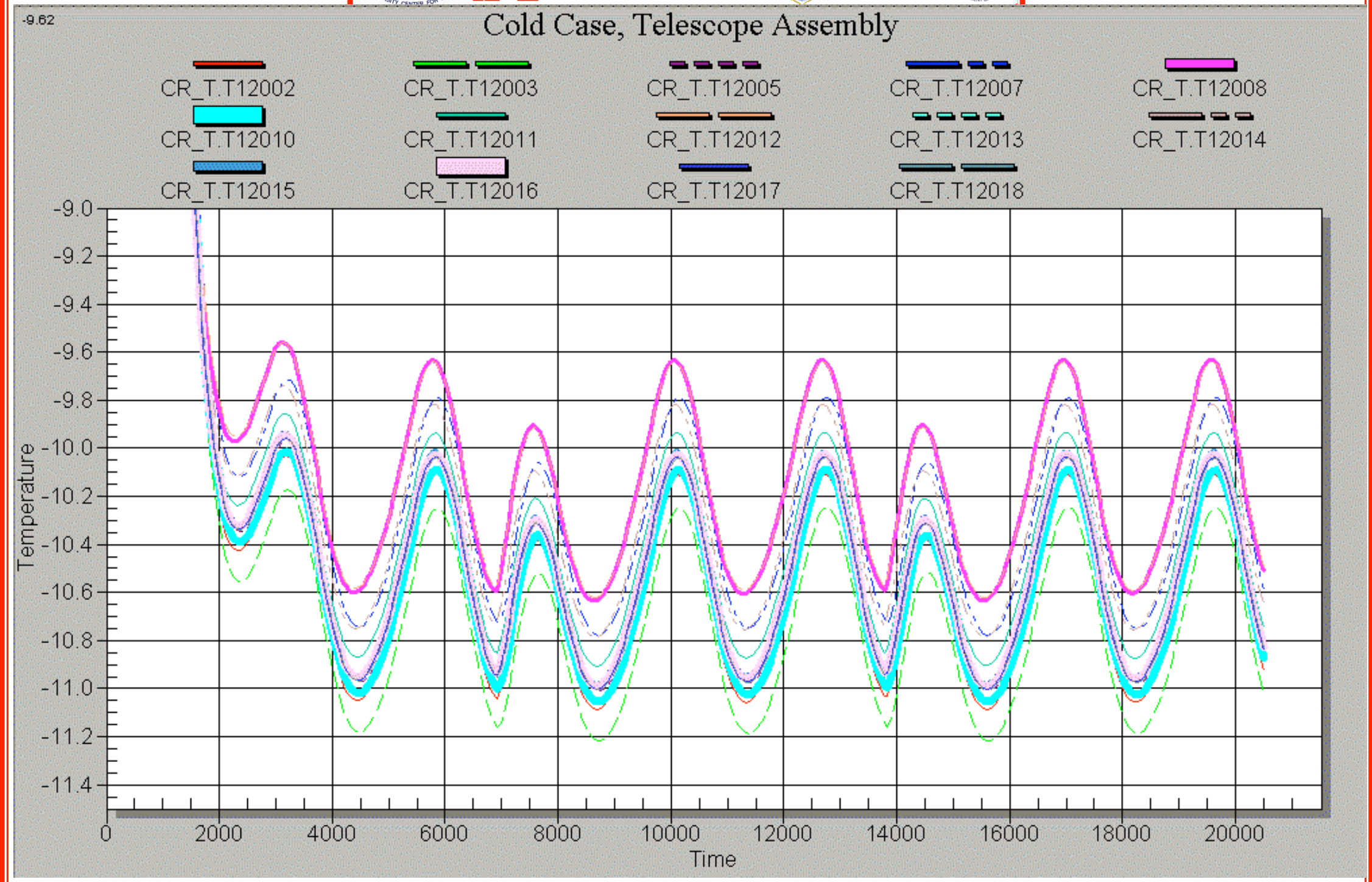
Cold Case



Cosmic RAY Telescope for the Effects of Radiation



Cosmic RAY Telescope for the Effects of Radiation



Cosmic RAY Telescope for the Effects of Radiation



