

# SWS Instrument Status:

ARM Mentor: Connor Flynn

ARM Developer: Sutanay Choudhury

Thanks to Pat Dowell and Chris Martin at SGP for consistently excellent on-site support.

# SWS General Characteristics

- ▶ Zenith radiance,  $< 2^\circ$  FOV full-angle
- ▶ Spectral range from  $\sim 350$  nm –  $2.2$   $\mu$ m spectra @ 1 Hz
- ▶ Si linear array, 300-1100 nm
  - Zeiss MMS NIR-enhanced, ambient room temperature
  - 256 pixels,  $\pm 0.3$  nm CWL,  $\sim 3.3$  nm spacing, 8 nm FWHM
- ▶ InGaAs linear array, 900 nm –  $2.2$   $\mu$ m
  - Zeiss PGS 2.2, Peltier TE cooled
  - 256 pixels,  $\pm 0.6$  nm CWL,  $\sim 5$  nm spacing,  $\sim 12$  nm FWHM

# SWS History and Reliability

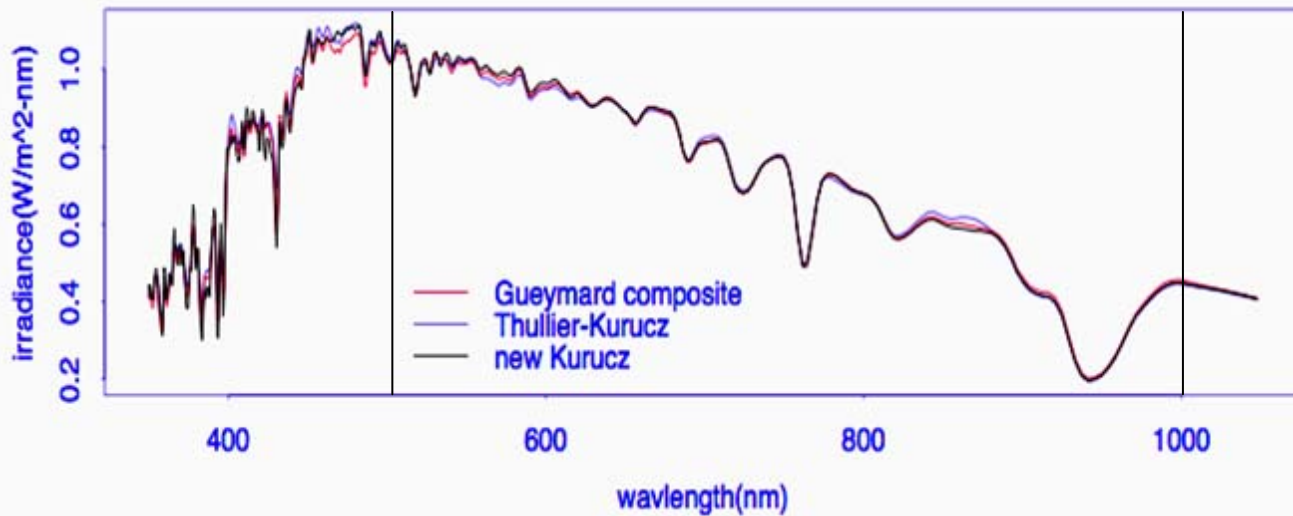
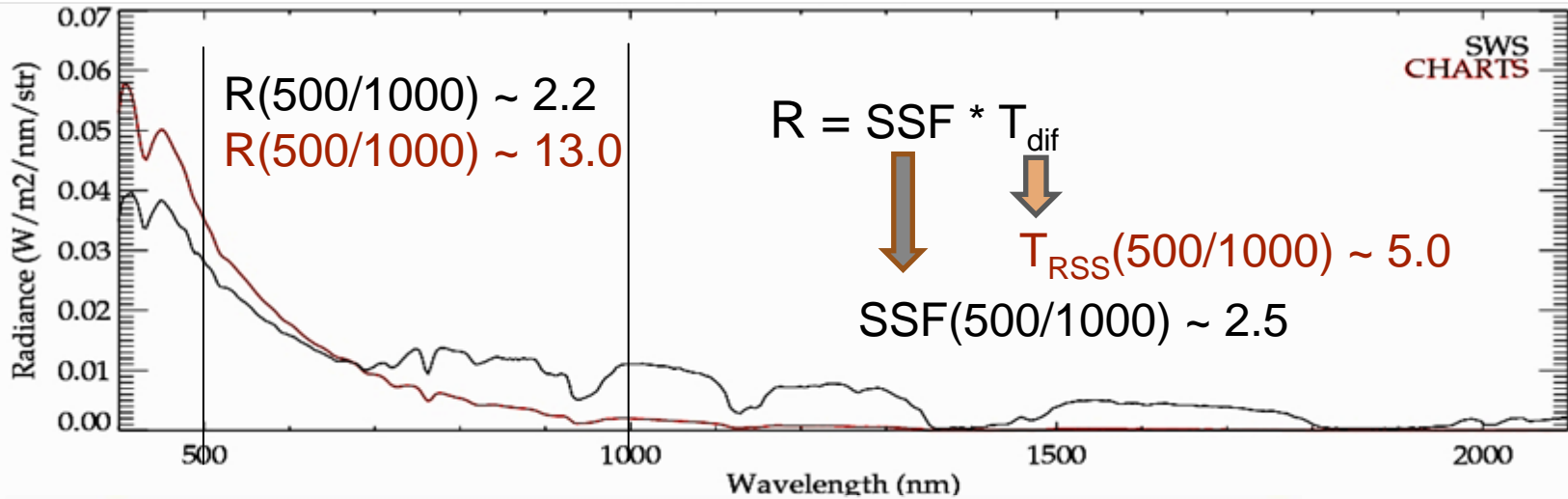
- ▶ Designed and built by Warren Gore, NASA Ames, in collaboration with Peter Pilewski.
- ▶ Mentored by Peter Pilewski, Scott Kittelman, Pat McBride.
- ▶ Highly reliable with excellent uptime except for annual calibrations at NASA Ames in Nov-Dec timeframe.

However...

- ▶ In May 2008, it began to show intermittent problems with the InGaAs detector leading to shut down in August.
- ▶ This problem was resolved and the SWS returned to service in October, followed by annual calibration at NASA Ames in November.

