

PSA-WCA Separation Measurements for TV 2003 and 2006

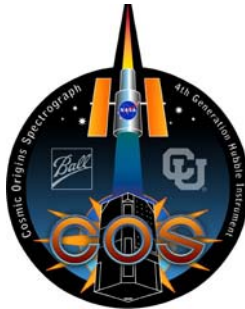
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1. INTRODUCTION

During thermal-vacuum tests in 2003, a complete set of exposures were obtained at each central wavelength of each grating for the NUV and FUV detector through both the PSA and WCA apertures. These files have been selected to get the WCA wavelength templates, to determine the wavelength dispersion solutions and the separation, in pixel space, between the spectra observed through the PSA and through the WCA aperture. These values are used to generate the reference files that the COS pipeline (calcos) need to be able to assign wavelengths to the observed spectrum.

The PSA-WCA separation is dependant on the installation of COS with respect to RASCAL for the thermal-vac tests, and with respect to the HST's incoming beam during SM4 install. The dataset obtained during thermal-vac 2006 show a different alignment and thus different values for this offset. We were able to demonstrate (COS-11-0047 "NUV Geometric Distortion and Wavelength Calibration") that we can use the dispersion solutions obtained with the 2003 datasets on the 2006 data by simply adding an offset.

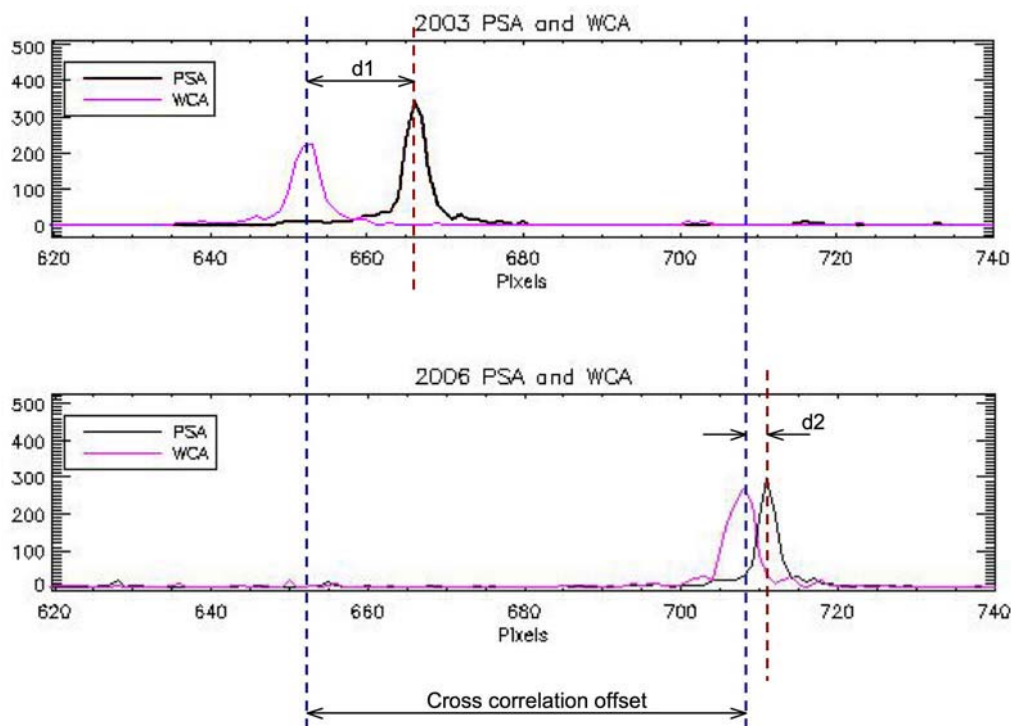


Figure 1-1 WCA and PSA positions for a specific spectral line from 2003 and 2006.

The wavelength for each photon event is obtained with the relation below (refering to figure 1.1) where:

Y_{06} : original dispersion direction pixel location for photons through the PSA

Y'_{06} : new pixel location aligned, in the dispersion direction, with the 2003 PSA spectra

CCO : cross-correlation offset between the 2003 and the 2006 WCA spectra

d1: separation in pixels between the PSA and WCA from 2003 data (PSA – WCA)

d2: separation in pixels between the PSA and WCA from 2006 data (PSA – WCA)

(d1-d2) : difference in the installation alignment between 2003 and 2006

PSA₀₃ : wavelength solution parameters for the 2003 PSA spectrum

$$Y'_{06} = Y_{06} - \text{CCO} + (d1-d2)$$

$$\lambda_{06} = \text{PSA}_{03}[0] + \text{PSA}_{03}[1] * Y'_{06} + \text{PSA}_{03}[2] * (Y'_{06})^2$$

The following sections list the values of d1 (for 2003) and d2 (for 2006) for the various gratings/central wavelength/stripe or segment combination.

2. NUV DETECTOR – TV 2003

The Table 2.1 below gives the list of PSA and WCA files used to determine the value of “d1” as described above. This value was obtained by cross-correlating the two spectrum using a width of 256 pixels. A positive value of d1 indicates that the PSA is spectra falls further on the detector (larger pixels values). The sign of d1 in the table below is for data in the default USERCOORD coordinate system. The sign needs to be changed for data in DETECTOR coordinates.

