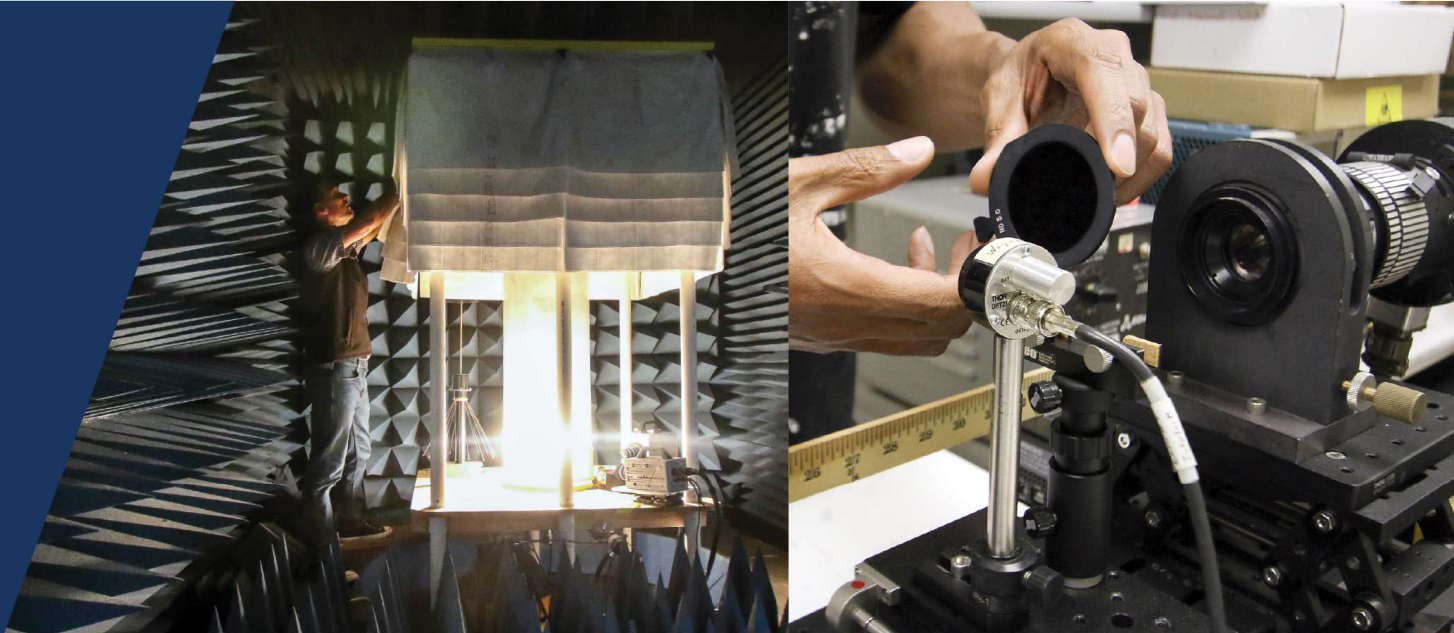


An Introduction to TSI



Thermographic Spectral Imaging

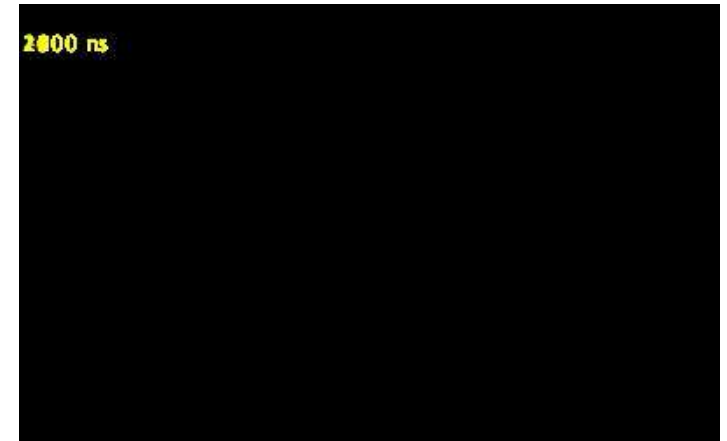
Maria Palacios, NNSS
Johnny Goett, LANL

- ▶ Overview
 - TSI, why?
- ▶ Equipment
 - Probe
 - Cameras
 - Spectrometer
 - Streak
- ▶ Data Analysis
 - Calibration and correlation
- ▶ SHOTS, SHOTS, SHOTS
- ▶ Development
 - Progress

Overview

► TSI, Why?