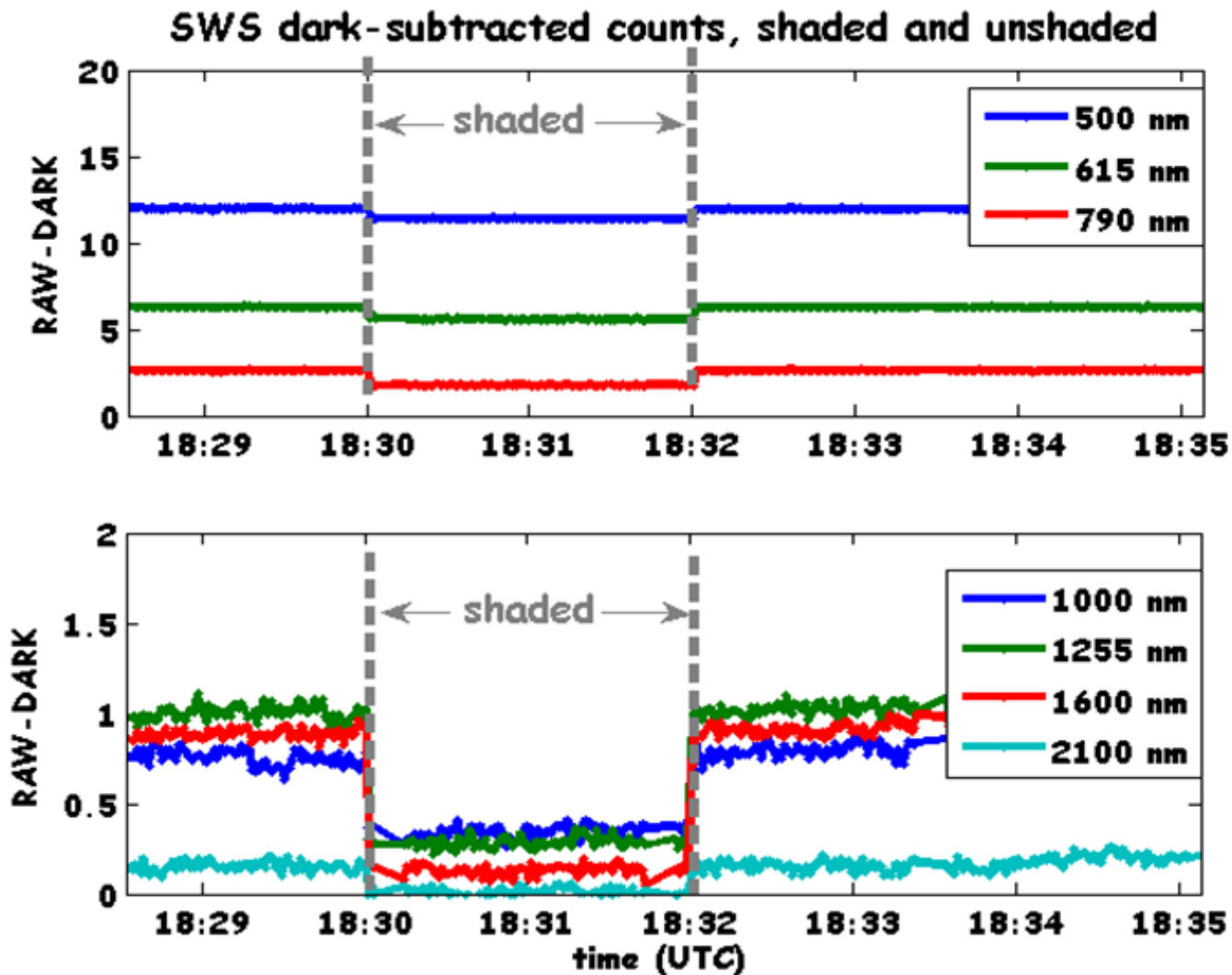
So, we're okay. Right?

# And then the other shoe dropped... Clear Sky Modeling (SWS v. CHARTS)

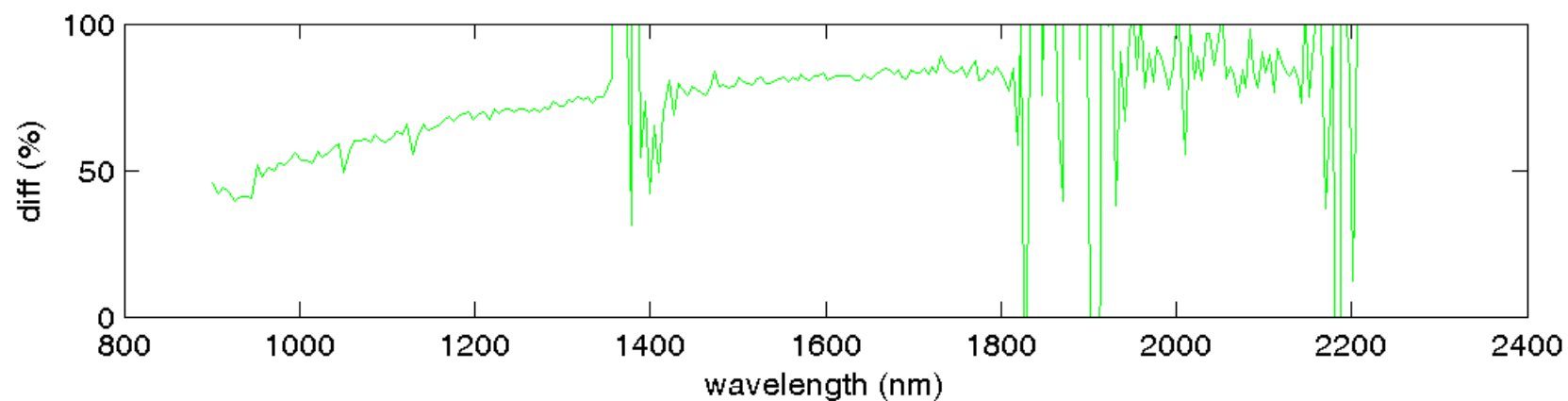
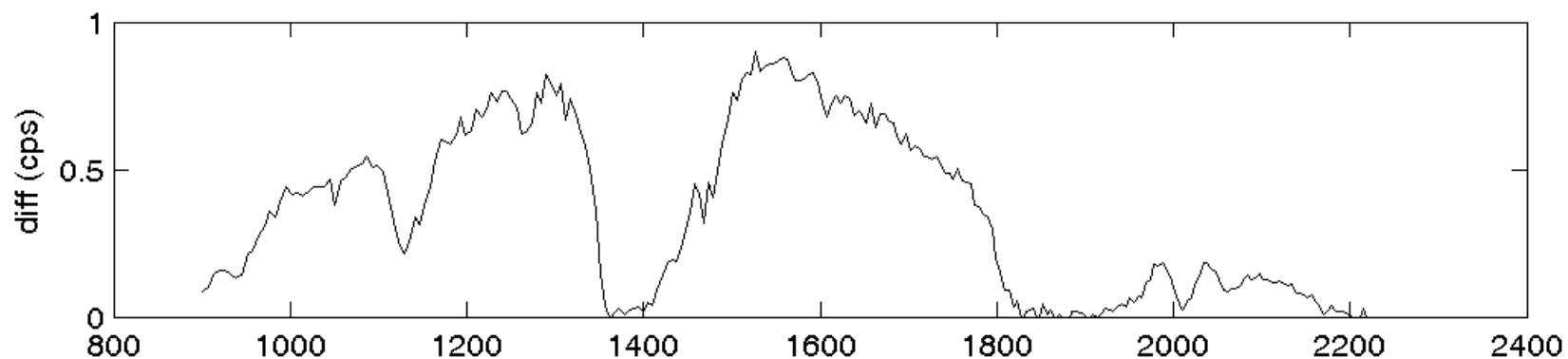
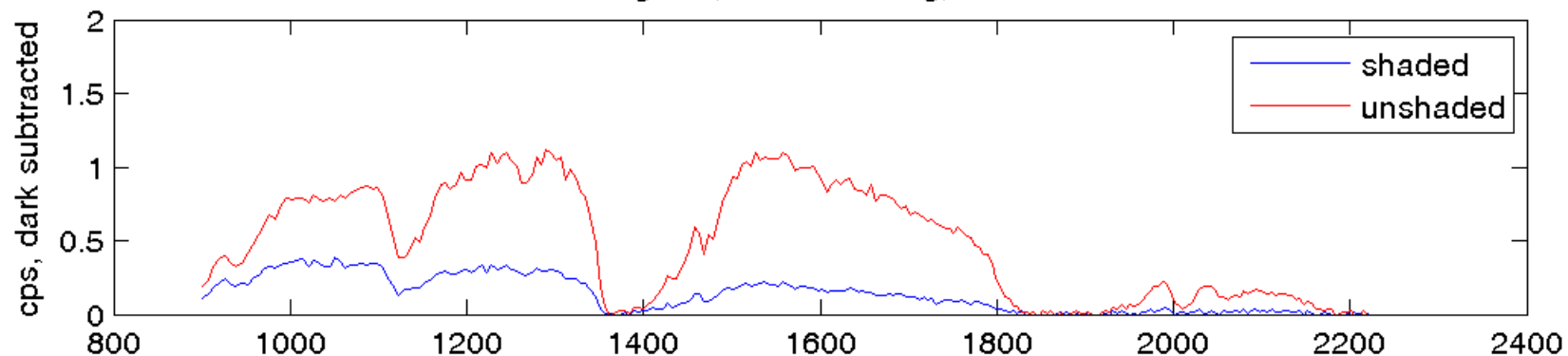