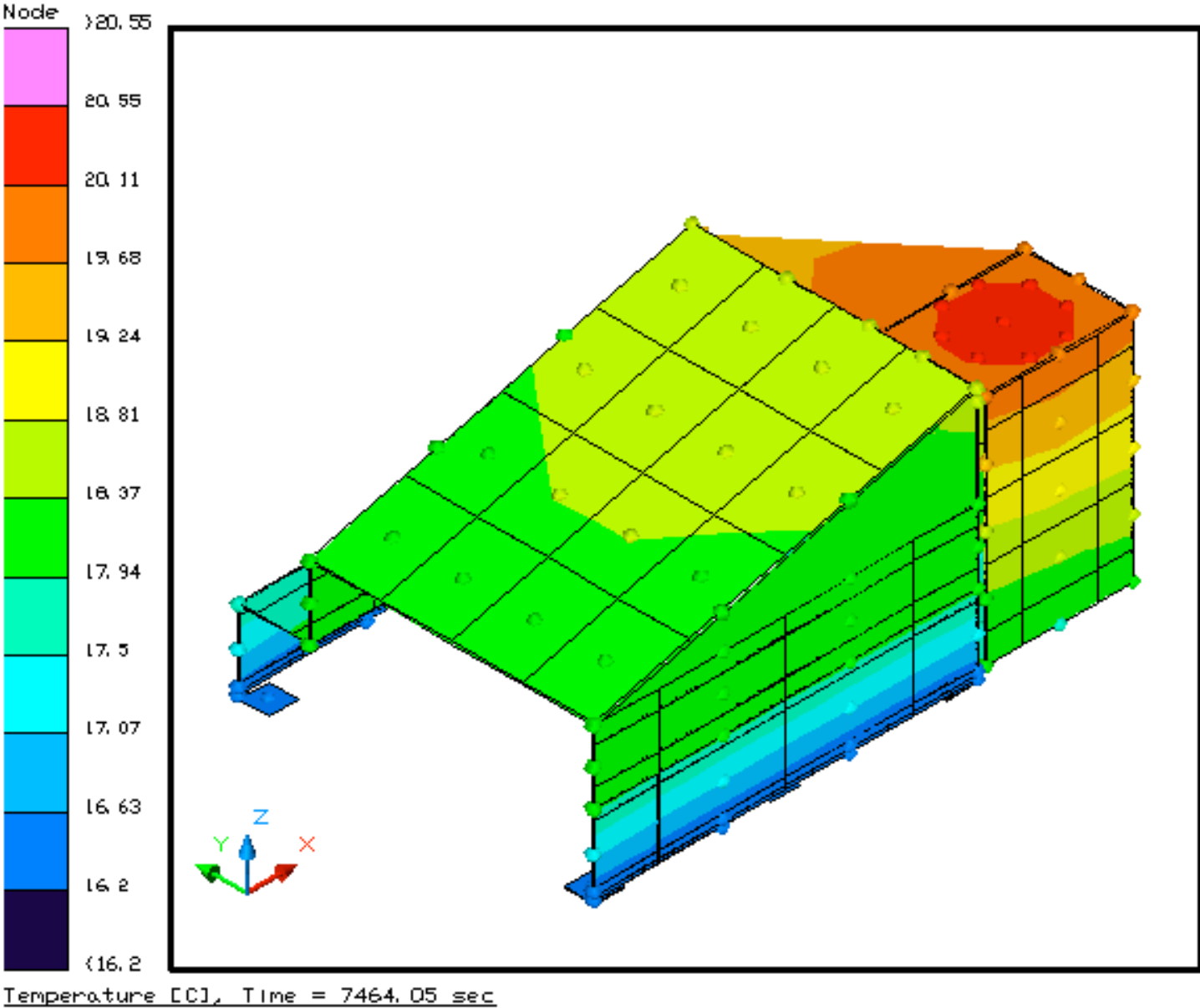
Hot Case (Bright Case)

- Boundary Nodes: -270.15 C
- Spacecraft Interface: ~16 C
- Box: 16 C to 18.5 C
- Scope: 17.5 C to 20.2 C