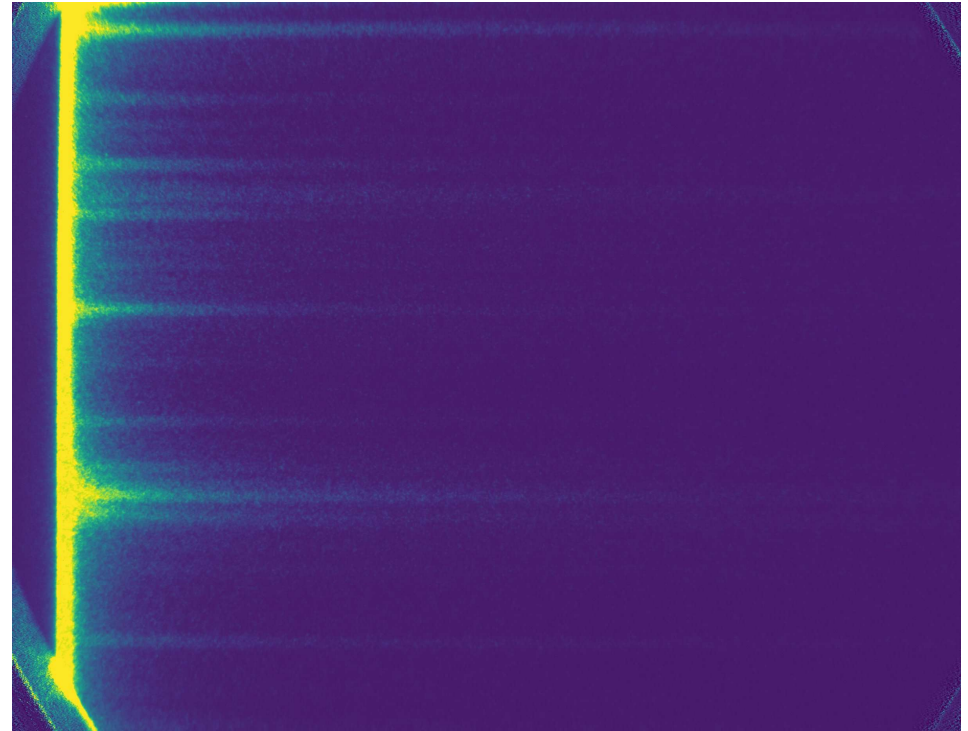
- In strong shock regimes assumptions of equilibrium according to a Planck distribution can induce larger uncertainties in temperature estimates.
 - Goal of TSI is to extend insight into this domain by reducing our assumptions of thermal equilibrium.
 - TSI acquires spectrally resolved images to bound surface temperatures and quantify displacement from thermal equilibrium.



TSI : Thermographic Spectral Imaging

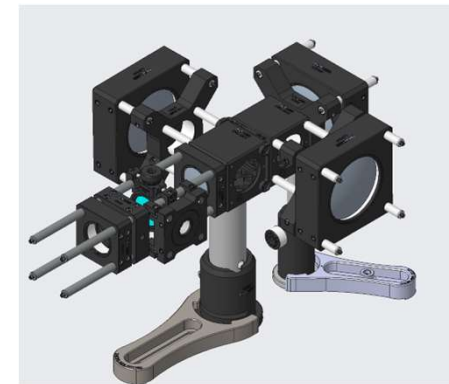
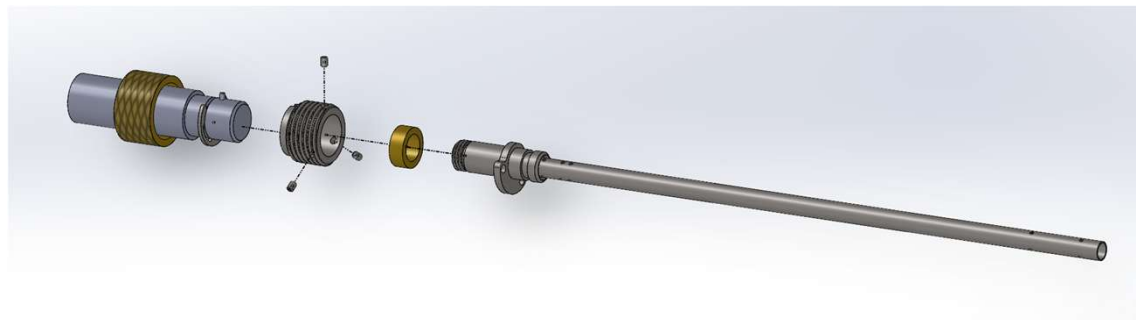
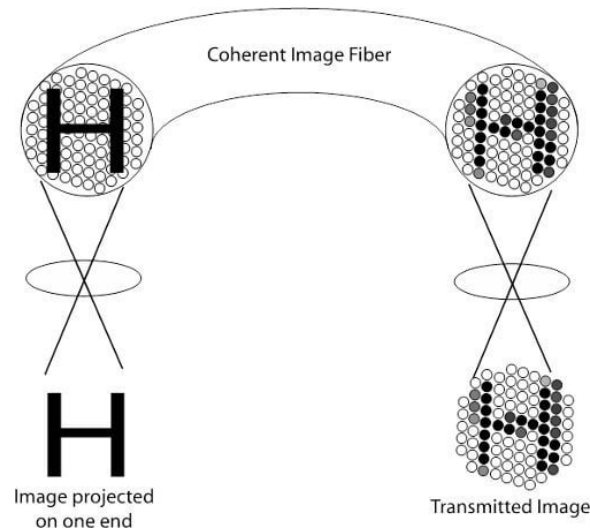
Overview