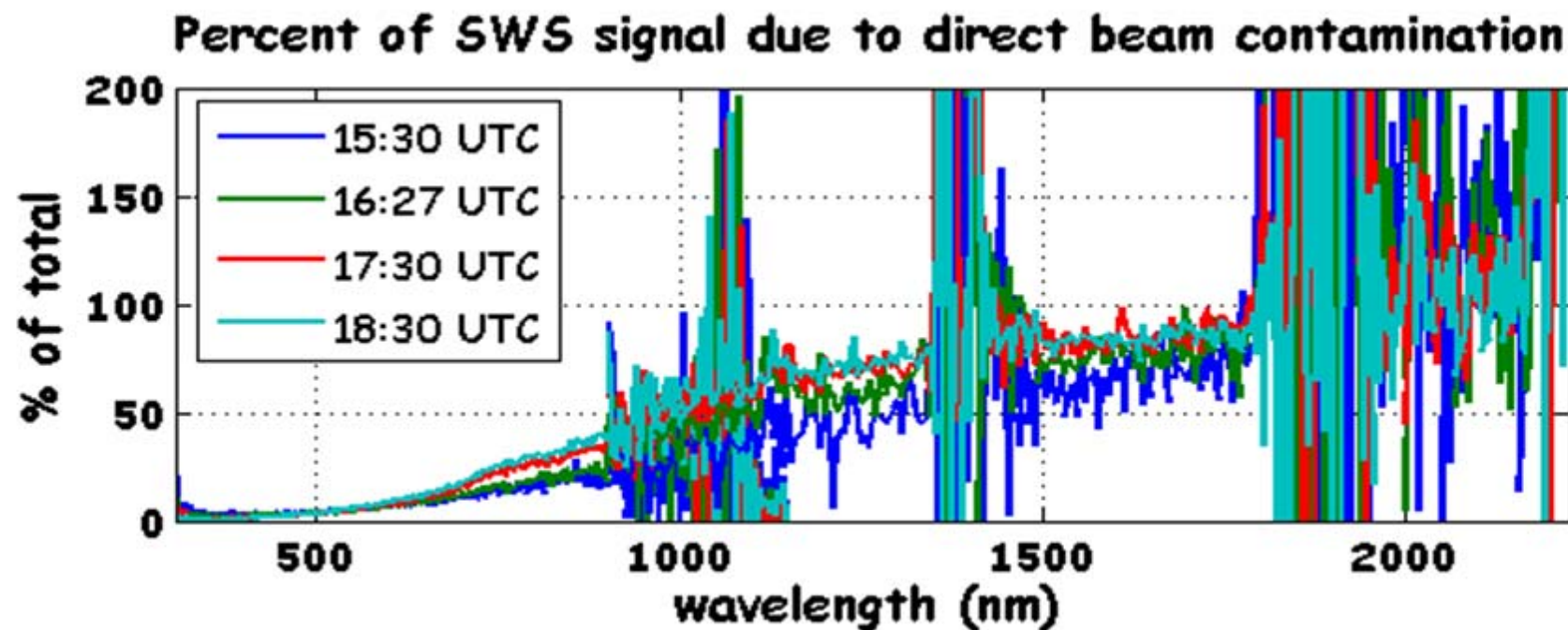
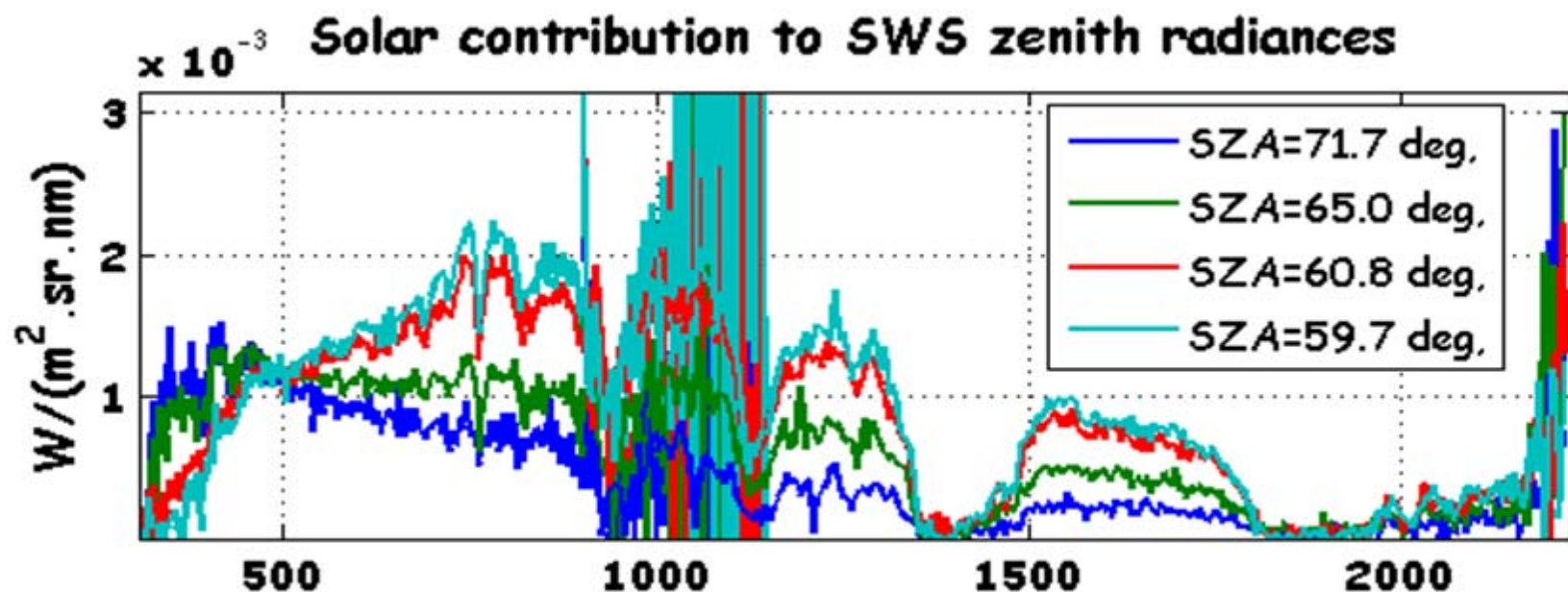
# The bad news...