PSA Filename	WCA Filename	OPT ELEM	CENWAVE	SEGMENT	D1 (pix)
CSIL03266024446	CSIL03266025117	G185M	1786	NUVA	-18.78
CSIL03266024446	CSIL03266025117	G185M	1786	NUVB	-16.35
CSIL03266024446	CSIL03266025117	G185M	1786	NUVC	-14.05
CSIL03266010322	CSIL03266010953	G185M	1817	NUVA	-18.13
CSIL03266010322	CSIL03266010953	G185M	1817	NUVB	-15.03
CSIL03266010322	CSIL03266010953	G185M	1817	NUVC	-12.48
CSIL03266030140	CSIL03266030811	G185M	1835	NUVA	-16.89
CSIL03266030140	CSIL03266030811	G185M	1835	NUVB	-15.03
CSIL03266030140	CSIL03266030811	G185M	1835	NUVC	-11.93
CSIL03266012016	CSIL03266012647	G185M	1850	NUVA	-16.76
CSIL03266012016	CSIL03266012647	G185M	1850	NUVB	-14.03
CSIL03266012016	CSIL03266012647	G185M	1850	NUVC	-11.72
CSIL03266031834	CSIL03266032505	G185M	1864	NUVA	-15.69
CSIL03266031834	CSIL03266032505	G185M	1864	NUVB	-13.60
CSIL03266031834	CSIL03266032505	G185M	1864	NUVC	-11.01
CSIL03266013710	CSIL03266014341	G185M	1882	NUVA	-15.06
CSIL03266013710	CSIL03266014341	G185M	1882	NUVB	-12.92
CSIL03266013710	CSIL03266014341	G185M	1882	NUVC	-10.08

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CSIL03266033528	CSIL03266034159	G185M	1890	NUVA	-13.39
CSIL03266033528	CSIL03266034159	G185M	1890	NUVB	-11.10
CSIL03266033528	CSIL03266034159	G185M	1890	NUVC	-9.08
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CSIL03266104759	CSIL03266105430	G225M	2250	NUVB	-1.47
CSIL03266104759	CSIL03266105430	G225M	2250	NUVC	0.85
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CSIL03266113841	CSIL03266114512	G225M	2357	NUVA	-1.46
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CSIL03266230229	CSIL03266230900	G285M	3094	NUVB	9.61
CSIL03266230229	CSIL03266230900	G285M	3094	NUVC	13.25
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CSIL03267084203	CSIL03267084734	G230L	3360	NUVB	-46.45
CSIL03267084203	CSIL03267084734	G230L	3360	NUVC	-44.38

3. NUV DETECTOR – TV 2006

The NUV data from thermal-vacuum testing all come images taken with TAGFLASH turned on.

PSA Filename	WCA Filename	OPT ELEM	CENWAVE	SEGMENT	D2 (pix)
CSIL06333004428	CSIL06333004428	G185M	1786	NUVA	-8.43
CSIL06333004428	CSIL06333004428	G185M	1786	NUVB	-4.94
CSIL06333004428	CSIL06333004428	G185M	1786	NUVC	-2.06
CSIL06332231205	CSIL06332231205	G185M	1817	NUVA	-8.26
CSIL06332231205	CSIL06332231205	G185M	1817	NUVB	-5.22
CSIL06332231205	CSIL06332231205	G185M	1817	NUVC	-2.46
CSIL06333005952	CSIL06333005952	G185M	1835	NUVA	-6.41
CSIL06333005952	CSIL06333005952	G185M	1835	NUVB	-4.37
CSIL06333005952	CSIL06333005952	G185M	1835	NUVC	-0.56
CSIL06332232729	CSIL06332232729	G185M	1850	NUVA	-6.34
CSIL06332232729	CSIL06332232729	G185M	1850	NUVB	-3.39
CSIL06332232729	CSIL06332232729	G185M	1850	NUVC	-1.89
CSIL06333011516	CSIL06333011516	G185M	1864	NUVA	-5.96
CSIL06333011516	CSIL06333011516	G185M	1864	NUVB	-3.41
CSIL06333011516	CSIL06333011516	G185M	1864	NUVC	-0.69
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CSIL06332234253	CSIL06332234253	G185M	1882	NUVC	0.77
CSIL06333013040	CSIL06333013040	G185M	1890	NUVA	-4.40
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CSIL06332235817	CSIL06332235817	G185M	1921	NUVB	-1.19
CSIL06332235817	CSIL06332235817	G185M	1921	NUVC	0.94
CSIL06333020128	CSIL06333020128	G185M	1941	NUVA	-3.68
CSIL06333020128	CSIL06333020128	G185M	1941	NUVB	-0.54
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CSIL06333001340	CSIL06333001340	G185M	1953	NUVA	-2.98
CSIL06333001340	CSIL06333001340	G185M	1953	NUVB	-0.39
CSIL06333001340	CSIL06333001340	G185M	1953	NUVC	-2.69
CSIL06333021652	CSIL06333021652	G185M	1971	NUVA	-3.19
CSIL06333021652	CSIL06333021652	G185M	1971	NUVB	-0.04
CSIL06333021652	CSIL06333021652	G185M	1971	NUVC	2.85
CSIL06333002904	CSIL06333002904	G185M	1986	NUVA	-2.36
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CSIL06333002904	CSIL06333002904	G185M	1986	NUVC	2.76
CSIL06333023216	CSIL06333023216	G185M	2010	NUVA	-2.28
CSIL06333023216	CSIL06333023216	G185M	2010	NUVB	0.59
CSIL06333023216	CSIL06333023216	G185M	2010	NUVC	4.27

