CIT FROSTI Post-Test Analysis
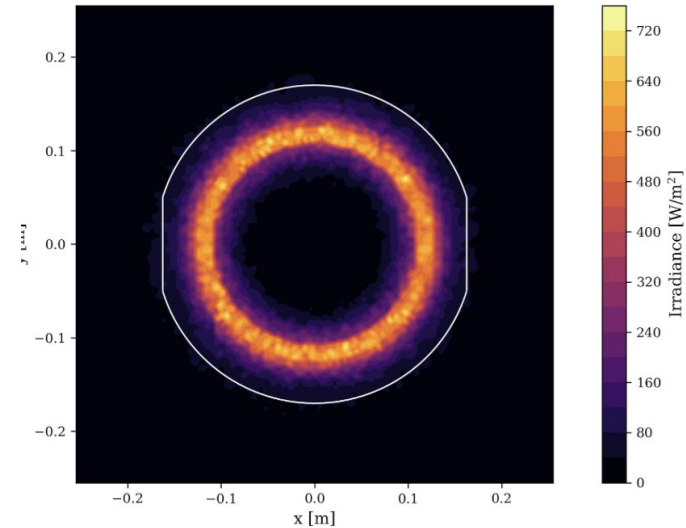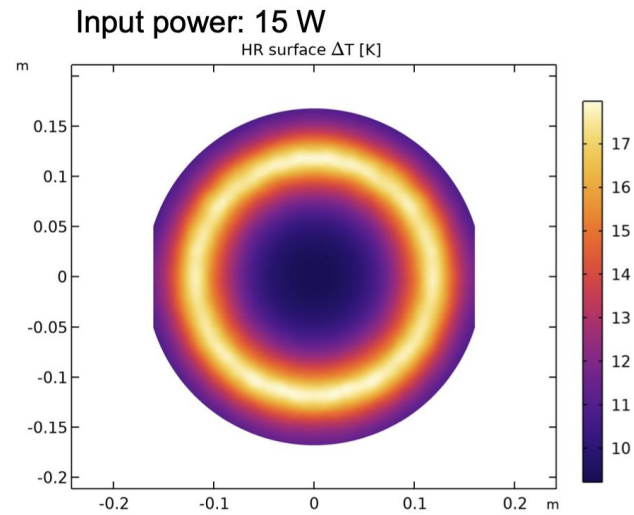
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June 3rd Group Meeting

Goal

- Produce ΔT($\mathbf{r}$) and Irradiance [I($\mathbf{r}$)] Plots
- Find ΔT_{Max}
  - Get incident power: P_{inc}
  - Get inferred element temperature: $T_{element}$

Input power: 15 W

Steps 1-3: Average Cut, and Subtract

- 1. Average data from period which FROSTI was at its maximum operating point
- 2. Cut the test mass data out from the rest of the averaged FLIR image
- 3. Subtract temperature of test mass center from the averaged data to get the $\Delta T(\mathbf{r})$ plot

FROSTI Test Mass ΔT Profile
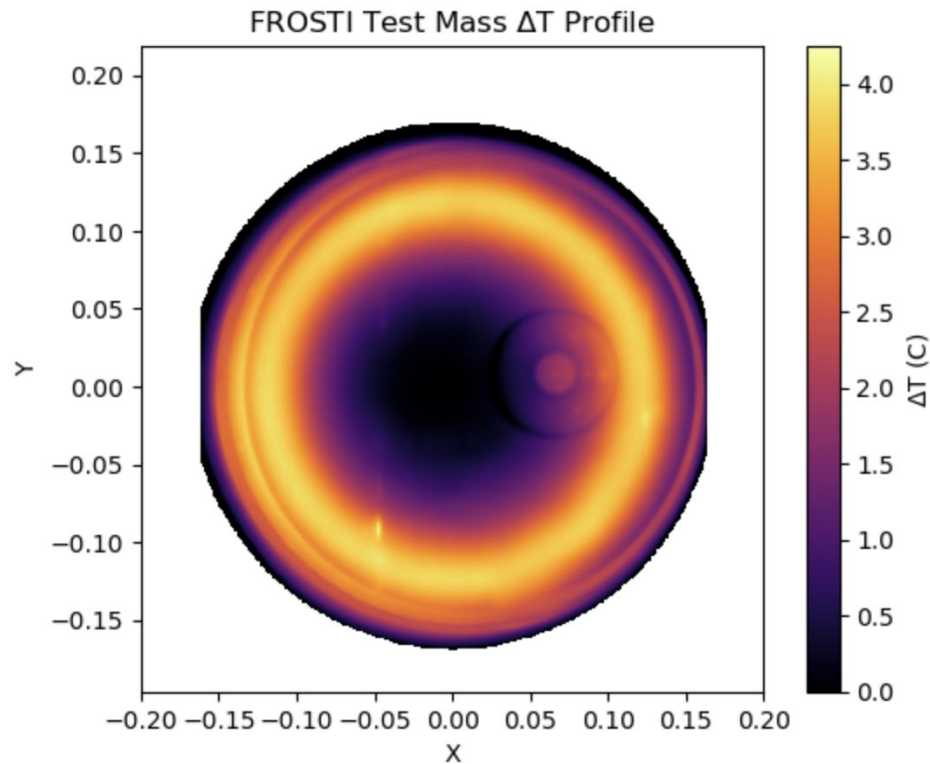
Steps 4-6: Compute Irradiance Profile, Incident Power, Element Temperature

- 4. $I(\mathbf{r}) = \alpha\,\Delta T(\mathbf{r})$
  - $\alpha = 84.760$ W/(m^2 K)
  - Result plot to the right
- 5. $P_{inc} = \beta\Delta T_{Max}$
  - $\beta = 2.069$ W/K
  - Computed result:
    - $P_{inc} \approx 8.79$ W
- 6. $T_{element} = \gamma(\Delta T_{Max})^{\wedge}(1\backslash 4)$
  - $\gamma = 365.40$ K^(¾)
  - Computed result:
    - $T_{element} \approx 251$ C

FROSTI Test Mass Irradiance Profile