## Source of discrepancy has been identified



SWS InGaAs shading test, SZA=60.0 deg, 2008-12-24 18:28 UTC



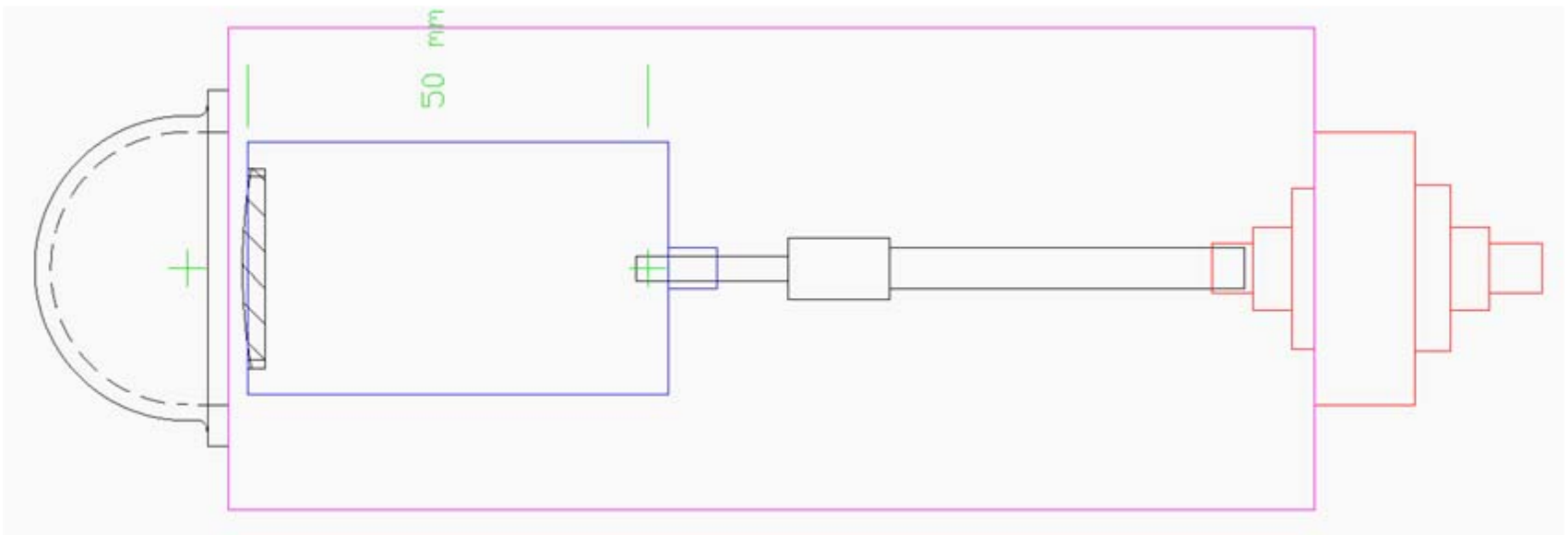


**Sensor  
Head**



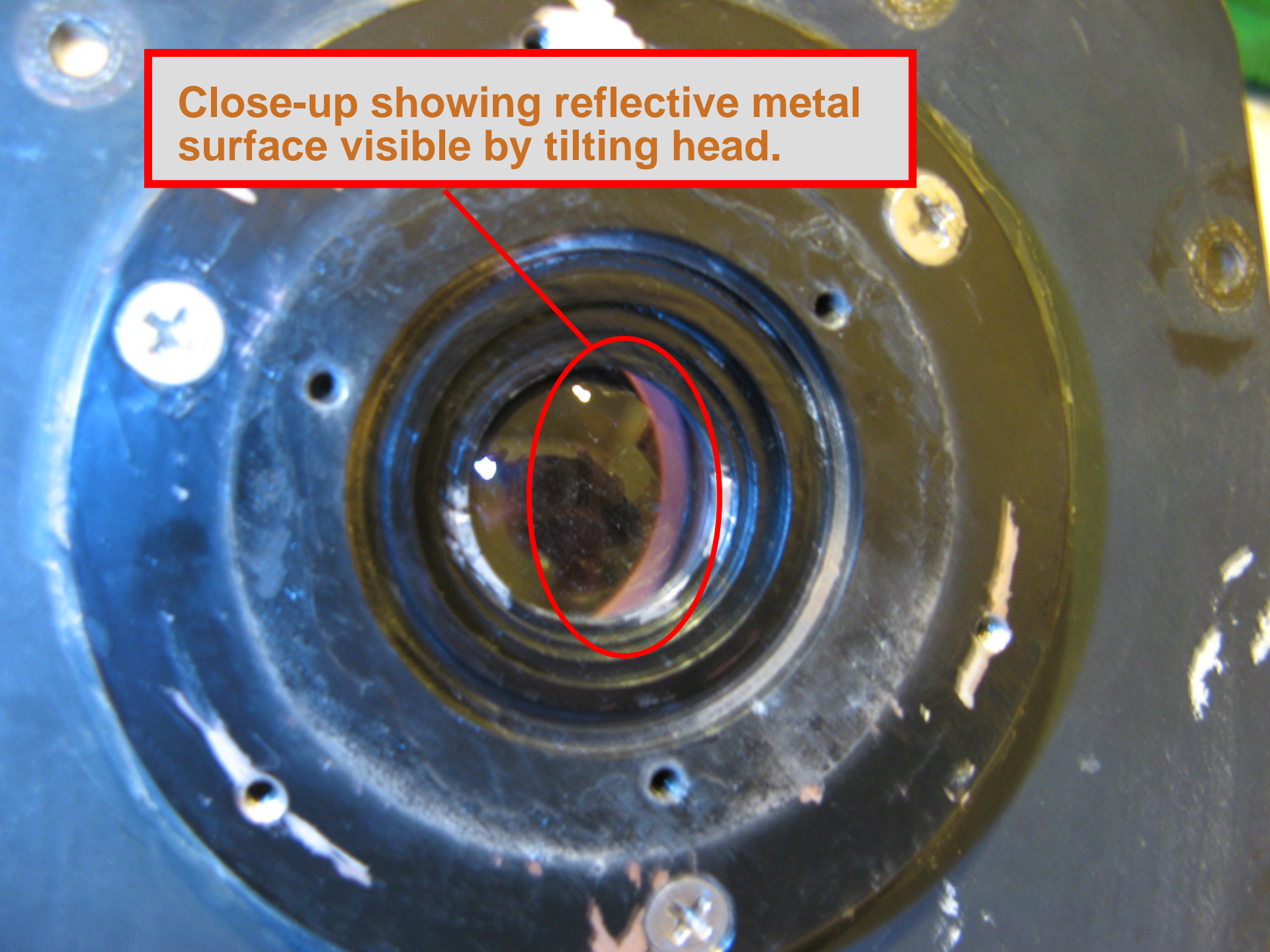


# SWS Sensor Head Sketch

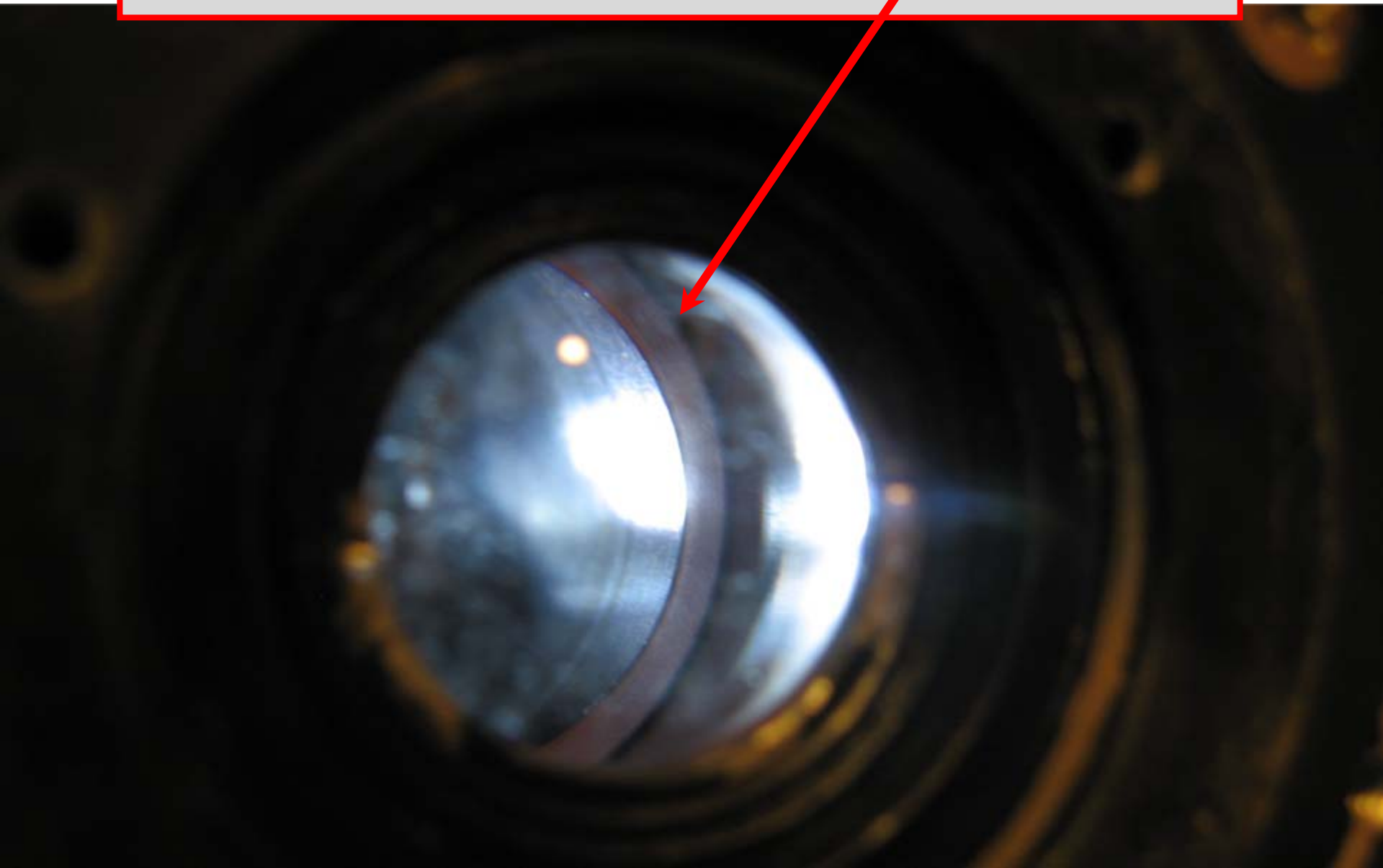


\* Courtesy P Pilewskie, W Gore

