COS
Monthly Status Review
August 19, 2003
Ball

Agenda

Management Changes	J. Green
Results from Initial Calibration	E. Wilkinson
BATC Presentation	R. Higgins
Financial Splinter	GSFC/Ball/CU

Management Changes

- Jon Morse has moved to Arizona State University (Tempe). He will remain a COS Co-I and member of the Science Team. However, he will no longer be COS Project Scientist. The new Project Scientist is Erik Wilkinson. This selection has the full endorsement of the COS Science Team. The position of Instrument Scientist will cease to exist after delivery of COS.

- John Andrews will be leaving CU and the COS project in the October/November time frame. He will cease to be a member of the COS Science Team, but will remain a valued colleague (expect to see him at launch). Effective immediately, Ken Brownsberger is the COS Deputy Project Manager and he will become the Project Manager after John’s departure.

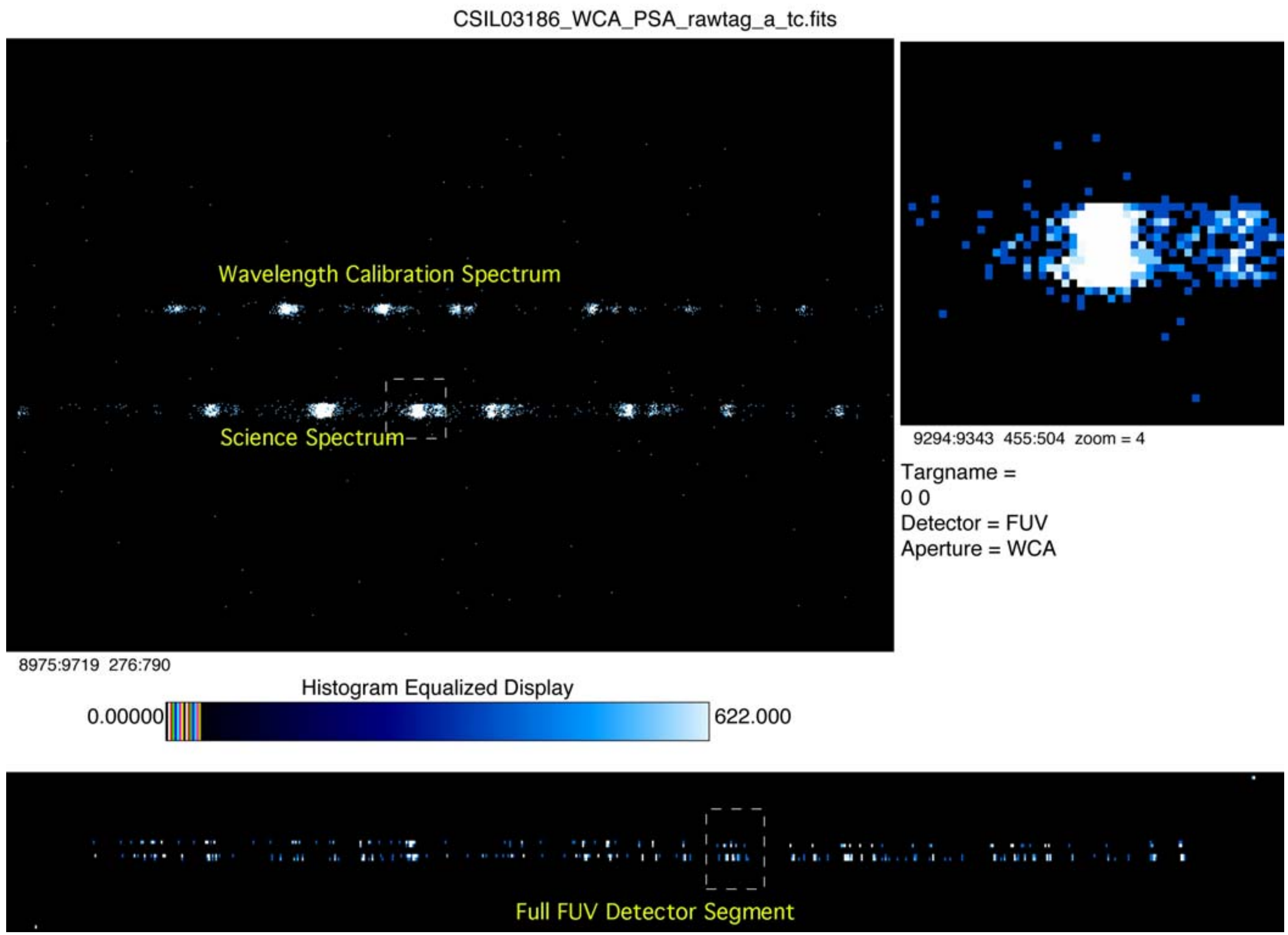
Results from Appendix A (initial calibration)

- Appendix A was designed to provide…
  - the first full FUV spectra for resolution, wavelength scales - all previous data were acquired in a GN2 environment
  - sufficient data to calibrate mechanism position vs wavelength for all modes
  - a quick-look into the performance of the COS instrument prior to full calibration
    - Efficiency
    - Resolution
    - Spatial Resolution
- Appendix A also provided us the opportunity to test our analysis techniques and refine our calibration methodologies for a more efficient Appendix B
- Appendix A took place over 4 days (24 hours/day) and resulted in 480 data files
- Ultimately the whole activity was an excellent dry run and will result in a more thorough and complete calibration of COS