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CSIL06332114024	CSIL06332114024	G225M	2186	NUVC	6.25
CSIL06332103802	CSIL06332103802	G225M	2217	NUVA	1.27
CSIL06332103802	CSIL06332103802	G225M	2217	NUVB	4.42
CSIL06332103802	CSIL06332103802	G225M	2217	NUVC	8.00
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CSIL06332104824	CSIL06332104824	G225M	2250	NUVB	5.70
CSIL06332104824	CSIL06332104824	G225M	2250	NUVC	8.77
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CSIL06332115048	CSIL06332115048	G225M	2268	NUVB	6.58
CSIL06332115048	CSIL06332115048	G225M	2268	NUVC	10.51
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CSIL06332105848	CSIL06332105848	G225M	2283	NUVB	6.90
CSIL06332105848	CSIL06332105848	G225M	2283	NUVC	9.87
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CSIL06332110912	CSIL06332110912	G225M	2325	NUVB	8.27
CSIL06332110912	CSIL06332110912	G225M	2325	NUVC	10.87
CSIL06332121138	CSIL06332121138	G225M	2339	NUVA	5.71
CSIL06332121138	CSIL06332121138	G225M	2339	NUVB	9.01
CSIL06332121138	CSIL06332121138	G225M	2339	NUVC	11.67
CSIL06332111936	CSIL06332111936	G225M	2357	NUVA	6.00
CSIL06332111936	CSIL06332111936	G225M	2357	NUVB	9.24
CSIL06332111936	CSIL06332111936	G225M	2357	NUVC	11.58
CSIL06332101826	CSIL06332101826	G225M	2373	NUVA	6.65
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CSIL06332122202	CSIL06332122202	G225M	2410	NUVA	8.51
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CSIL06332173427	CSIL06332173427	G285M	2617	NUVA	3.53
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CSIL06332163203	CSIL06332163203	G285M	2637	NUVA	3.24
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CSIL06332141826	CSIL06332141826	G285M	2695	NUVA	3.23
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CSIL06332141826	CSIL06332141826	G285M	2695	NUVC	8.56
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CSIL06332145627	CSIL06332145627	G285M	2719	NUVB	9.73
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CSIL06332175515	CSIL06332175515	G285M	2739	NUVA	5.80
CSIL06332175515	CSIL06332175515	G285M	2739	NUVB	9.11
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CSIL06332153427	CSIL06332153427	G285M	2952	NUVA	12.67
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CSIL06332170315	CSIL06332170315	G285M	2979	NUVC	19.64
CSIL06332181603	CSIL06332181603	G285M	2996	NUVA	13.51
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CSIL06332171339	CSIL06332171339	G285M	3018	NUVA	14.62
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CSIL06332172403	CSIL06332172403	G285M	3057	NUVA	14.76
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CSIL06337054450	CSIL06337054450	G230L	2635	NUVA	-35.23
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CSIL06337045256	CSIL06337045256	G230L	3360	NUVA	-32.87
CSIL06337045256	CSIL06337045256	G230L	3360	NUVB	-29.56
CSIL06337045256	CSIL06337045256	G230L	3360	NUVC	-27.92

4. NUV DELTA (D1-D2)

The new dispersion reference files do not contain the value of DELTA, but instead, the value of D1 and D2 (identified as D_TV03 and D respectively). This will allow to update the reference file with the new values of D measured on orbit after installation and provides a convenient place to store D1. The values of D_TV03 and D in the reference files are averaged values for a specific stripe for each central wavelengths of a grating. The table below has been reorganized to group the data per grating and stripe.