**Close-up showing reflective metal surface visible by tilting head.**



Close-up with back-lighting. The face of the ring is illuminated from light scattered from the back of the lens.

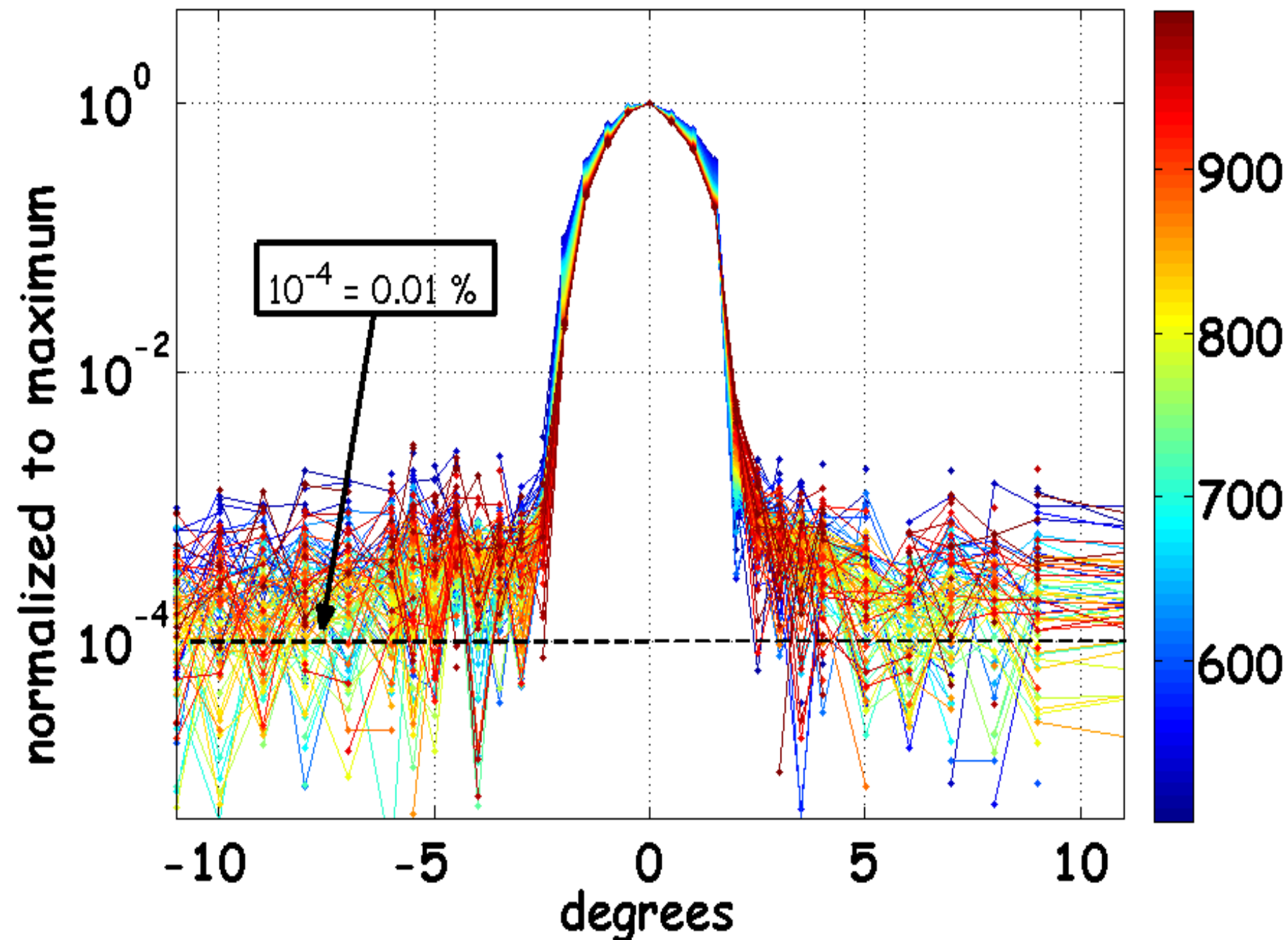


Photos taken with flash showing scattering from the internal surface of the lens.