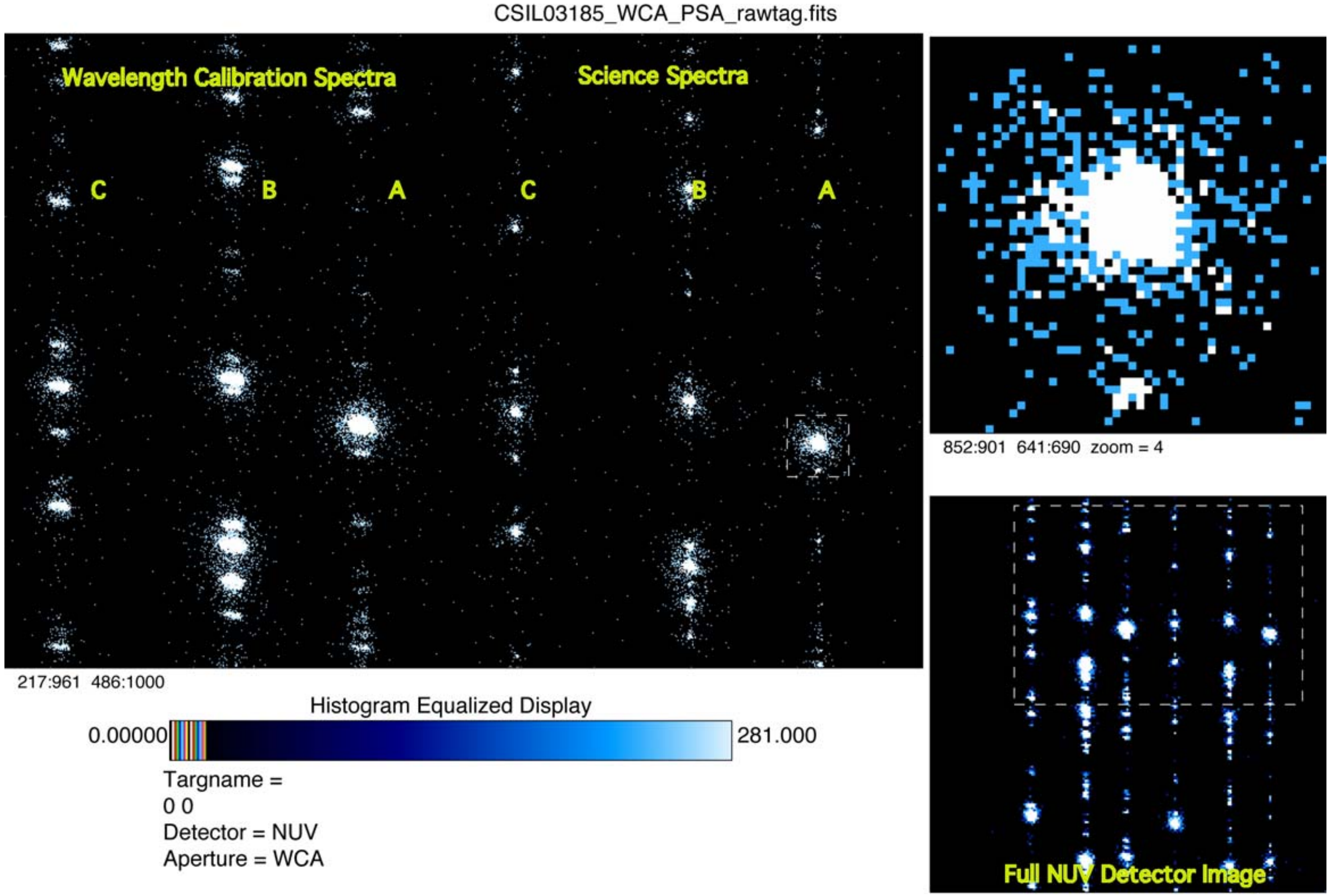
The whole effort was highly successful do to the excellent work by the Appendix A team

CU/CASA:	Cynthia Froning, James C. Green, Steven N. Osterman, Steven V. Penton, Erik Wilkinson
BATC:	Thomas Delker, Dennis Ebbets Jason McPhate, John V. Vallerga
STScI:	Scott Friedman, George Hartig, Charles Keyes, Claus Leitherer, Kenneth Sembach
JHU:	David J. Sahnow

