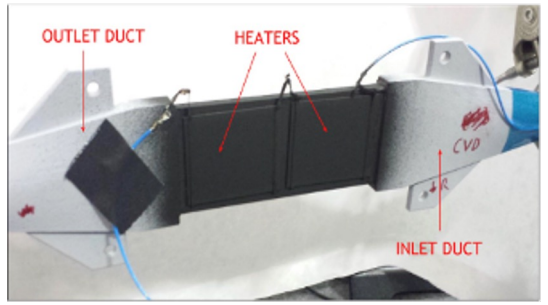
SVT specifics

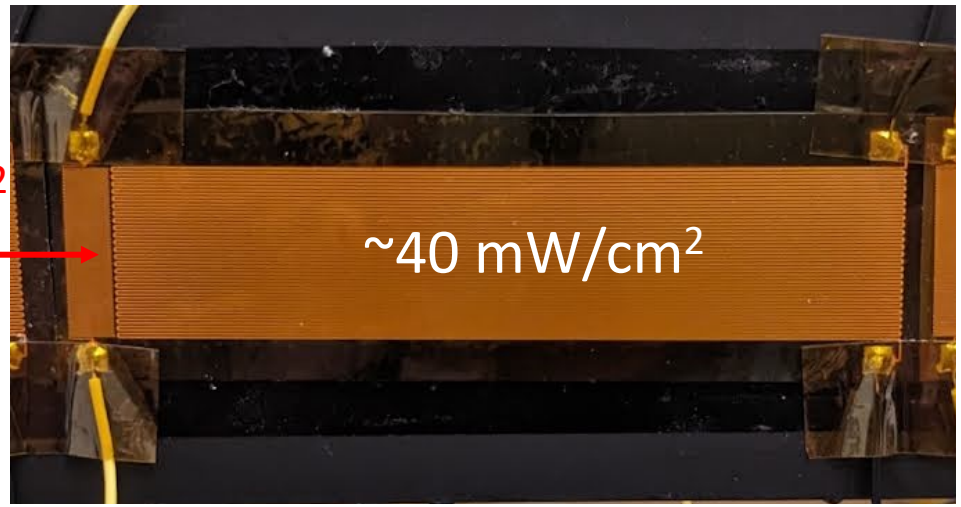
SVT specific heater prototypes, two power zones

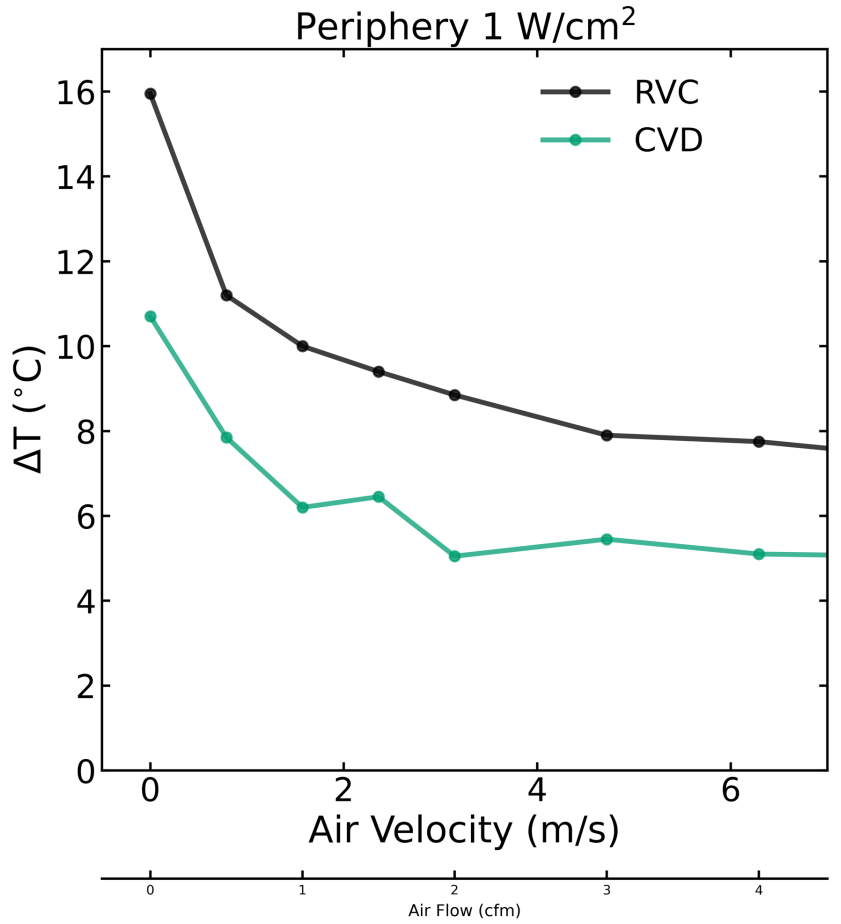
Tested just LEC (periphery) on both CVD & RVC