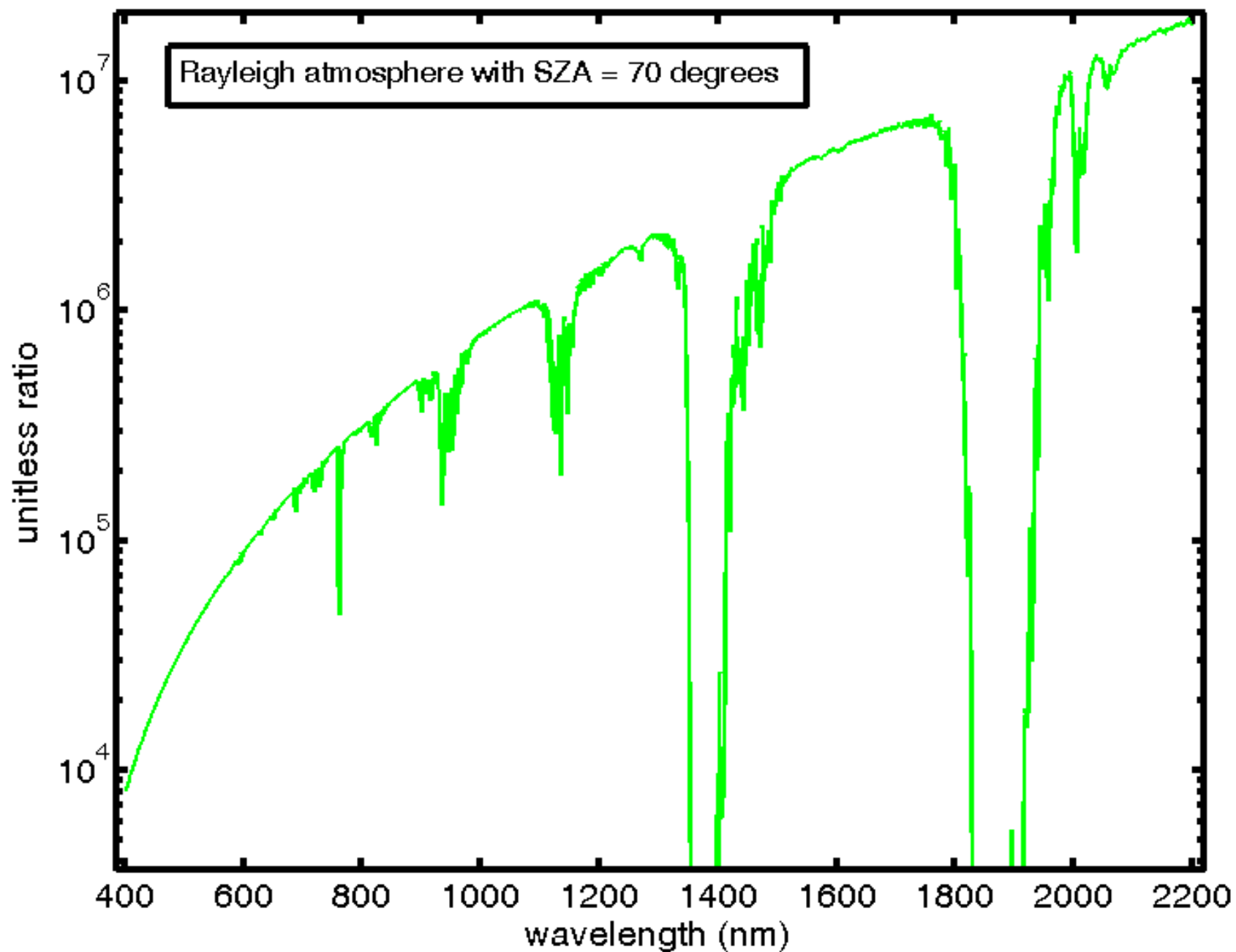


# SWS Si detector FOV measurement

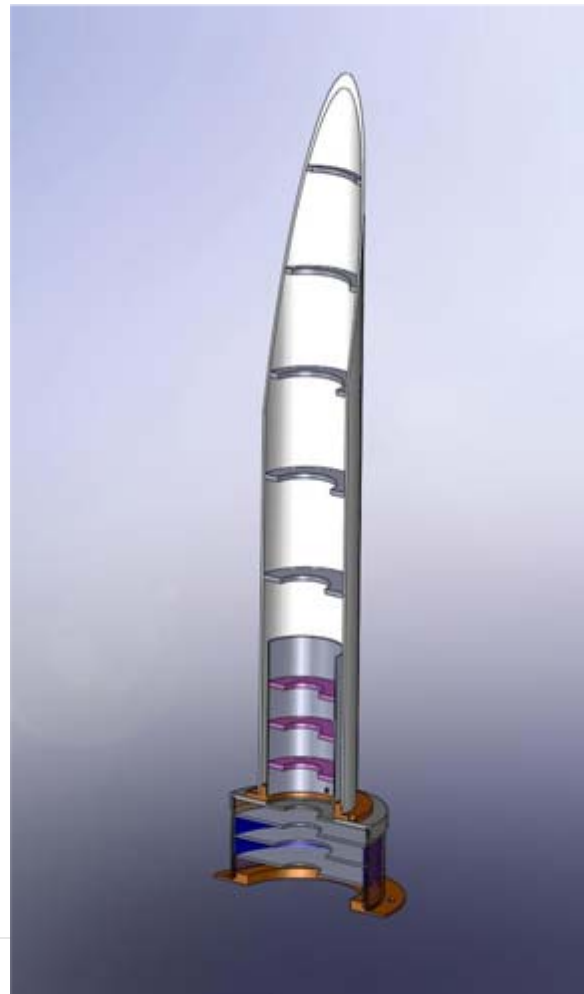
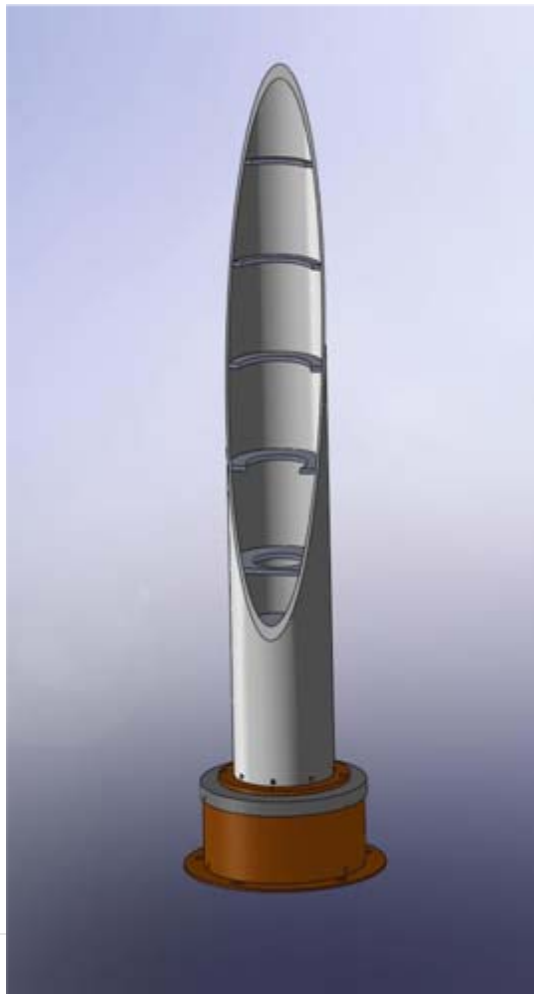
(nm)