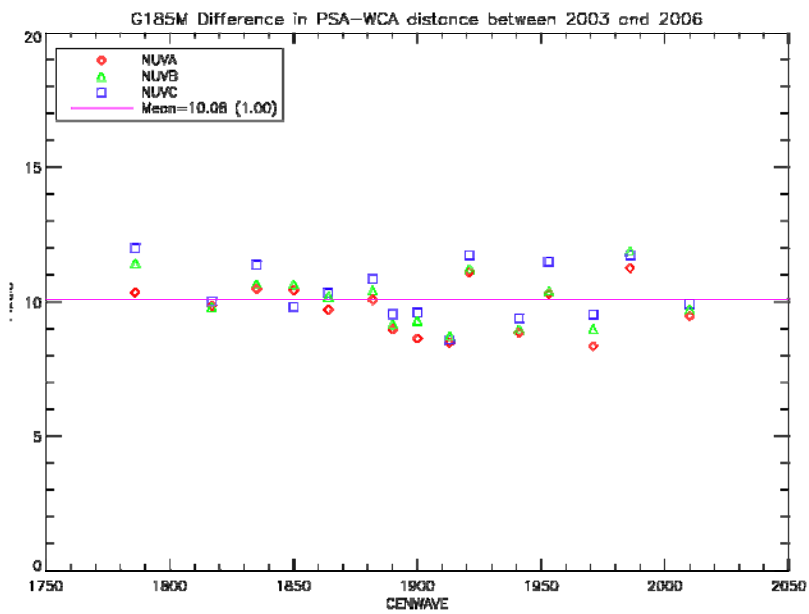
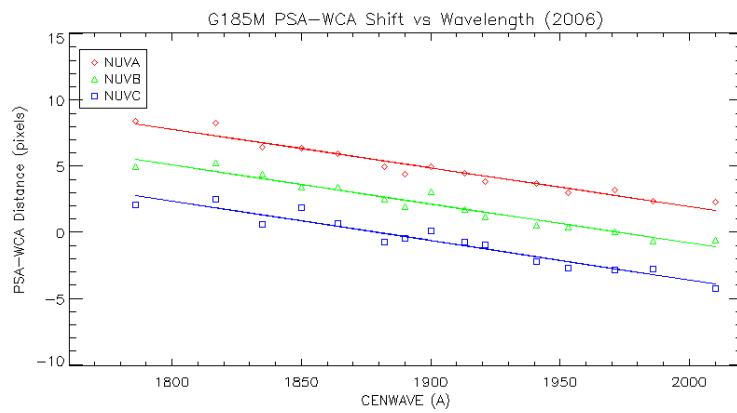
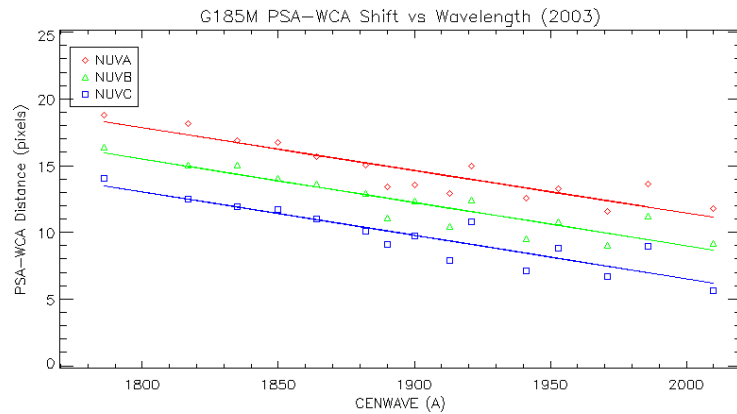
OPT ELEM	CENWAVE	SEGMENT	D1 (pix)	Averaged D1 (pix)	D2 (pix)	Averaged D2 (pix)	Delta (pix)
G185M	1786	NUVA	-18.78	-14.59	-8.43	-4.83	-10.35
G185M	1817	NUVA	-18.13		-8.26		-9.87
G185M	1835	NUVA	-16.89		-6.41		-10.48
G185M	1850	NUVA	-16.76		-6.34		-10.42
G185M	1864	NUVA	-15.69		-5.96		-9.73
G185M	1882	NUVA	-15.06		-4.98		-10.08
G185M	1890	NUVA	-13.39		-4.40		-8.99
G185M	1900	NUVA	-13.58		-4.93		-8.65
G185M	1913	NUVA	-12.93		-4.46		-8.47
G185M	1921	NUVA	-14.95		-3.85		-11.10
G185M	1941	NUVA	-12.54		-3.68		-8.86
G185M	1953	NUVA	-13.28		-2.98		-10.30
G185M	1971	NUVA	-11.54		-3.19		-8.35
G185M	1986	NUVA	-13.61		-2.36		-11.25
G185M	2010	NUVA	-11.76	-2.28	-9.48		
G185M	1786	NUVB	-16.35	-12.20	-4.94	-2.10	-11.41
G185M	1817	NUVB	-15.03		-5.22		-9.81
G185M	1835	NUVB	-15.03		-4.37		-10.66
G185M	1850	NUVB	-14.03		-3.39		-10.64
G185M	1864	NUVB	-13.60		-3.41		-10.19
G185M	1882	NUVB	-12.92		-2.51		-10.41
G185M	1890	NUVB	-11.10		-1.94		-9.16
G185M	1900	NUVB	-12.35		-3.05		-9.30
G185M	1913	NUVB	-10.45		-1.73		-8.72
G185M	1921	NUVB	-12.41		-1.19		-11.22
G185M	1953	NUVB	-10.77		-0.39		-10.38
G185M	1941	NUVB	-9.52		-0.54		-8.98
G185M	1971	NUVB	-9.03		-0.04		-8.99
G185M	1986	NUVB	-11.24		0.64		-11.88
G185M	2010	NUVB	-9.15	0.59	-9.74		
G185M	1786	NUVC	-14.05	-9.73	-2.06	0.66	-11.99
G185M	1817	NUVC	-12.48		-2.46		-10.02
G185M	1835	NUVC	-11.93		-0.56		-11.37
G185M	1850	NUVC	-11.72		-1.89		-9.83
G185M	1864	NUVC	-11.01		-0.69		-10.32
G185M	1882	NUVC	-10.08		0.77		-10.85
G185M	1890	NUVC	-9.08		0.47		-9.55
G185M	1900	NUVC	-9.71		-0.11		-9.60
G185M	1913	NUVC	-7.87		0.72		-8.59
G185M	1921	NUVC	-10.80		0.94		-11.74
G185M	1941	NUVC	-7.14		2.25		-9.39