ΔT reasonable even with NO air flow → lots of foam surface area, using boron-nitride in glue for enhanced thermal conductivity

Thermal tests done by Tyler Hague & students







*Air velocity calculated at duct

Corrugated prototype test pieces

Each piece → 2 layers 34 gsm veil + 5 layers resin

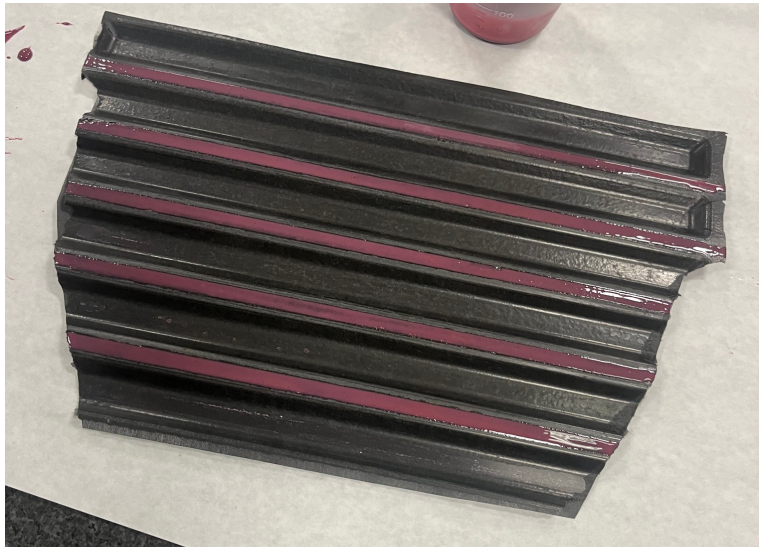
Face sheets glued with 9309 adhesive in 5 mm strips

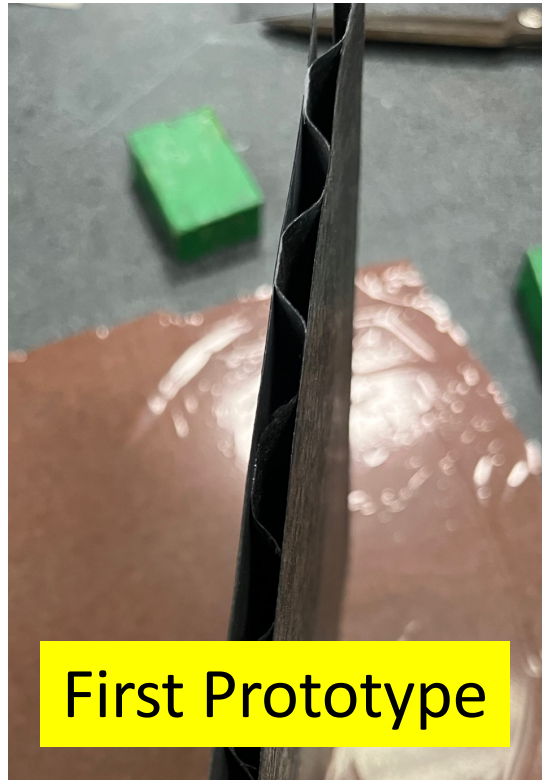
Final size of prototype test piece = 22.4 cm x 20.2 cm