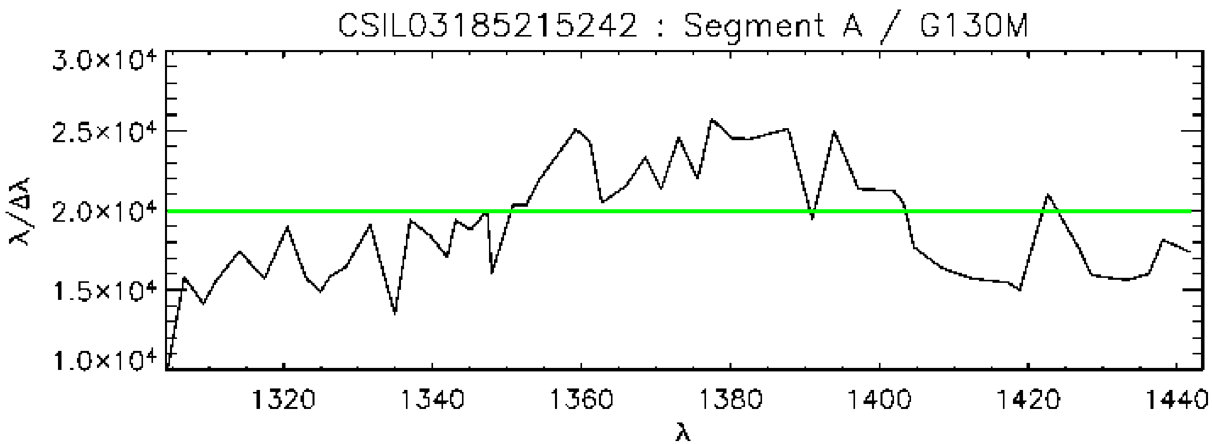
FUV Combined Image

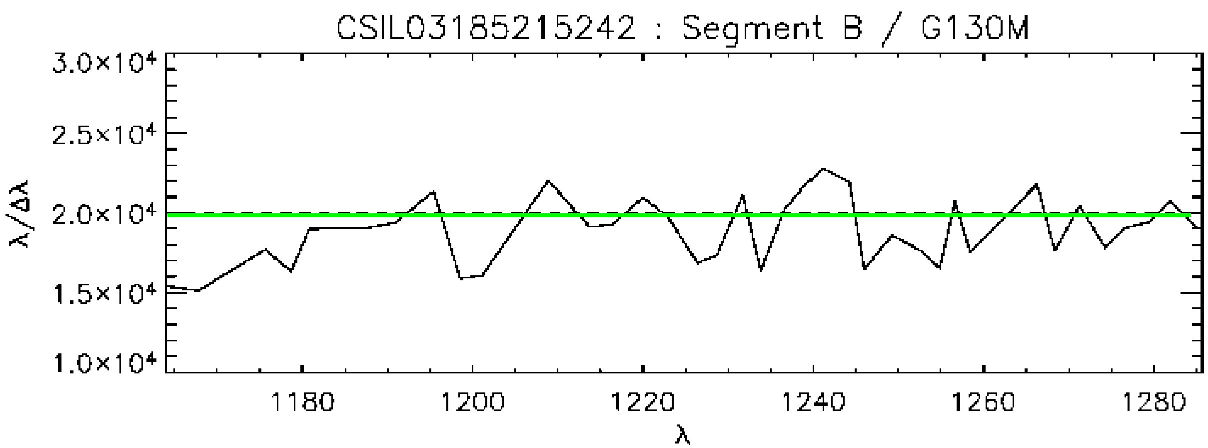


NUV Combined Image

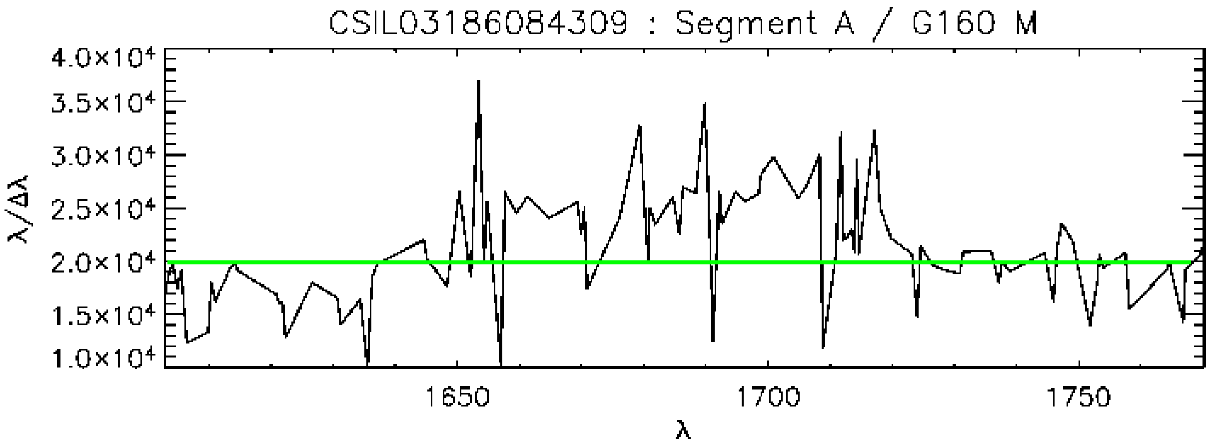


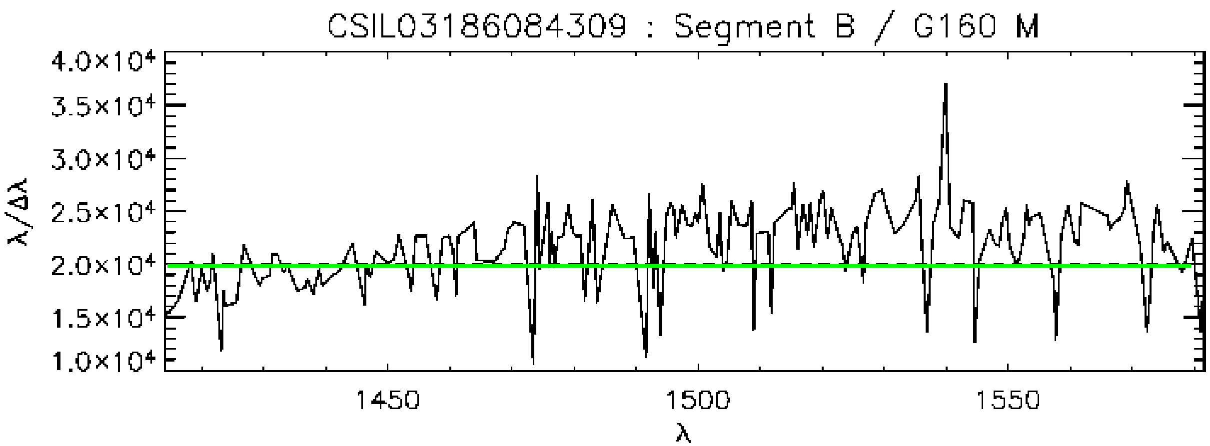
G130M Resolution