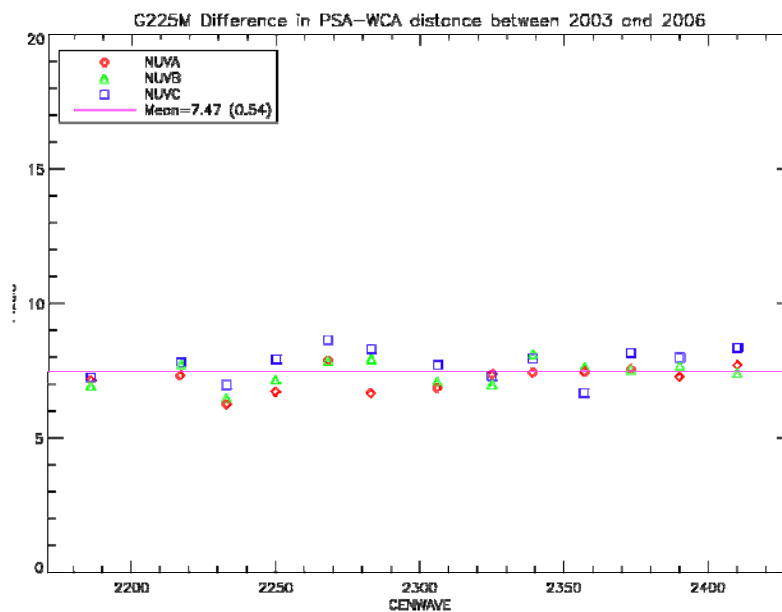
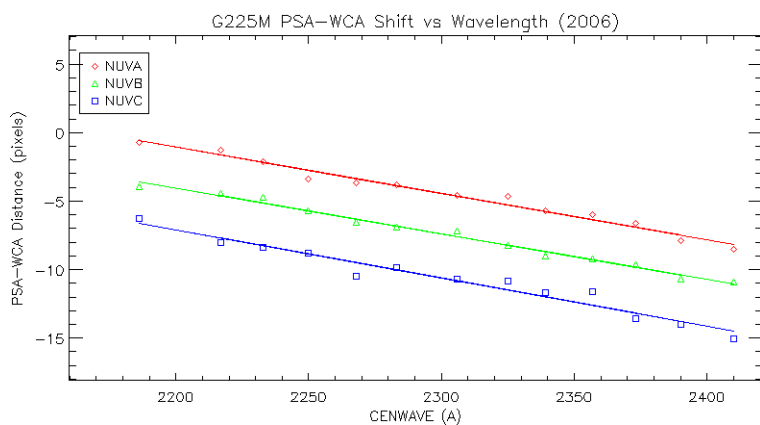
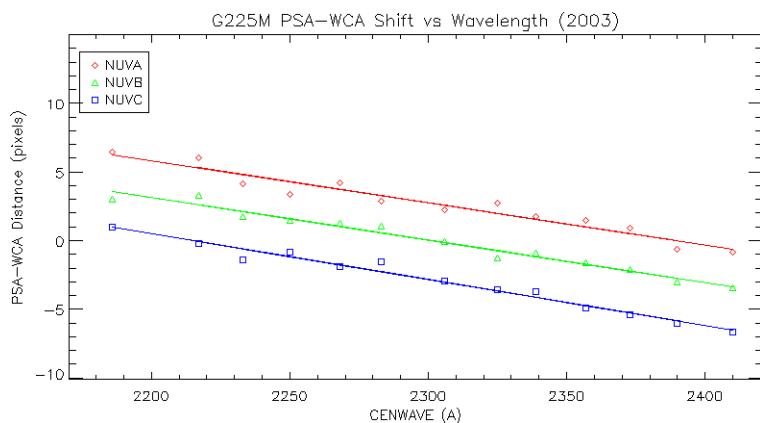
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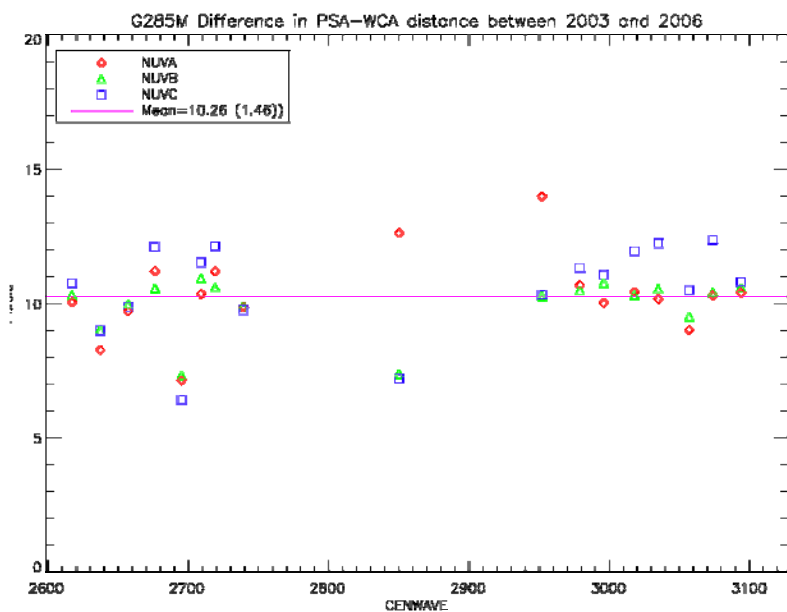
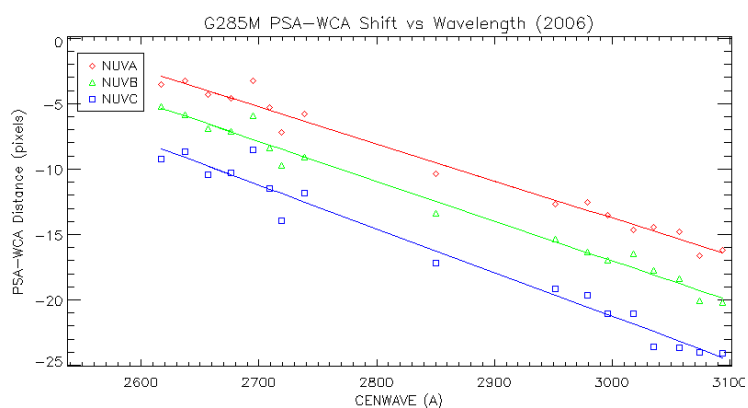
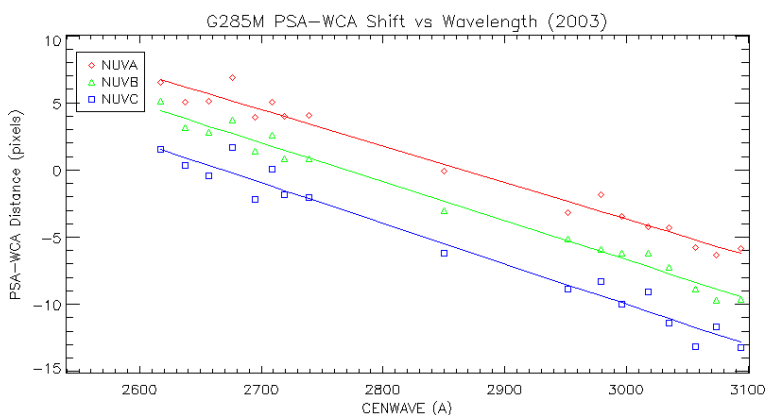
G185M	1953	NUVC	-8.80		-2.69		-11.49
G185M	1971	NUVC	-6.68		2.85		-9.53
G185M	1986	NUVC	-8.98		2.76		-11.74
G185M	2010	NUVC	-5.66		4.27		-9.93
G225M	2186	NUVA	-6.46	-2.67	0.69	4.54	-7.15
G225M	2217	NUVA	-6.06		1.27		-7.33
G225M	2233	NUVA	-4.12		2.14		-6.26
G225M	2250	NUVA	-3.37		3.36		-6.73
G225M	2268	NUVA	-4.22		3.66		-7.88
G225M	2283	NUVA	-2.85		3.83		-6.68
G225M	2306	NUVA	-2.28		4.59		-6.87
G225M	2325	NUVA	-2.72		4.65		-7.37
G225M	2339	NUVA	-1.72		5.71		-7.43
G225M	2357	NUVA	-1.46		6.00		-7.46
G225M	2373	NUVA	-0.91		6.65		-7.56
G225M	2390	NUVA	0.62		7.90		-7.28
G225M	2410	NUVA	0.81		8.51		-7.70
G225M	2186	NUVB	-3.02	0.05	3.92	7.47	-6.94
G225M	2217	NUVB	-3.31		4.42		-7.73
G225M	2233	NUVB	-1.76		4.72		-6.48
G225M	2250	NUVB	-1.47		5.70		-7.17
G225M	2268	NUVB	-1.26		6.58		-7.84