Final weight of prototype test piece = 22.5 g

Density = 497 gsm → ~ 0.12% X/X0

Silicon ~0.05% X/X0, adhesive 0.01-0.02% X/X0



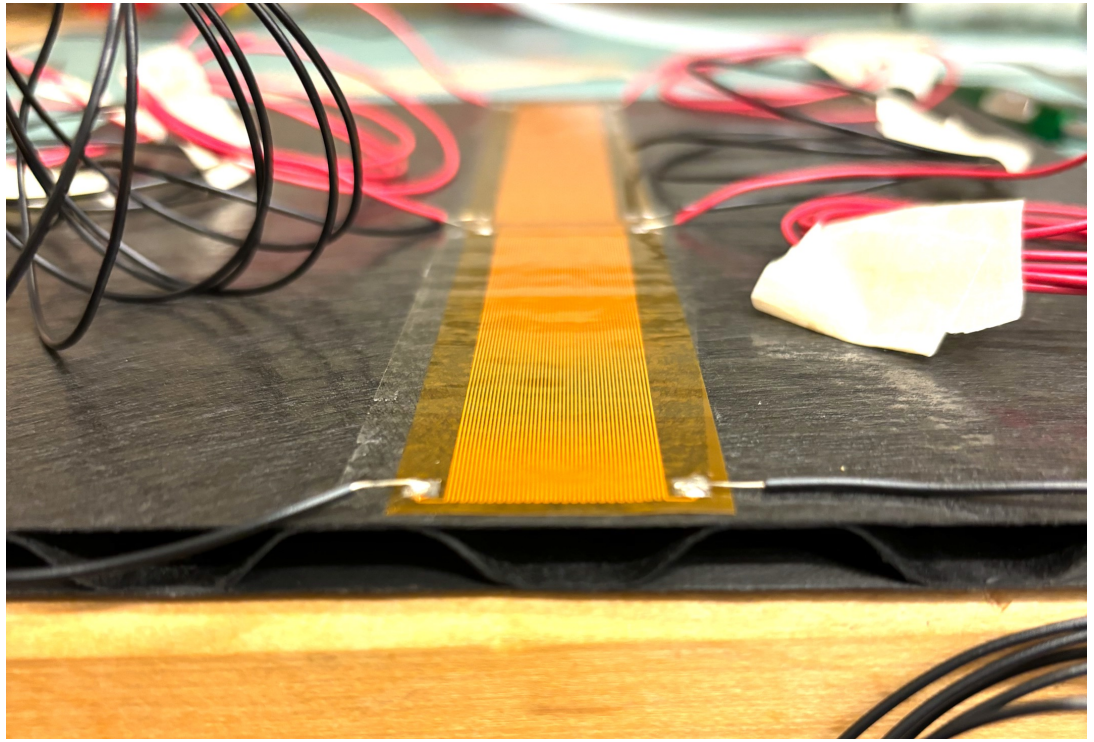


Corrugated carbon fiber thermal tests

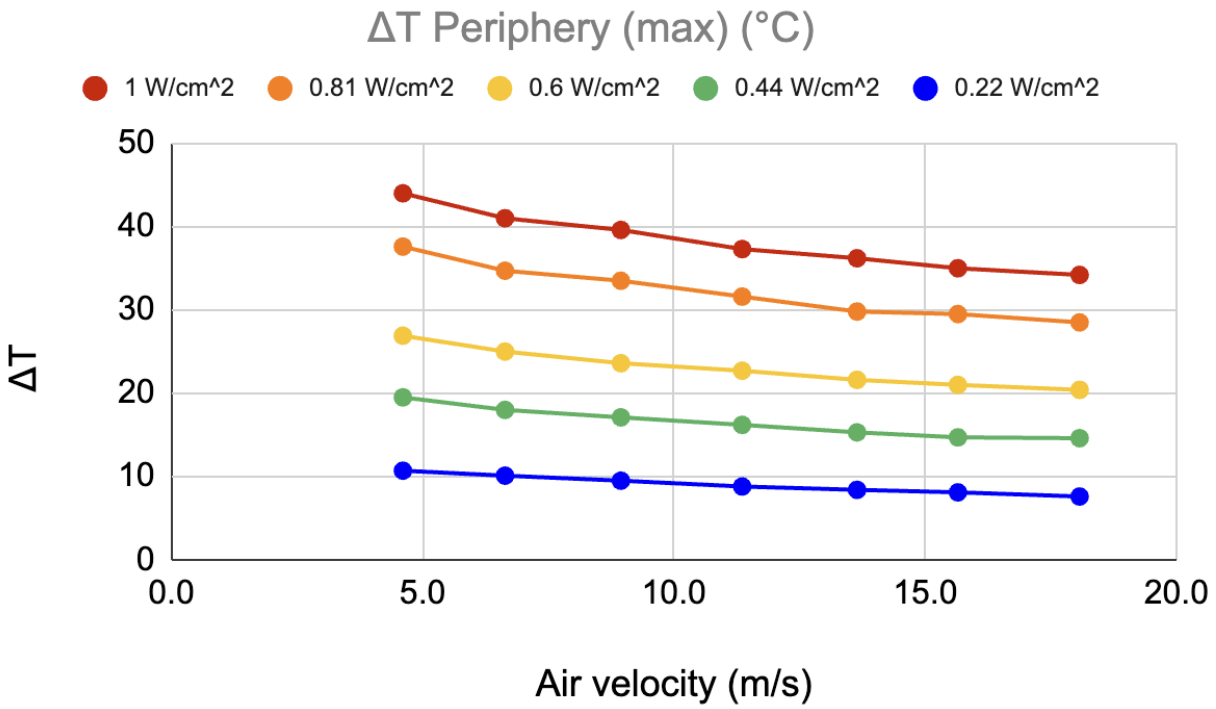
Two heaters with separate power zones for LEC (~1W/cm^2) & matrix (~40 mW/cm^2)