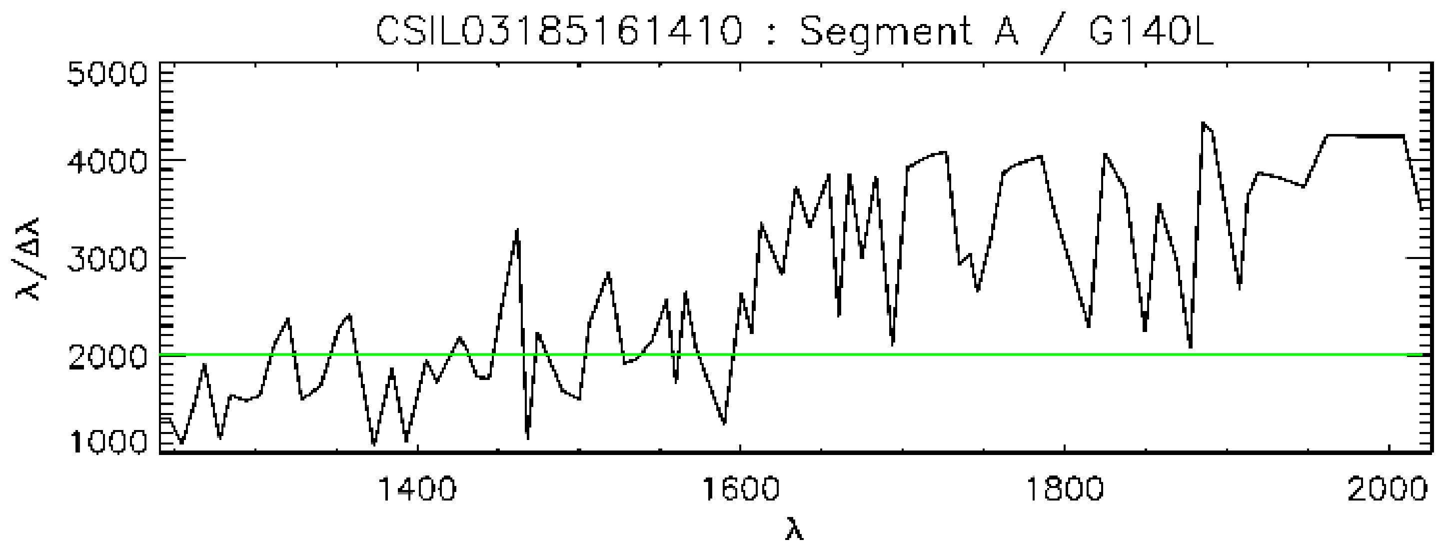


G160M Resolution

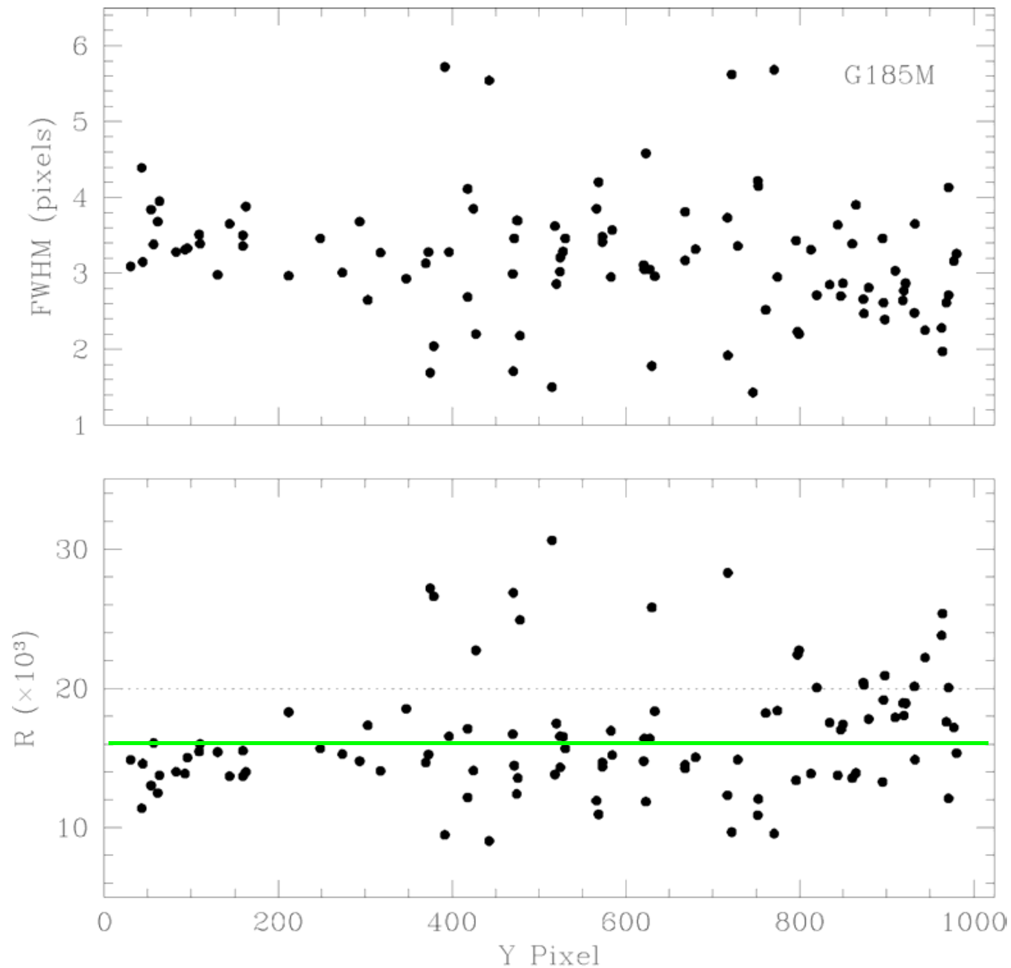




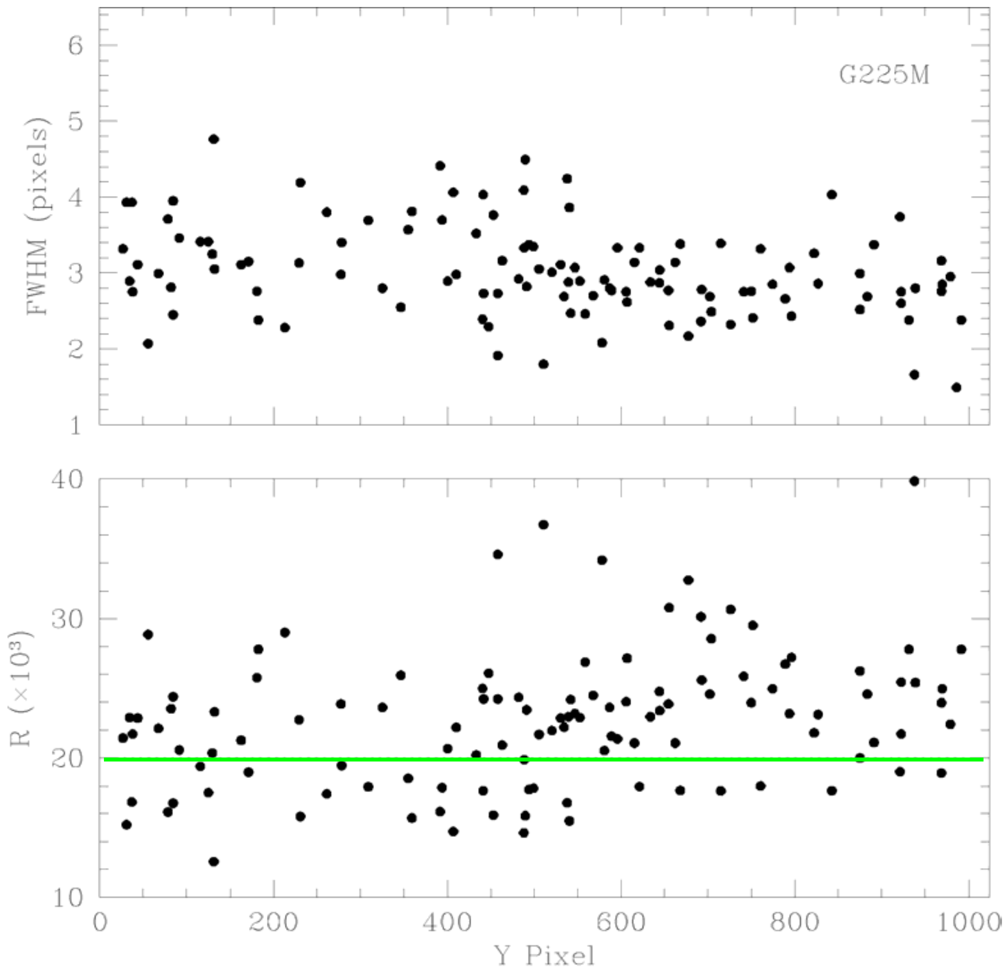
G140L Spectral Resolution



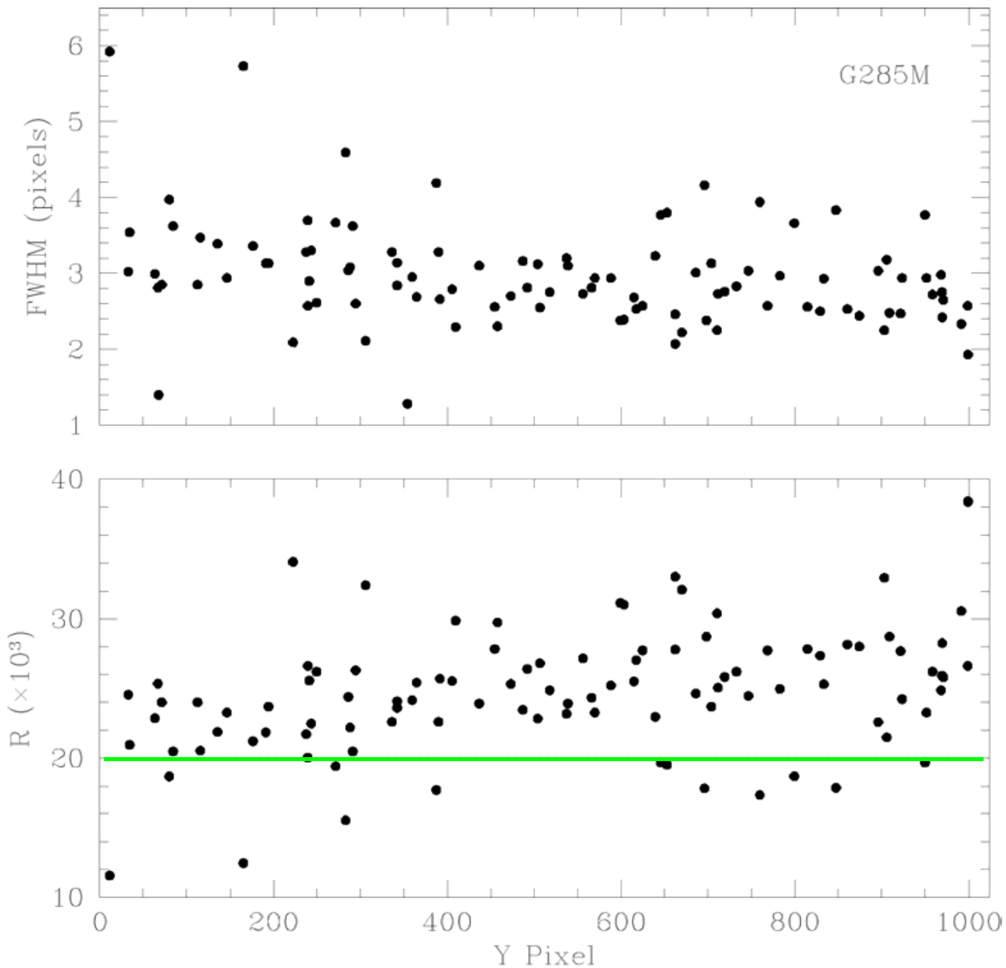
G185 Spectral Resolution