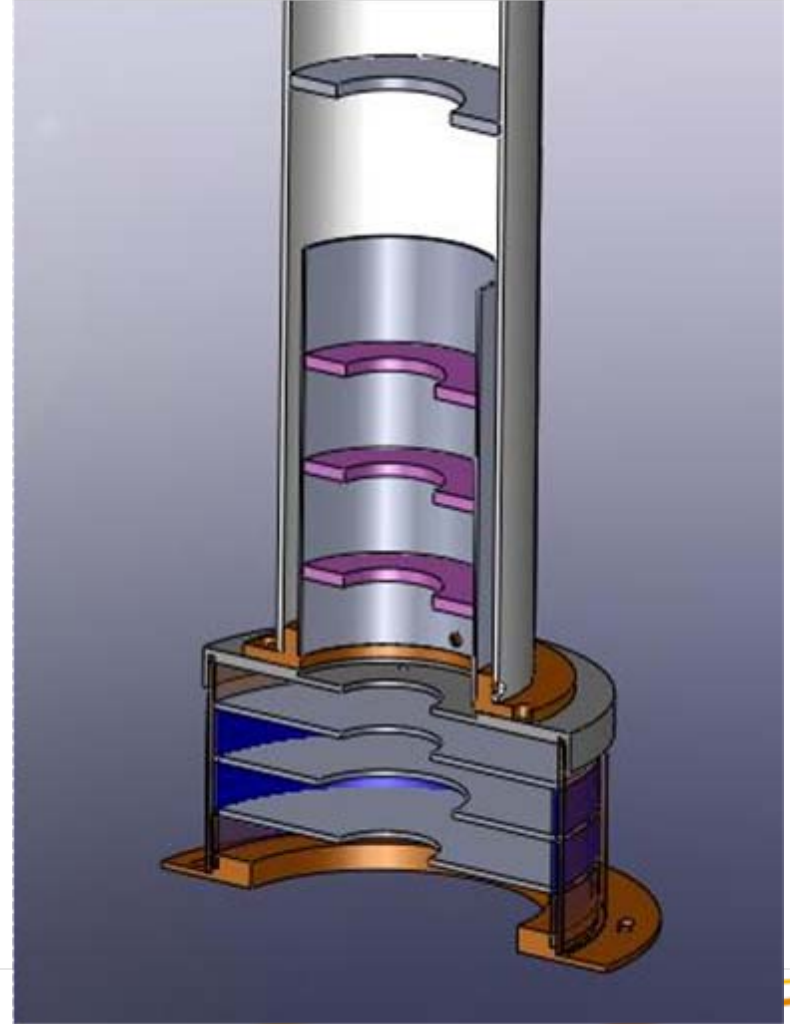
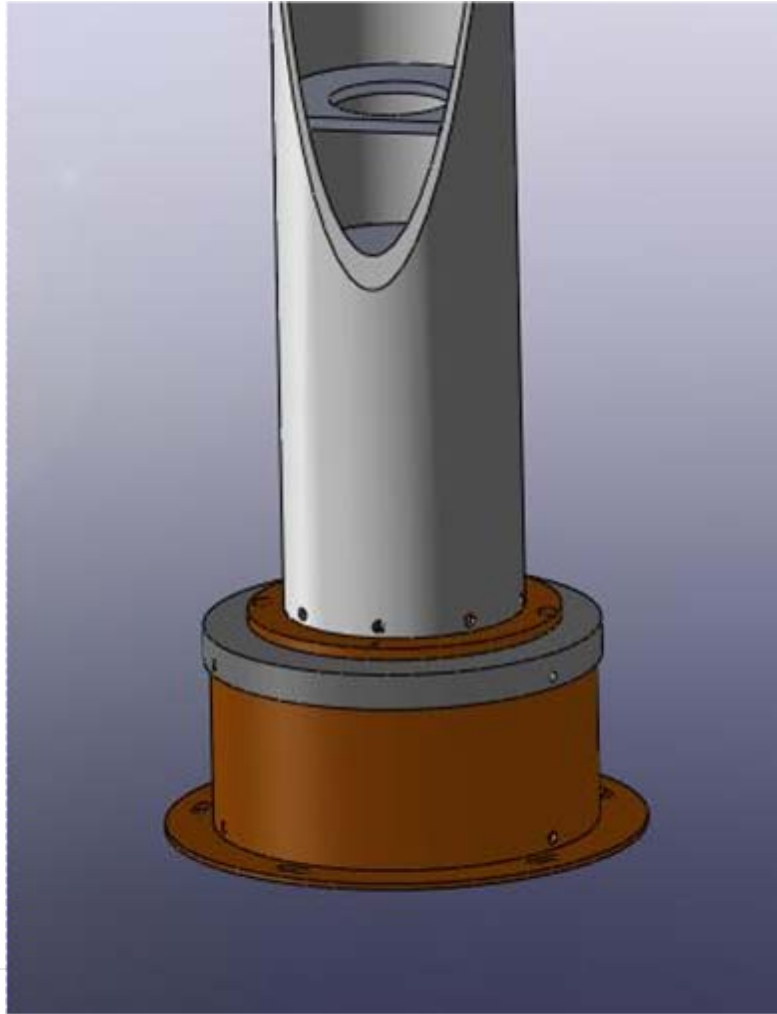
Ratio of dir\_irrad to zen\_rad integrated over SWS FOV



# Robust Light-Blocking Solution



# Close-up View of Sun Shade and Baffles





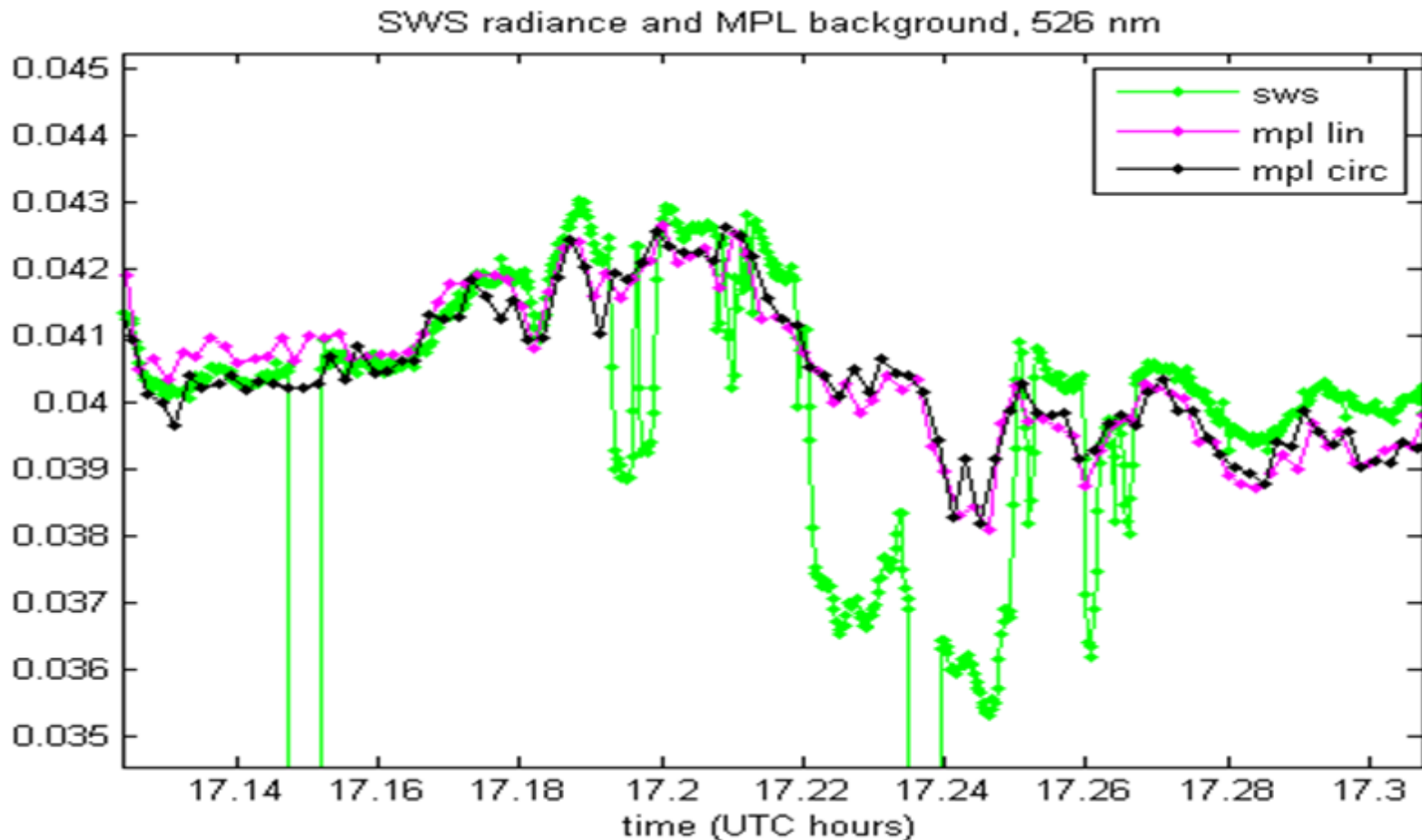
# Current Status – Currently Being Renovated

- ▶ Fabrication to begin the week of March 30.
- ▶ Approximately 80 hours of fabrication time over 4 weeks time.
- ▶ Testing and calibration extending for ~ 2-4 weeks.
- ▶ Re-deployment to SGP expected in early June.