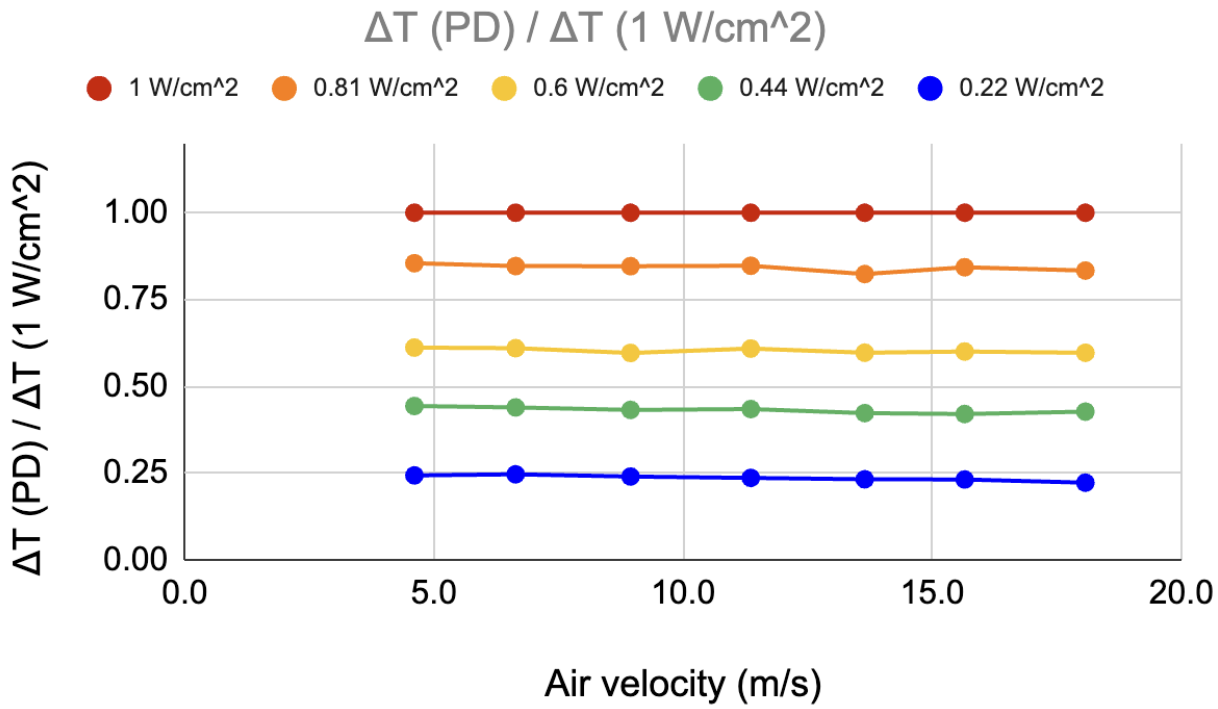
Using 3M 467MP double-sided tape, 60μm thick (used to glue silicon for STAR HFT PXL)

