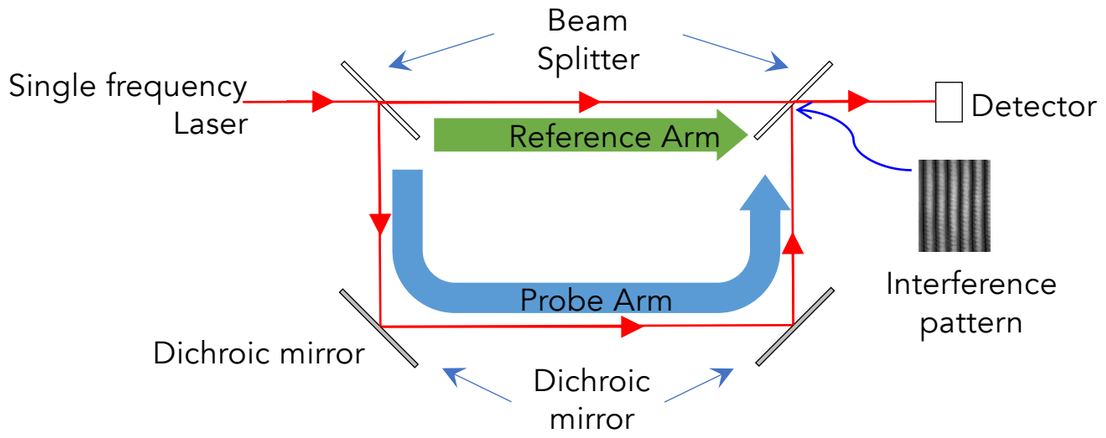
Photothermal Interferometer (PTI)

Data/Measurements/Retrievals:

- Aerosol absorption and scattering at 532 nm and 405 nm
- Derived SSA at each wavelength and AAE/SAE

Principle of Operation:

- Measure shift in interference pattern brought about during *thermal dissipation of spectrally-absorbed energy* by light absorbing particles.



Folded Jamin Interferometer improves spectrometer stability (Sedlacek and Lee, 2007)

Science Drivers:

- Aerosol absorption is critical for constraining the direct and semi-direct effects.
- Partitioning of absorption between BC and BrC
- Partitioning sub-micron and super-micron aerosol absorption and scattering

Instrument Specifications:

Weight: 40 kg
Dimensions (LWH): 61 cm x 48 cm x 48 cm
Power: 150 W
Ground or airborne platform deployment

Photothermal Interferometer (PTI)

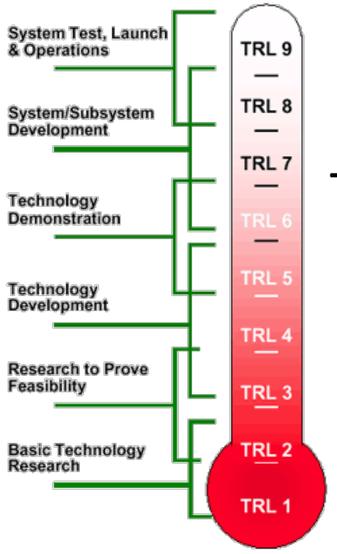
Operational Requirements and Experience:

- Deployed on DOE G-1 and NASA P-3
- Laboratory studies (Boston College series)
- Semi-autonomous operation (auto-start capabilities)
- Two-step calibration of absorption channel (~ 250 ppb NO_2 in air/fullerene soot); CO_2 for scattering
- Measurement precision (1σ) at 2-sec is ~1.5 Mm^{-1} for each channel (~ 0.5 Mm^{-1} for 10-sec average)

Benefit to ARM

- Direct measurement of aerosol absorption
  - No filter substrate bias
  - No interference from aerosol scattering on measurement.

Technical Readiness Level (TRL)



TRL 6/7