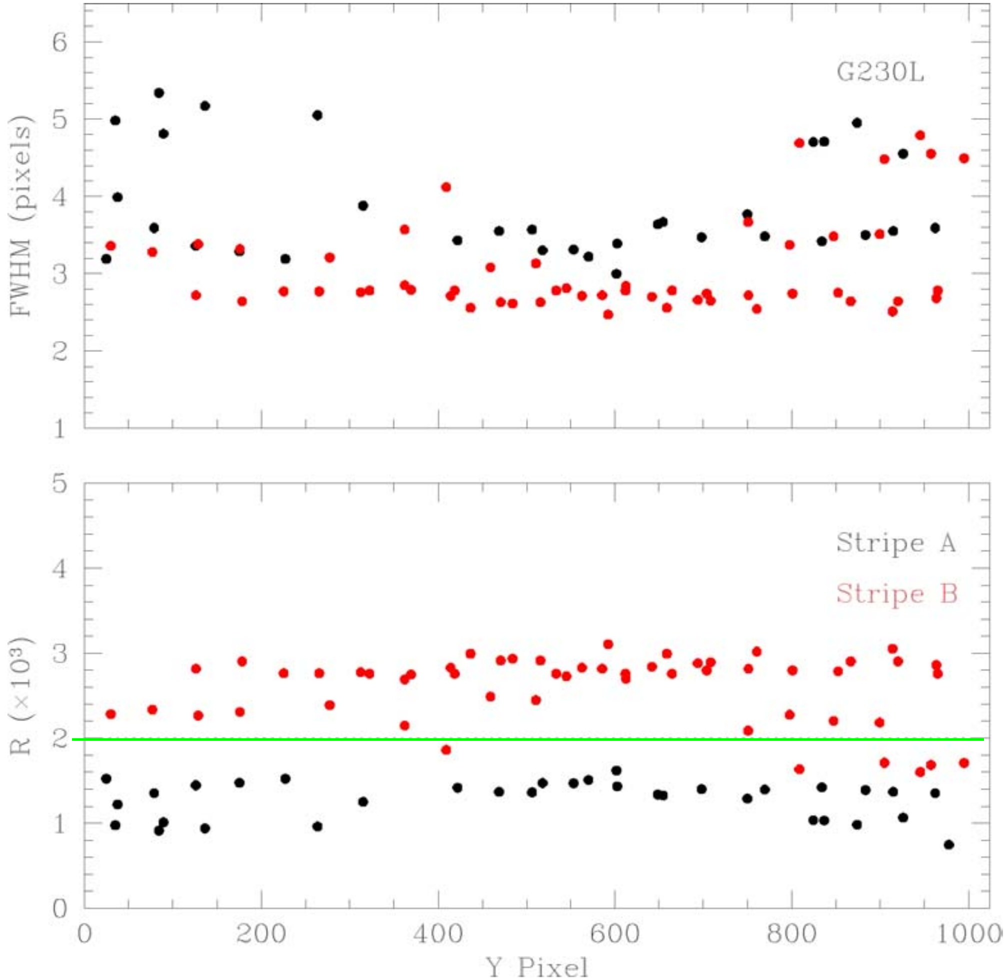
G225 Spectral Resolution



G285 Spectral Resolution

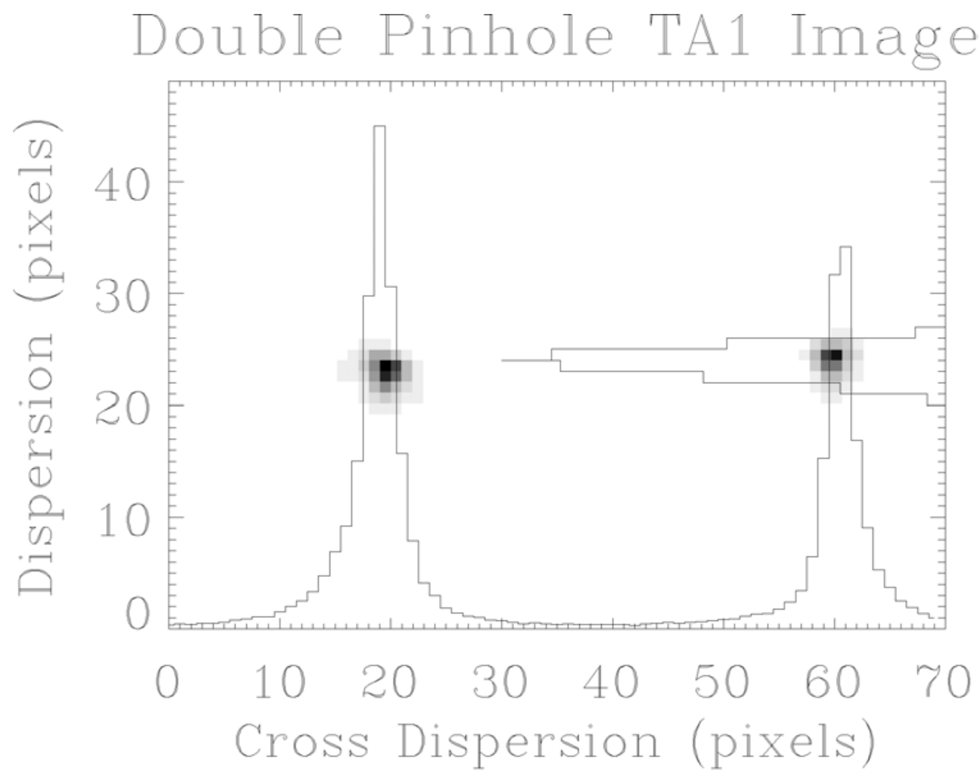


G230L Spectral Resolution

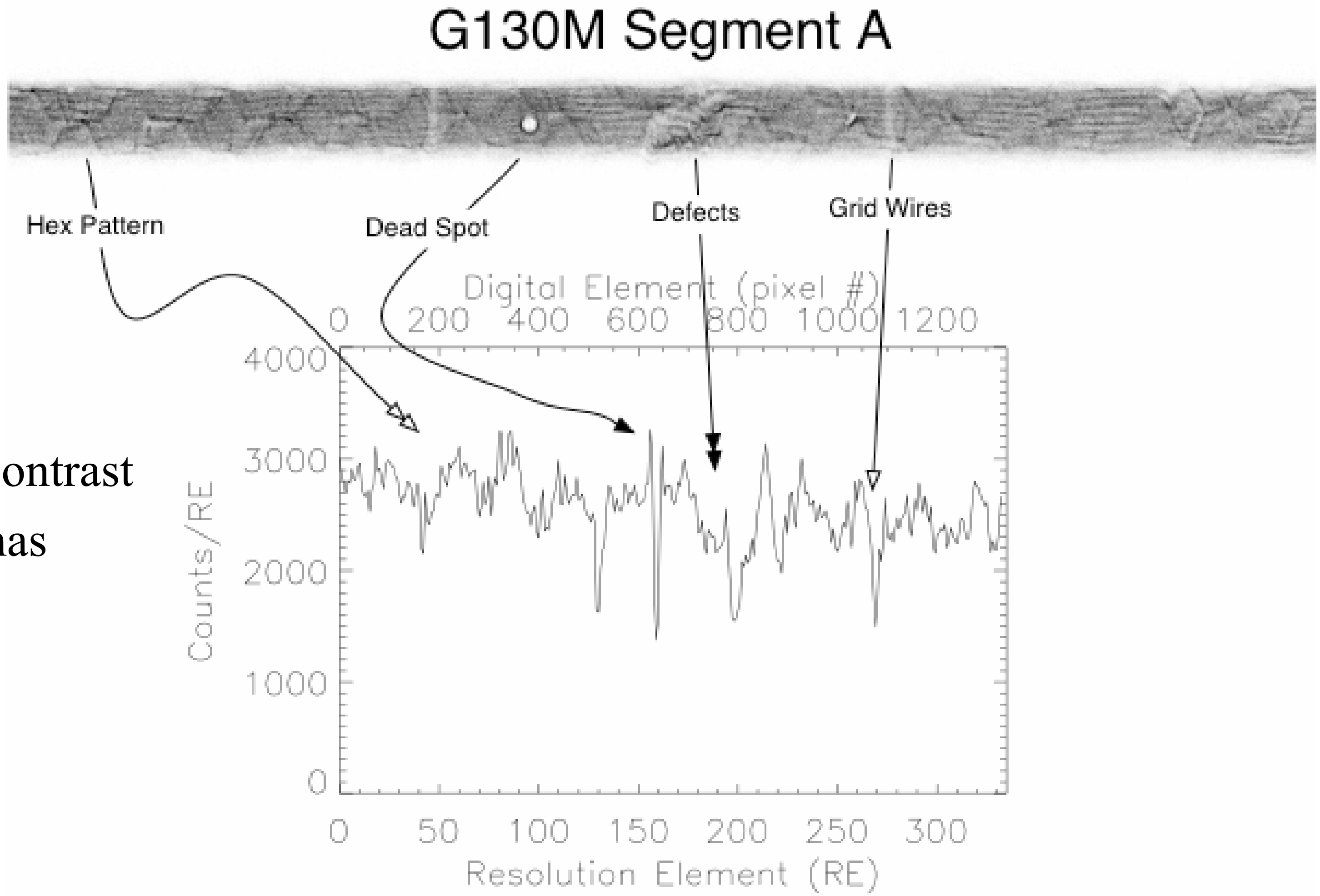


Spatial Resolution

- TA-1 shows the spatial resolution of the NUV channel is spot on.
- Image was really taken to verify we had the pinhole in correctly.
- FUV and NUV spectra will be taken during final calibration to verify spatial resolution for spectra.