- ▶ TSI, Why?
- ▶ Leveraging time resolved spectroscopy, data can be used to provide new insights on atomic species present in dynamic phenomena.



Equipment

- ▶ Probe
- ▶ Coherent fiber bundle
- ▶ Cage – Optics
- ▶ Cameras

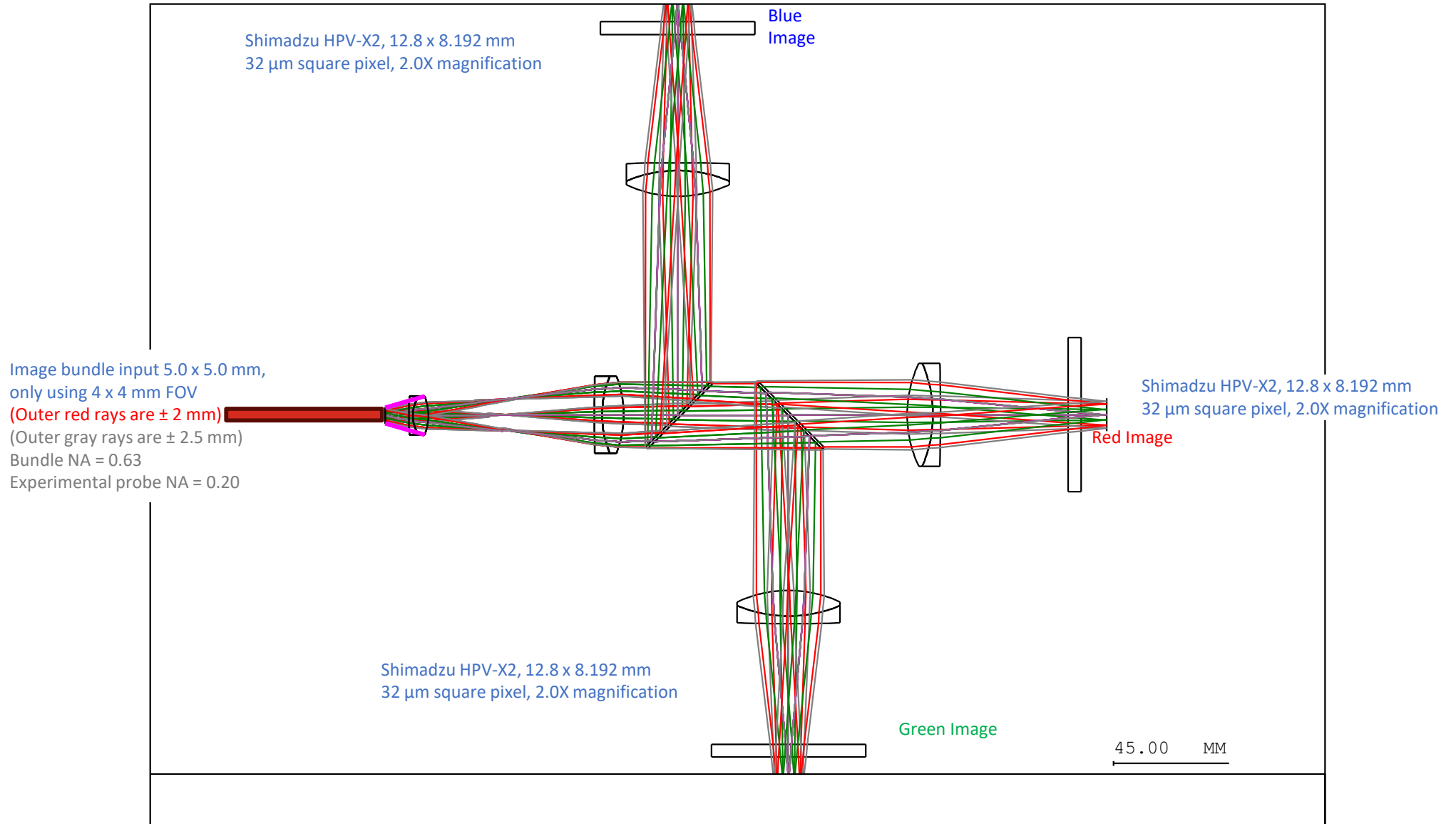


Equipment

- ▶ Spectrometer
- ▶ Streak Camera
- ▶ Calibration source

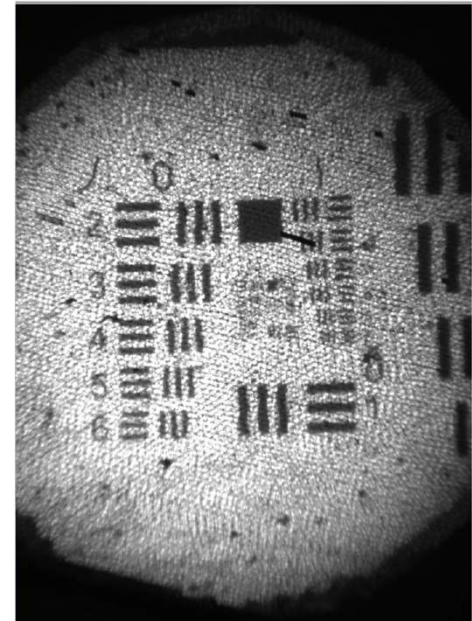


