Photonic Structure Textiles for Localized Thermal Management

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(Award duration: 3 years)
Radiative cooling and heating using photonic structure textiles

- **Approach:** Colored photonic structure textiles for radiative cooling/heating through engineered infrared (IR) properties
Photonic structure textiles: Spectral characteristics & System impact

- Cooling: IR transparent textiles to enhance heat dissipation (compared to current textiles)
- Heating: IR reflective textiles to reduce heat dissipation
- System impact: Reduce energy consumption for heating / cooling of buildings by 15% without sacrificing comfort
Validation plan & Performance target

• Identify materials. Perform therm. simulations
• Perform photonic structure design
• Fabricate photonic structures: small- and textile-scale
• Textile integration & system-level testing

• Demo: Photonic structure textiles with IR radiative cooling/heating beyond current textiles
How the DELTA community can help us

• We want to connect with textile experts and textile centers

• Learn more about basic characterization of existing textiles (hand, drape, softness, …)

• How can we integrate photonic structure textiles with existing textile manufacturing processes?