G225M	2283	NUVB	-1.03		6.90		-7.93
G225M	2306	NUVB	0.06		7.15		-7.09
G225M	2325	NUVB	1.28		8.27		-6.99
G225M	2339	NUVB	0.90		9.01		-8.11
G225M	2357	NUVB	1.60		9.24		-7.64
G225M	2373	NUVB	2.11		9.66		-7.55
G225M	2390	NUVB	3.03		10.71		-7.68
G225M	2410	NUVB	3.47		10.89		-7.42
G225M	2186	NUVC	-0.99	2.94	6.25	10.71	-7.24
G225M	2217	NUVC	0.21		8.00		-7.79
G225M	2233	NUVC	1.41		8.39		-6.98
G225M	2250	NUVC	0.85		8.77		-7.92
G225M	2268	NUVC	1.88		10.51		-8.63
G225M	2283	NUVC	1.57		9.87		-8.30
G225M	2306	NUVC	2.97		10.67		-7.70
G225M	2325	NUVC	3.56		10.87		-7.31
G225M	2339	NUVC	3.72		11.67		-7.95
G225M	2357	NUVC	4.90		11.58		-6.68
G225M	2373	NUVC	5.42		13.58		-8.16
G225M	2390	NUVC	6.01		13.98		-7.97
G225M	2410	NUVC	6.70		15.05		-8.35
G285M	2617	NUVA	-6.52	-033	3.53	9.59	-10.05
G285M	2637	NUVA	-5.03		3.24		-8.27
G285M	2657	NUVA	-5.15		4.34		-9.49
G285M	2676	NUVA	-6.86		4.56		-11.42
G285M	2695	NUVA	-3.91		3.23		-7.14
G285M	2709	NUVA	-5.07		5.28		-10.35
G285M	2719	NUVA	-3.99		7.21		-11.20
G285M	2739	NUVA	-4.07		5.80		-9.87
G285M	2850	NUVA	0.05		10.37		-10.32
G285M	2952	NUVA	3.17		12.67		-9.50