CAGE



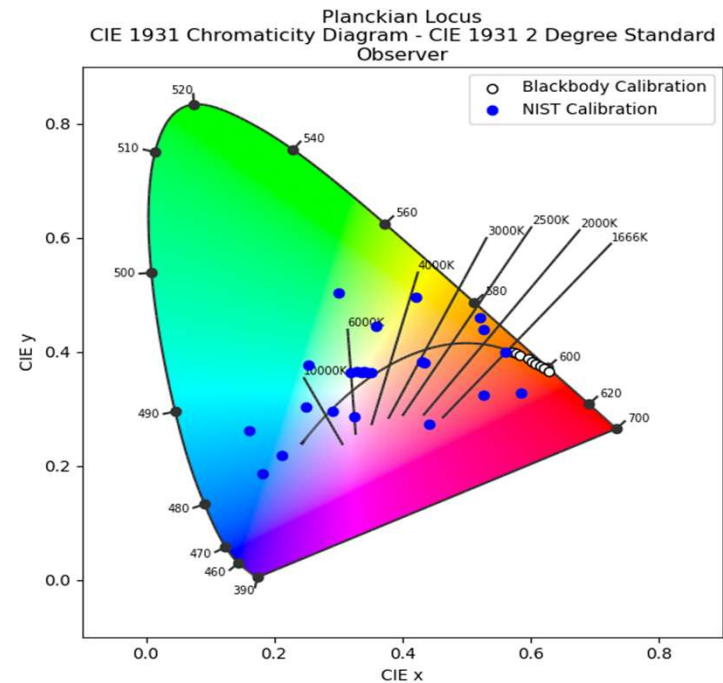
Calibration

- ▶ Calibrate the chromaticity response of high-speed cameras with well characterized radiance targets as well as using integrating sphere
- ▶ Band-passes should be optimized for the approximate CCT of the phenomena being studied
- ▶ Spectra are calibrated against atomic emission lines.