- + 6.6 W (internal power)
- - 5.95 W (to spacecraft interface)
- - 0.6 W (out apertures)
- + 0.05 W (in blankets)

*Cosmic **RA**y Telescope for the **E**ffects of **R**adiation*

Hot Case, Bright Case



Cosmic RAY Telescope for the Effects of Radiation

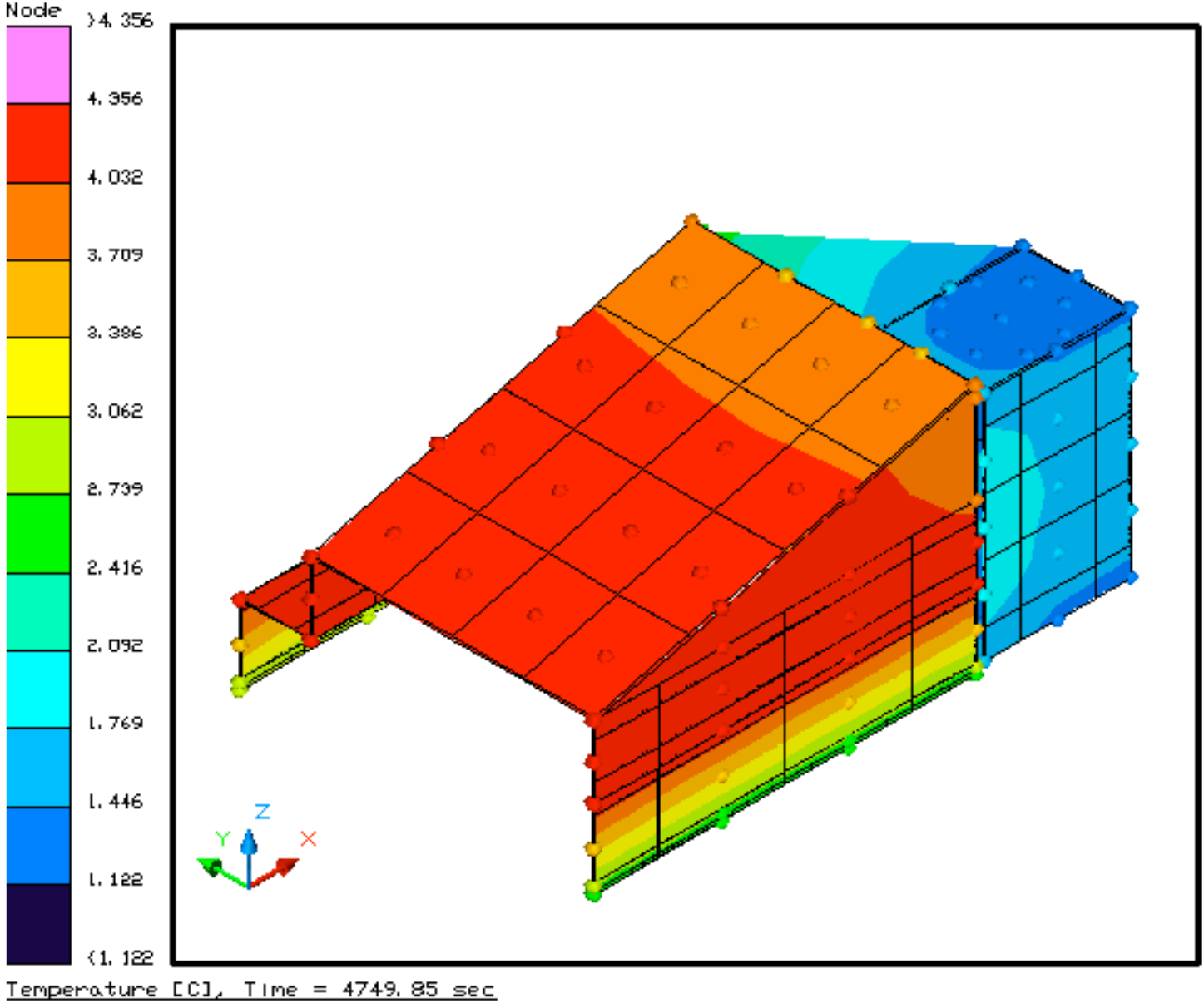


Hot Case – Dark Case

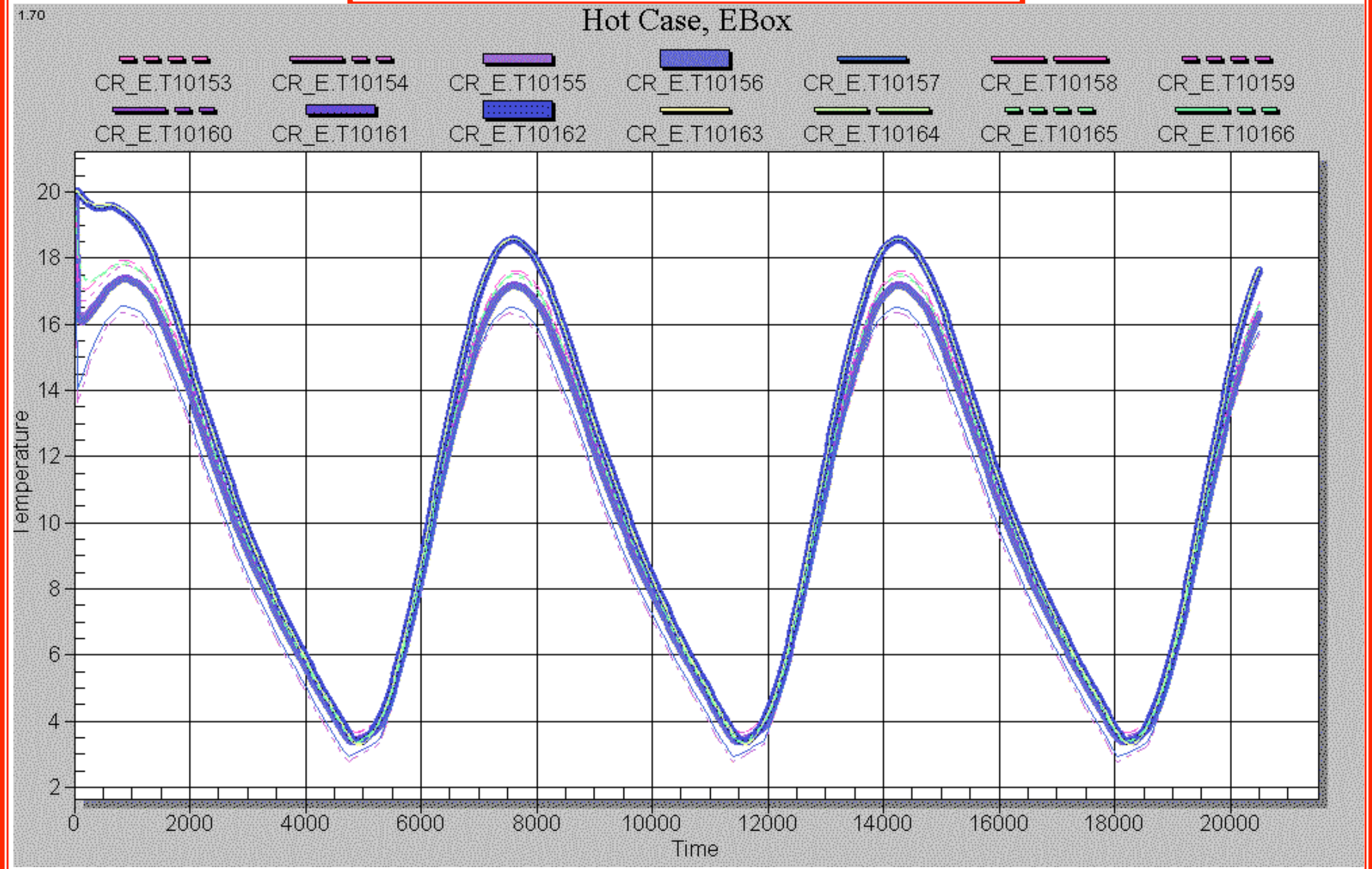
- Boundary Nodes: -270.15 C
- Spacecraft Interface: ~2.5 C
- Box: 2.5 C to 4.3 C
- Scope: 1.5 C to 2.0 C