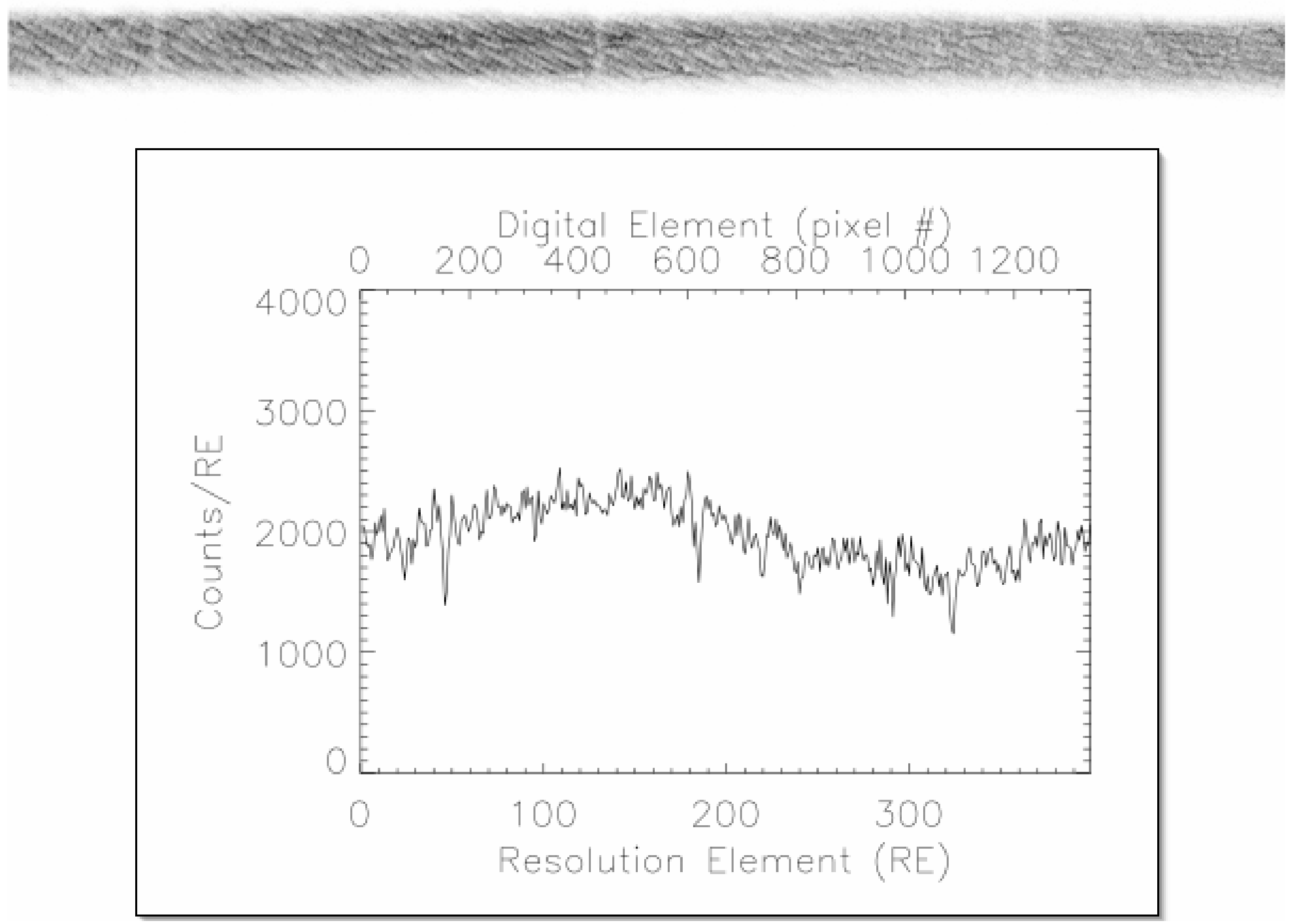


Flat Fields



- Image has enhanced contrast
- Spectrum has "real-life" binning

G130 Segment A



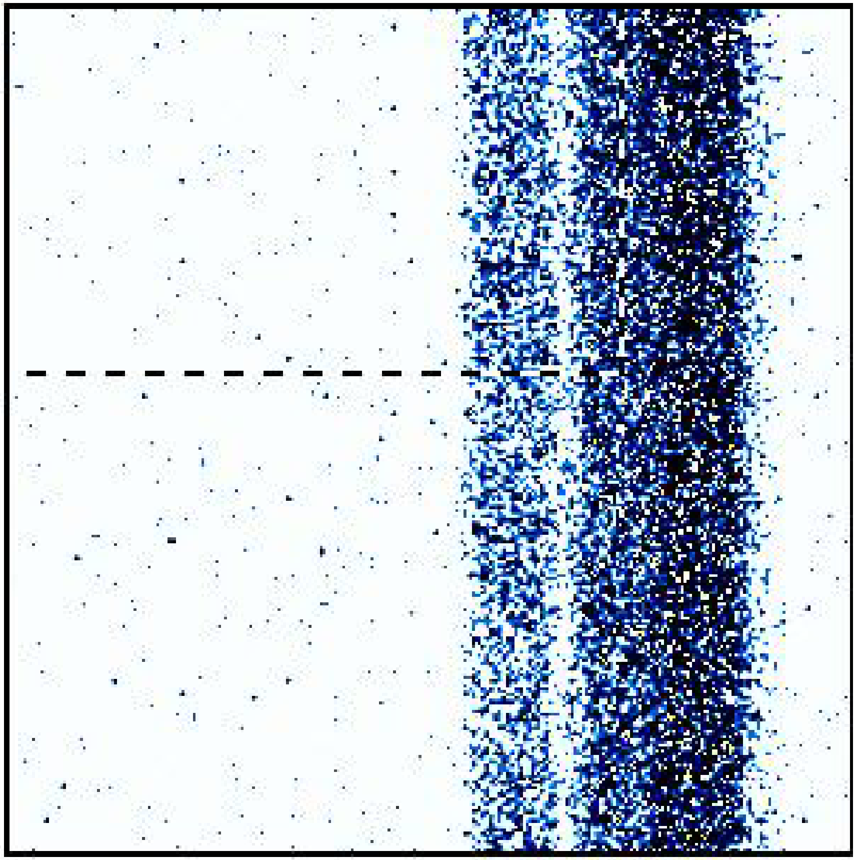
Flat Fields

- S/N limited by fixed pattern noise

$$\sqrt{n} \approx 50$$

Flat Fields

- G285M flat field exposure with the internal flat field lamps.
- Exposure time was 180 seconds.