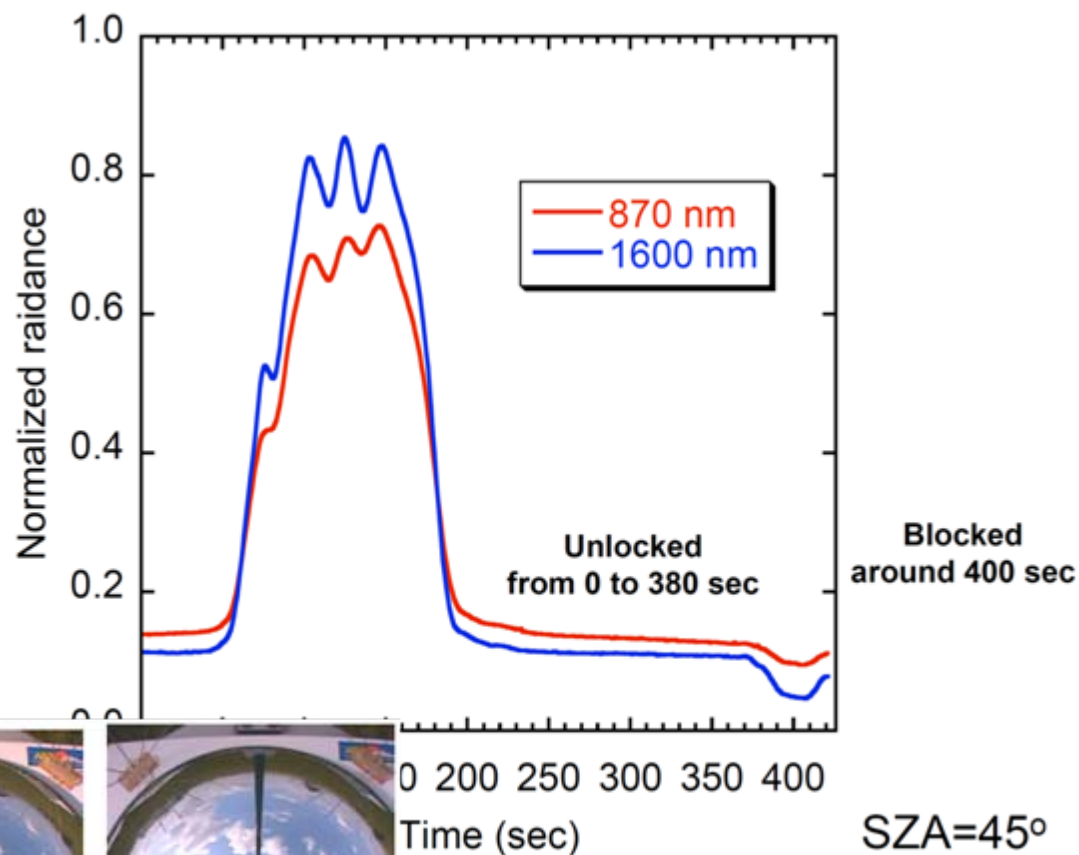
# Backup Slides...

# Work with DQO to Generate Quicklooks and Instrument Comparisons

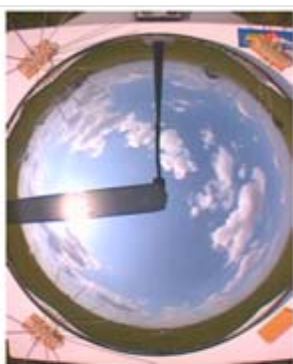
- ▶ Compare to MPL and RL zenith background
- ▶ Compare to NFOV and NFOV2 (2006-2007)
- ▶ Compare to IRT (qualitative only)



# Marshak and Chiu, Detection and Correction



310



340

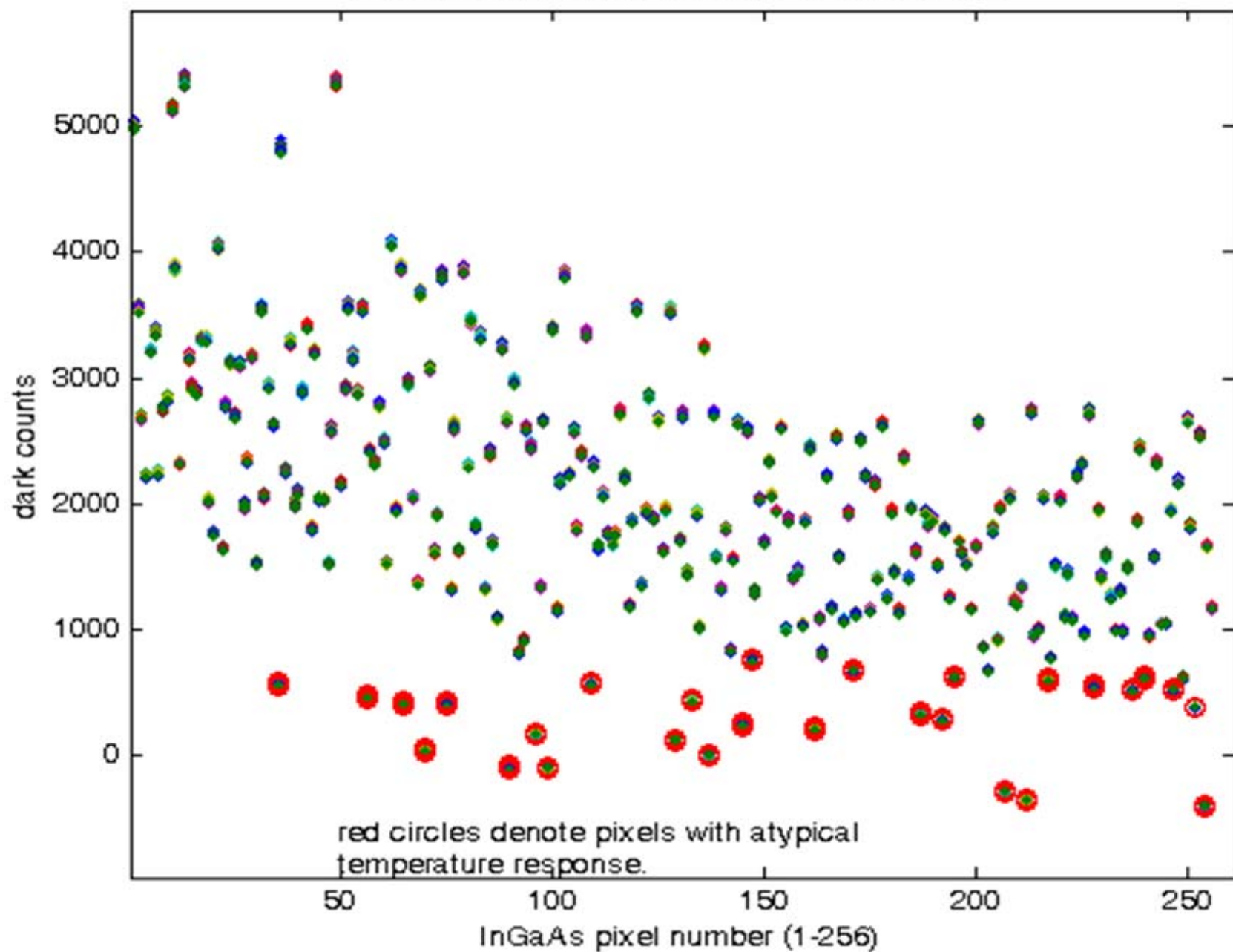


370



400

InGaAs dark counts for 250 ms integration time



Si dark counts for 90 ms integration time