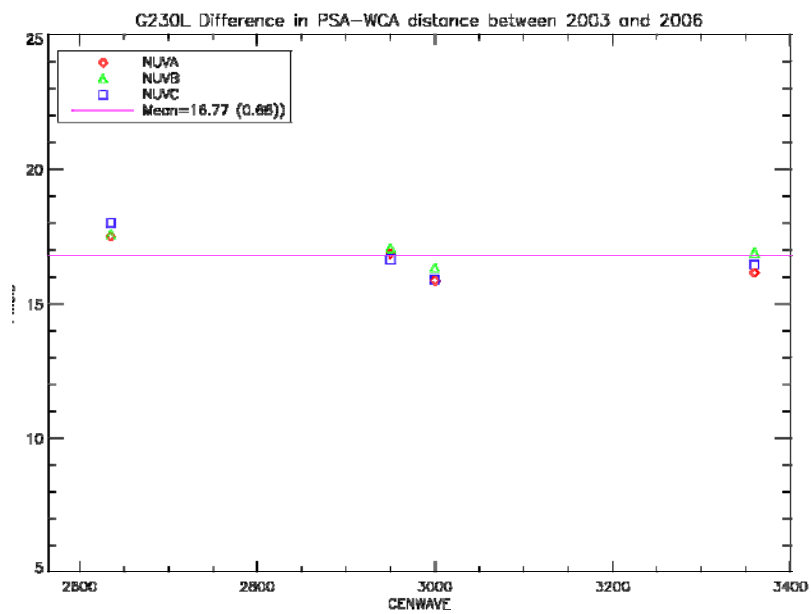
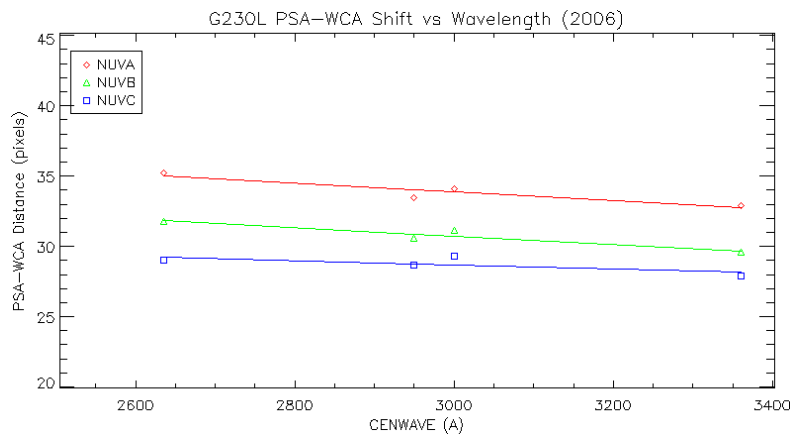
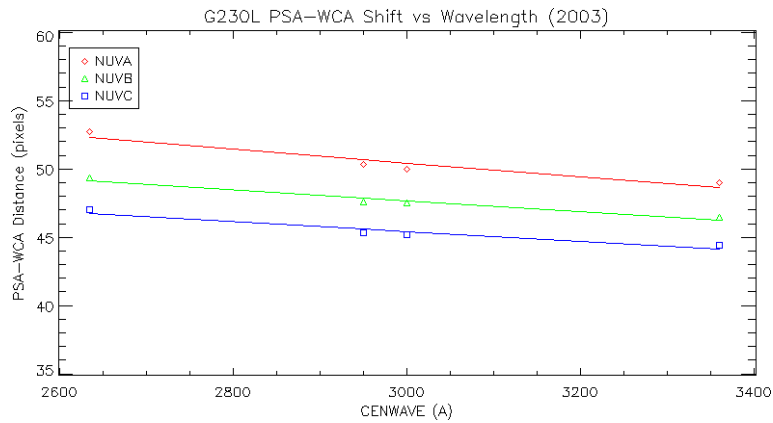
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G285M	2979	NUVA	1.84		12.52		-10.68
G285M	2996	NUVA	3.48		13.51		-10.03
G285M	3018	NUVA	4.20		14.62		-10.42
G285M	3035	NUVA	4.27		14.44		-10.17
G285M	3057	NUVA	5.75		14.76		-9.01
G285M	3074	NUVA	6.35		16.64		-10.29
G285M	3094	NUVA	5.83		16.23		-10.40
G285M	2617	NUVB	-5.12	2.44	5.20	12.54	-10.32
G285M	2637	NUVB	-3.12		5.89		-9.01
G285M	2657	NUVB	-2.82		6.88		-9.70
G285M	2676	NUVB	-3.68		7.15		-10.83
G285M	2695	NUVB	-1.38		5.94		-7.32
G285M	2709	NUVB	-2.57		8.37		-10.94
G285M	2719	NUVB	-0.86		9.73		-10.59
G285M	2739	NUVB	-0.80		9.11		-9.91
G285M	2850	NUVB	3.00		13.37		-10.37
G285M	2952	NUVB	5.12		15.38		-10.26
G285M	2979	NUVB	5.88		16.36		-10.48
G285M	2996	NUVB	6.22		16.98		-10.76
G285M	3018	NUVB	6.16		16.47		-10.31
G285M	3035	NUVB	7.23		17.77		-10.54
G285M	3057	NUVB	8.87		18.39		-9.52
G285M	3074	NUVB	9.68		20.09		-10.41
G285M	3094	NUVB	9.61		20.18		-10.57
G285M	2617	NUVC	-1.53	5.58	9.23	16.35	-10.76
G285M	2637	NUVC	-0.35		8.65		-9.00
G285M	2657	NUVC	0.45		10.46		-10.01
G285M	2676	NUVC	-1.65		10.32		-11.97
G285M	2695	NUVC	2.16		8.56		-6.40
G285M	2709	NUVC	-0.03		11.49		-11.52
G285M	2719	NUVC	1.83		13.96		-12.13
G285M	2739	NUVC	2.07		11.83		-9.76
G285M	2850	NUVC	6.17		17.16		-10.99
G285M	2952	NUVC	8.85		19.16		-10.31
G285M	2979	NUVC	8.32		19.64		-11.32
G285M	2996	NUVC	10.01		21.07		-11.06
G285M	3018	NUVC	9.11		21.05		-11.94
G285M	3035	NUVC	11.36		23.60		-12.24
G285M	3057	NUVC	13.16		23.65		-10.49
G285M	3074	NUVC	11.65		24.02		-12.37
G285M	3094	NUVC	13.25		24.04		-10.79
G230L	2635	NUVA	-52.73	-50.51	-35.23	-33.91	-17.50
G230L	2950	NUVA	-50.31		-33.45		-16.86
G230L	3000	NUVA	-49.97		-34.10		-15.87
G230L	3360	NUVA	-49.03		-32.87		-16.16
G230L	2635	NUVB	-49.33	-47.73	-31.77	-30.76	-17.56
G230L	2950	NUVB	-47.61		-30.56		-17.05
G230L	3000	NUVB	-47.51		-31.15		-16.36
G230L	3360	NUVB	-46.45		-29.56		-16.89
G230L	2635	NUVC	-47.01	-45.47	-29.00	-28.72	-18.01
G230L	2950	NUVC	-45.31		-28.66		-16.65
G230L	3000	NUVC	-45.19		-29.30		-15.89
G230L	3360	NUVC	-44.38		-27.92		-16.46