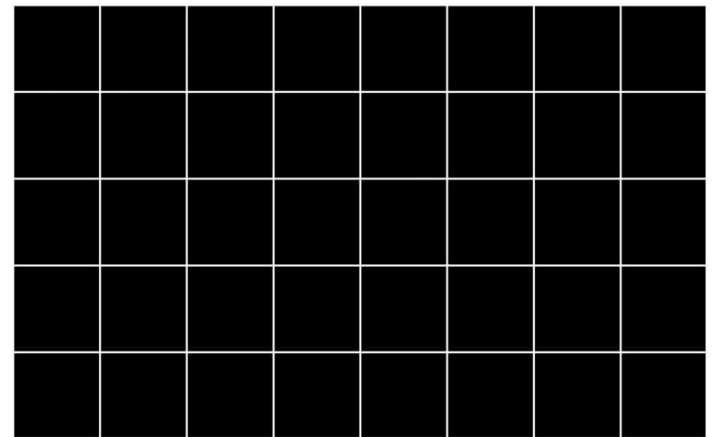
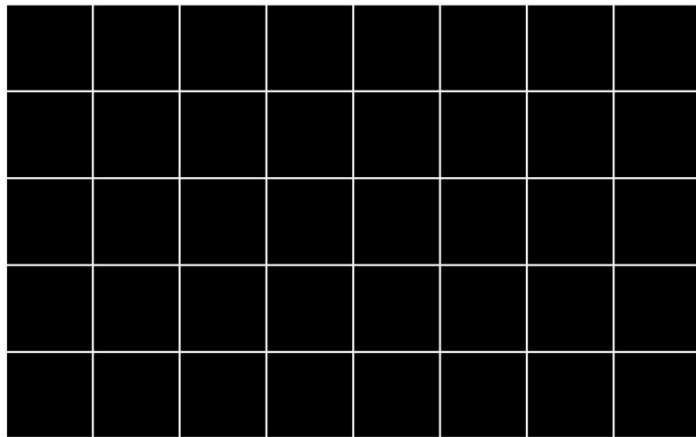
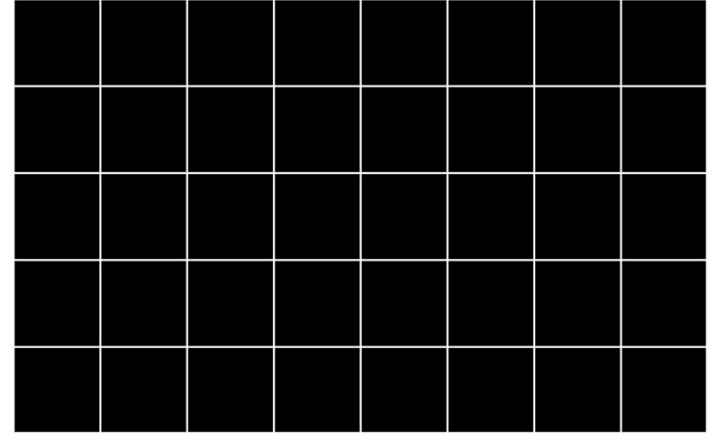
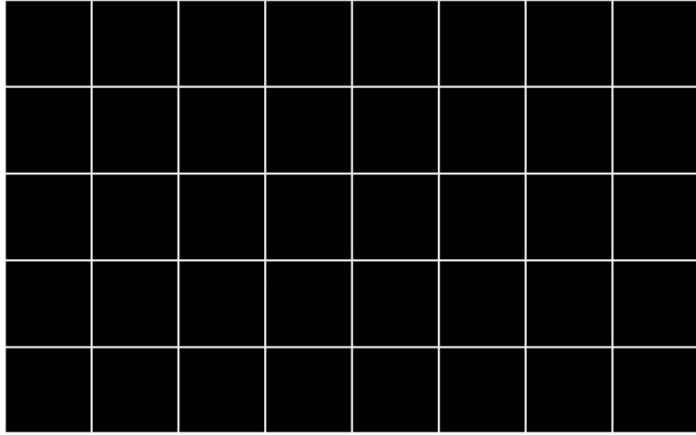


Data Analysis

- ▶ Correlating features in images.
- ▶ Flipping images
- ▶ Chromaticity response of system.



SHOTS, SHOTS, SHOTS



Conclusion

- ▶ TSI is developmental diagnostic hoping to bound surface temperatures and quantify displacement from thermal equilibrium to better understand the domain in which
- ▶ Future improvements
 - Probe design
 - Cameras
 - Spectroscopy