- First step: Put a tube in corrugated channel and blow air through



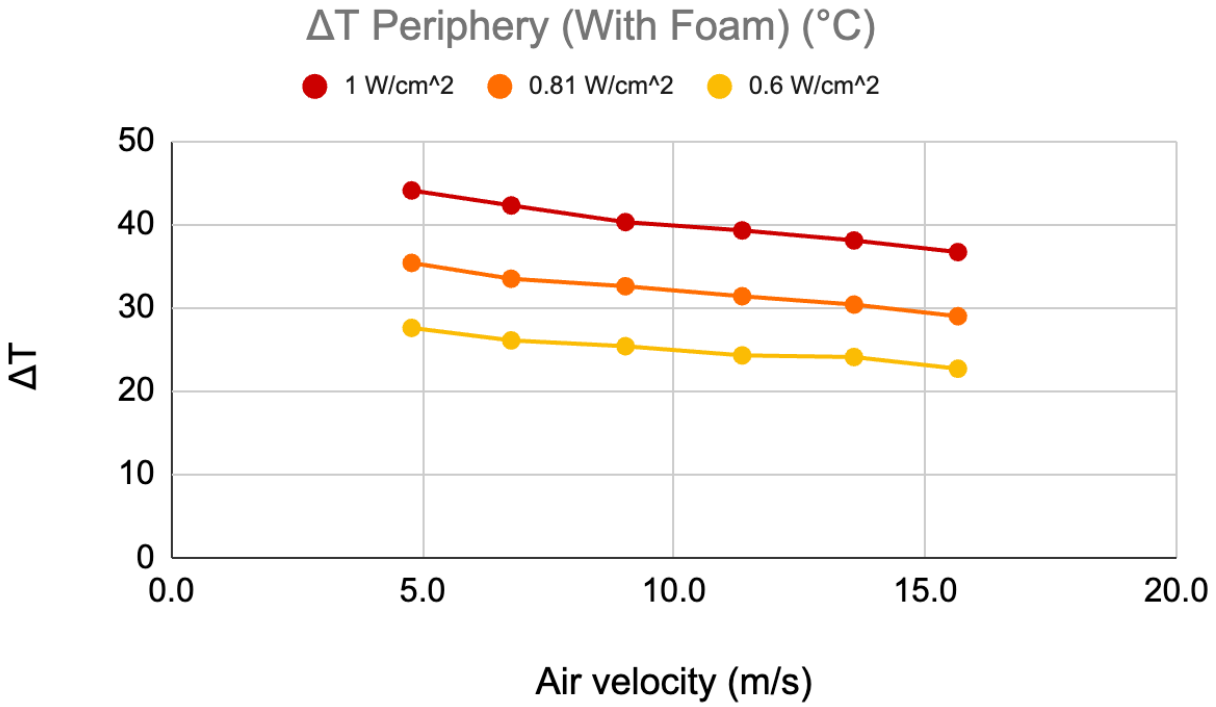
ΔT at different power densities

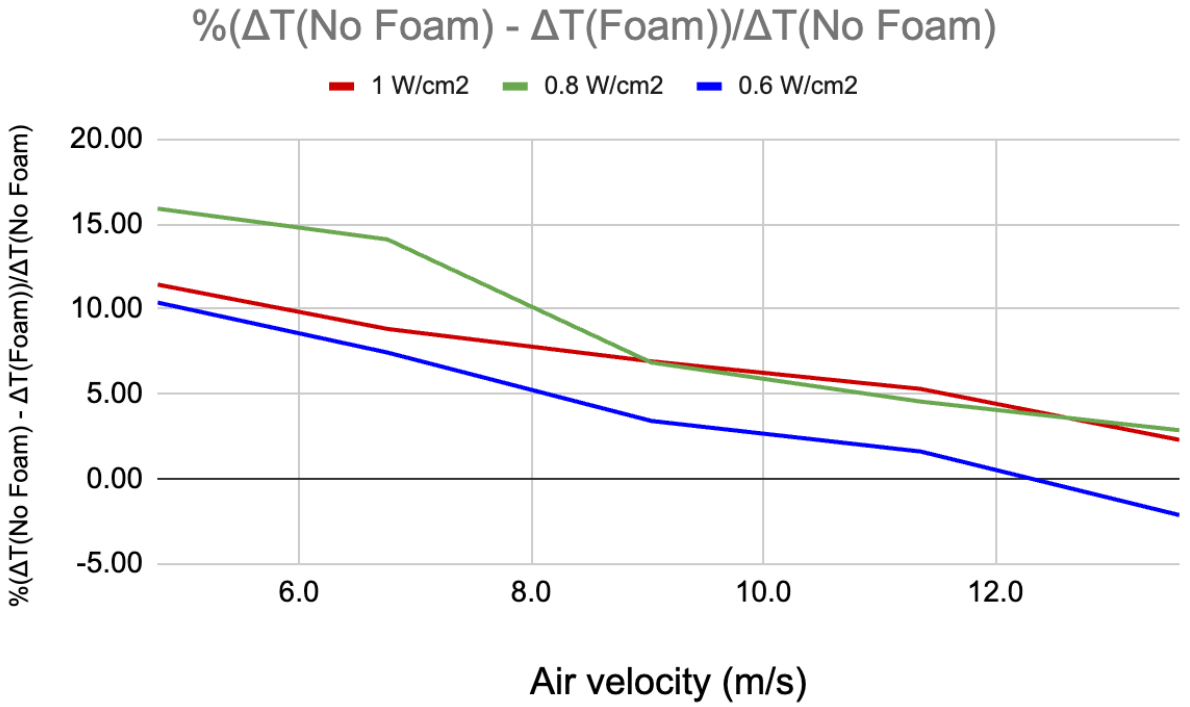




- New information: periphery @ 0.7 W (max
  - LAS could be ½ of that, based on number of data lines
- ΔT scales → very useful for making estimates based on power

RVC foam under periphery





- 30 ppi RVC glued under periphery using thermally conductive glue
- Largest ΔT reduction at the lower air speeds

Next steps

- Pressure drop through the corrugation
- Incorporate PT100s
- Calculations/simulations to compare to data