- + 6.6 W (internal power)
- - 6.23 W (to spacecraft interface)
- - 0.32 W (out apertures)
- - 0.05 W (out blankets)

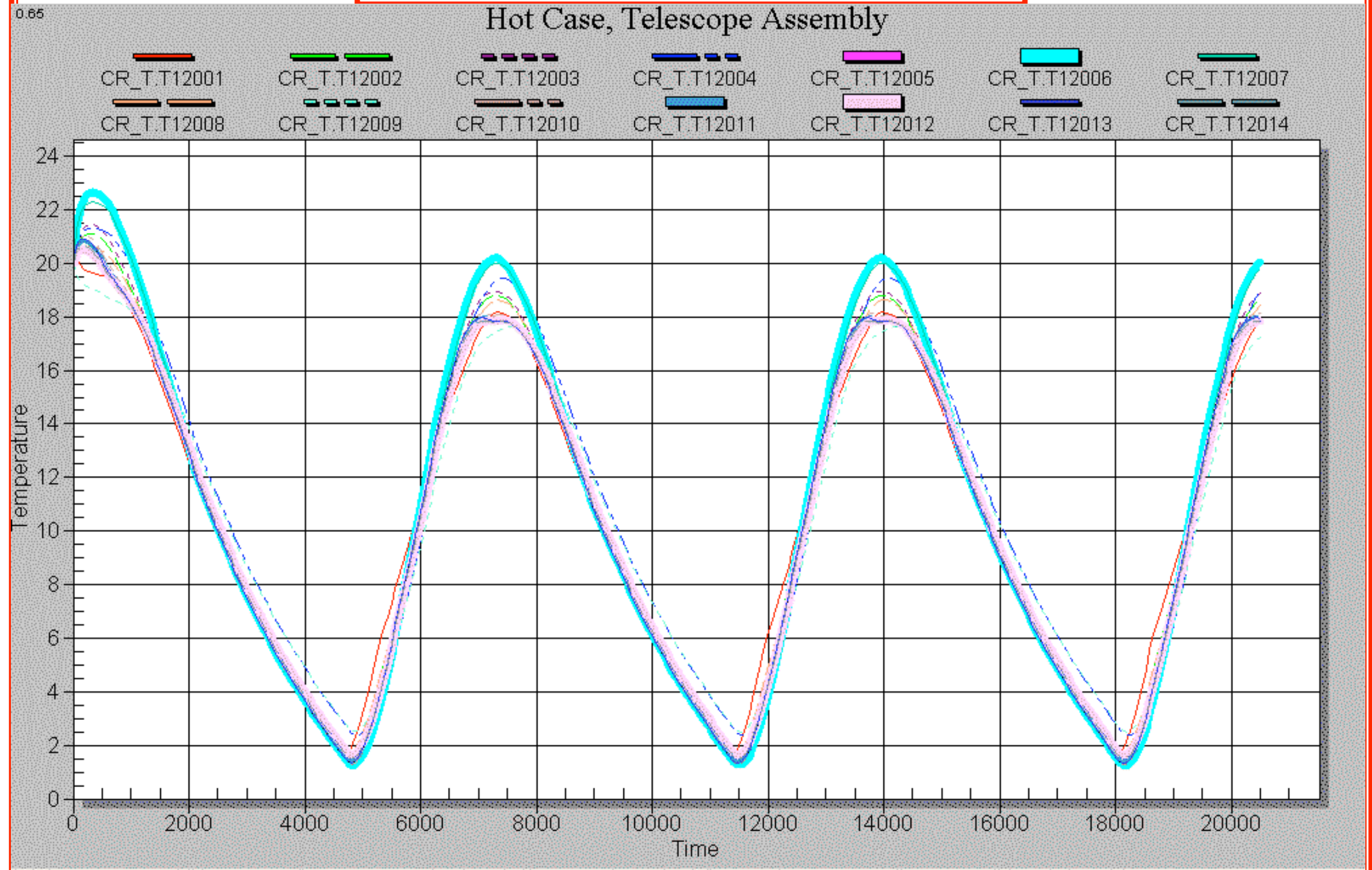
Hot Case, Dark Case



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