COS Efficiency Checks

Grating	Wavelength	Absolute Efficiency	CEI Requirement
G130M-B	1248□	0.174±0.018	>0.103
G130M-A	1327□	0.113±0.017	
G160M-B	1430□	0.120±0.011	>0.077
G160M-A	1621□	0.075±0.016	
G140L	1327□	0.083±0.014	>0.07
G185M	1846□	0.0355±0.0043	>0.023
G225M	2487□	0.0248±0.0023	>0.023
G285M	2695□	0.0189±0.0014	>0.023
G230L	2262□	0.0246±0.029	>0.016
TA1	2487□	0.0424±0.0043	no requirement
TA1-BRT	2487□	0.0031±0.0003	no requirement

Why we do not have a problem

- The specification for the G285M efficiency is identical to that of the other “M” NUV channels - despite the QE of the MAMA dropping off at the longer wavelengths. This led us to review the logic used to derive the NUV CEI requirements and we realized that as the NUV design evolved the CEI efficiencies were not adjusted accordingly as the band-passes changed - recall we went from 2 to 3 channels. We rederived the CEI specifications using the same basic assumptions but with correct band-passes and calculated the following values
  - G185M - 0.018 : lower due to decreased reflectivity at shorter wavelengths
  - G225M - 0.023 : No change
  - G285M - 0.017 : lower due to decreased QE of the MAMA at longer wavelengths
  - G230L - 0.021 :
- Compared to these numbers we actually meet spec.
- The “problem” is not with the instrument but our initial expectations. We suggest that submitting a waiver is the best course of action.

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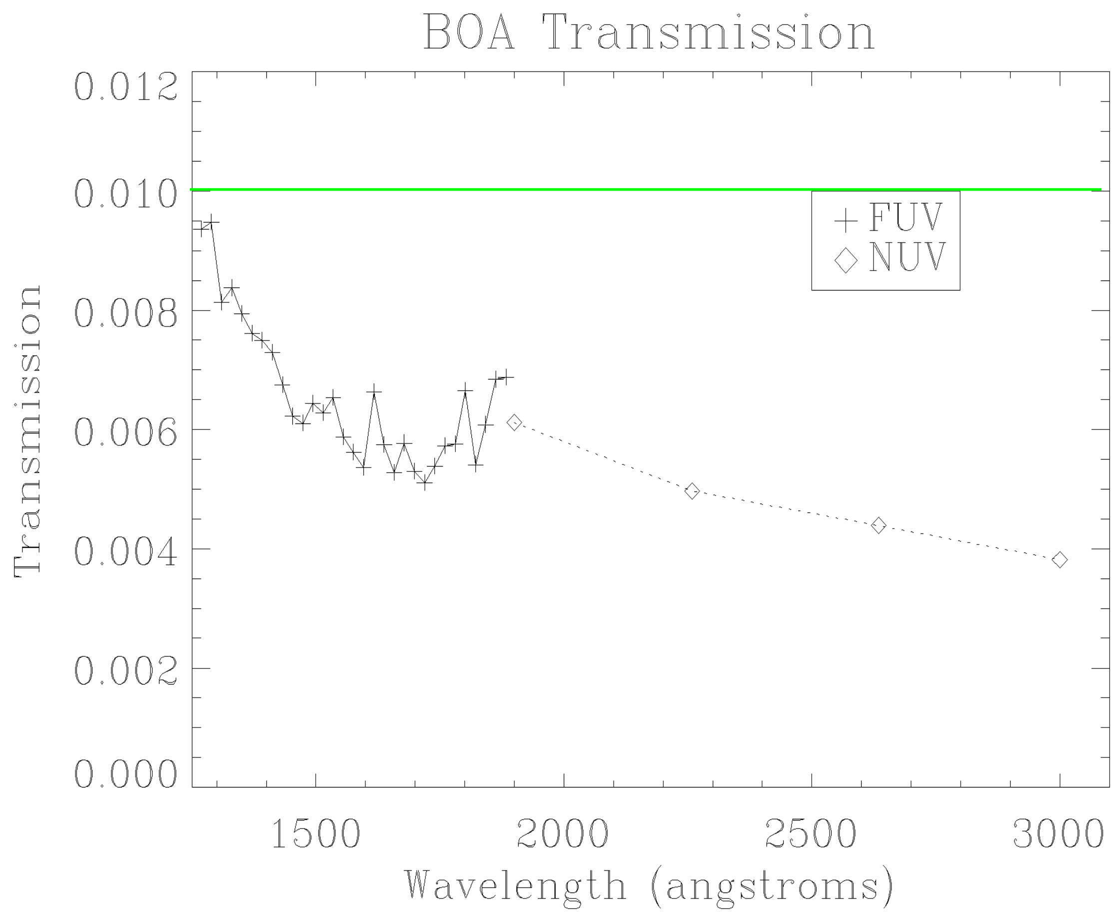
BOA Attenuation

- BOA attenuation measured by forming the ratio of an identical input spectrum observed through the PSA and BOA (minimal systematic errors)
- Larger attenuation than expected is GOOD.



Other things we learned

- The FUV detector resolution and plate scale is stable with count rate
- The FUV geometric distortion needs to be recalibrated. This was not entirely unexpected and we are including a detailed geometric distortion calibration in final calibration. New tests demonstrate that we can derive a map of the detector distortion using the onboard wavelength calibration lamp and RAS/Cal.
- The mechanism repeatability appears to be excellent.
- The ND filters in the calibration subsystem are fine, however, to preserve in-orbit lamp life all ground NUV flat fields will be done using external lamps.
- Refined all the wavelength calibration exposure times based on measured spectra.
- We are including a series of test to double check FUV detector operational parameters.