5. FUV DETECTOR – TV 2003

PSA Filename	WCA Filename	OPT ELEM	CENWAVE	SEGMENT	D1 (pix)
CSIL03286092655	CSIL03286093403	G130M	1291	FUVA	-41.78
CSIL03286092655	CSIL03286093403	G130M	1291	FUVB	-42.33
CSIL03286094450	CSIL03286095158	G130M	1300	FUVA	-41.92
CSIL03286094450	CSIL03286095158	G130M	1300	FUVB	-41.46
CSIL03286020938	CSIL03286021646	G130M	1309	FUVA	-45.23
CSIL03286020938	CSIL03286021646	G130M	1309	FUVB	-42.07
CSIL03286100245	CSIL03286100953	G130M	1318	FUVA	-43.73
CSIL03286100245	CSIL03286100953	G130M	1318	FUVB	-43.00
CSIL03286102040	CSIL03286102748	G130M	1327	FUVA	-44.30
CSIL03286102040	CSIL03286102748	G130M	1327	FUVB	-41.91
CSIL03286075755	CSIL03286080403	G160M	1577	FUVA	-43.86
CSIL03286075755	CSIL03286080403	G160M	1577	FUVB	-42.48
CSIL03286081450	CSIL03286082058	G160M	1589	FUVA	-44.16
CSIL03286081450	CSIL03286082058	G160M	1589	FUVB	-43.80
CSIL03286033938	CSIL03286034546	G160M	1600	FUVA	-44.34
CSIL03286033938	CSIL03286034546	G160M	1600	FUVB	-42.23
CSIL03286083145	CSIL03286083753	G160M	1611	FUVA	-45.07
CSIL03286083145	CSIL03286083753	G160M	1611	FUVB	-43.58
CSIL03286084840	CSIL03286085448	G160M	1623	FUVA	-45.96
CSIL03286084840	CSIL03286085448	G160M	1623	FUVB	-43.76
CSIL03286112055	CSIL03286120659	G140L	1105	FUVA	-44.41
CSIL03286060155	CSIL03286060833	G140L	1230	FUVA	-43.88

6. FUV DETECTOR – TV 2006

PSA Filename	WCA Filename	OPT ELEM	CENWAVE	SEGMENT	D2 (pix)
CSIL06339173014	CSIL06339173014	G130M	1291	FUVA	-33.91
CSIL06339173014	CSIL06339173014	G130M	1291	FUVB	-35.53
CSIL06339180115	CSIL06339180115	G130M	1300	FUVA	-33.78
CSIL06339180115	CSIL06339180115	G130M	1300	FUVB	-36.02
CSIL06339040633	CSIL06339040633	G130M	1309	FUVA	-35.20
CSIL06339040633	CSIL06339040633	G130M	1309	FUVB	-34.79
CSIL06339183215	CSIL06339183215	G130M	1318	FUVA	-32.33
CSIL06339183215	CSIL06339183215	G130M	1318	FUVB	-34.03
CSIL06339190315	CSIL06339190315	G130M	1327	FUVA	-36.65
CSIL06339190315	CSIL06339190315	G130M	1327	FUVB	-34.67
CSIL06339194815	CSIL06339194815	G160M	1577	FUVA	-36.23
CSIL06339194815	CSIL06339194815	G160M	1577	FUVB	-35.72
CSIL06339201915	CSIL06339201915	G160M	1589	FUVA	-35.05
CSIL06339201915	CSIL06339201915	G160M	1589	FUVB	-34.89
CSIL06339081303	CSIL06339081303	G160M	1600	FUVA	-34.19
CSIL06339081303	CSIL06339081303	G160M	1600	FUVB	-33.53
CSIL06339205015	CSIL06339205015	G160M	1611	FUVA	-33.89
CSIL06339205015	CSIL06339205015	G160M	1611	FUVB	-34.91
CSIL06339212115	CSIL06339212115	G160M	1623	FUVA	-34.69
CSIL06339212115	CSIL06339212115	G160M	1623	FUVB	-33.85
CSIL06339221615	CSIL06339221615	G140L	1105	FUVA	-37.19
CSIL06337005354	CSIL06337005354	G140L	1230	FUVA	-35.16

7. FUV DELTA (D1-D2)

The new dispersion reference files do not contain the value of DELTA, but instead, the value of D1 and D2 (identified as D_TV03 and D respectively). This will allow to update the reference file with the new values of D measured on orbit after installation and provides a convenient place to store D1. The values of D_TV03 and D in the reference files are averaged values for a specific stripe for each central wavelengths of a grating. The table below has been reorganized to group the data per grating and stripe.

OPT ELEM	CENWAVE	SEGMENT	D1 (pix)	Averaged D1 (pix)	D2 (pix)	Averaged D2 (pix)	Delta (pix)
G130M	1291	FUVA	-41.78	-43.39	-33.91	-34.37	-7.87
G130M	1300	FUVA	-41.92		-33.78		-8.14
G130M	1309	FUVA	-45.23		-35.20		-10.03
G130M	1318	FUVA	-43.73		-32.33		-11.40
G130M	1327	FUVA	-44.30		-36.65		-7.66
G130M	1291	FUVB	-42.33	-42.15	-35.53	-35.01	-6.80
G130M	1300	FUVB	-41.46		-36.02		-5.44
G130M	1309	FUVB	-42.07		-34.79		-7.28
G130M	1318	FUVB	-43.00		-34.03		-8.98
G130M	1327	FUVB	-41.91		-34.67		-7.24
G160M	1577	FUVA	-43.86	-44.68	-36.23	-34.81	-7.63
G160M	1589	FUVA	-44.16		-35.05		-9.11
G160M	1600	FUVA	-44.34		-34.19		-10.16
G160M	1611	FUVA	-45.07		-33.89		-11.18
G160M	1623	FUVA	-45.96		-34.69		-11.28
G160M	1577	FUVB	-42.48	-43.17	-35.72	-34.58	-6.76
G160M	1589	FUVB	-43.80		-34.89		-8.91
G160M	1600	FUVB	-42.23		-33.53		-8.71
G160M	1611	FUVB	-43.58		-34.91		-8.67
G160M	1623	FUVB	-43.76		-33.85		-9.91
G140L	1105	FUVA	-44.41	-44.15	-37.19	-36.18	-7.22
G140L	1230	FUVA	-43.88		-35.16		-8.72

