

May 30, 2008

COS ETC 17.2: Updates from COS ETC 17.1

The COS ETC 17.2 was released on May 19, 2008. Here we summarize what has been modified since the previous ETC release (17.1).

SPECTROSCOPY

- The extraction box height for NUV spectroscopy has been decreased from 25 to 8 pixels (8 pixels contain approximately 80% of the encircled energy): this affects mostly users using COS in the background noise limited regimes. This change leads to more realistic S/N calculations for faint sources and allows a more fair comparison between the COS and STIS capabilities in this regime.

- The local count rate screening limit for the NUV mode has been decreased from 80 to 70 counts s⁻¹ per pixel. The previous, slightly higher, screening limit resulted from a misinterpretation of the procedures used by the flight software for bright object protection.

- Counts per segment for the FUV modes have been added to the output page. Note that for the G140L 1105 Å central wavelength observing mode Segment B is turned down to HVLOW and does not contribute any counts to the total count rate; for the 1230 Å central wavelength setting Segment B only contributes counts associated with dark current.

- The ETC will output a warning when some specific wavelengths are selected: The throughput files currently used by the COS ETC are not 'sharp at the edges' when taking into account the wavelength ranges defined for all the bandpasses in the COS Instrument Handbook (Table 5.3 FUV; Table 5.4 NUV). So for e.g. a calculation performed at 1309 Å will lead to an exposure time or S/N that is different from that performed at 1309.5 Å. If the user selects a wavelength that falls near the edge of the bandpass, where this happens, the ETC will output a warning urging the user to select another wavelength. To avoid this problem, please select a wavelength in the range defined by Table 1 for the FUV and Table 2 for the NUV.

- The wavelength associated with the spectroscopic ETC default mode (used for exposure time and S/N calculations - section 2) has been changed from 1309 to 1310 Å because of the issue with the edges of the throughput files discussed above.

IMAGING

- The local count rate screening limits for the NUV have been decreased from 80 to 50 counts s⁻¹ per pixel for predictable and irregular sources. The previous screening limit

resulted from a misinterpretation of the procedures used by the flight software for bright object protection.

- The throughput curves for MIRRORA and MIRRORB have been updated: they have been extended to wavelengths $> 3200 \text{ \AA}$ to take into account the non-zero sensitivity of the NUV MAMA detector above this wavelength (red leak). This will result in a significant increase in the count rate for very red objects (K type and later). In addition, the new MIRRORA curve is about 20% lower, moving the blue cutoff from 1400 to about 1650 \AA . This will make a significant reduction in the count rates for blue objects.

IMAGING TARGET ACQUISITION

- The extraction box used for imaging target acquisition has been decreased from 345×816 pixels to 9×9 pixels: the previous larger box resulted from a misinterpretation of the procedures used by the flight software during target acquisition. Using this smaller box size dramatically reduces exposure times needed for imaging target acquisitions, particularly for fainter sources.

- Bright object warning has been added to NUV imaging target acquisition

- The throughput curves for MIRRORA and MIRRORB have been updated: they have been extended to wavelengths $> 3200 \text{ \AA}$ to take into account the non-zero sensitivity of the NUV MAMA detector above this wavelength (red leak). This will result in a significant increase in the count rate for very red objects (K type and later). In addition, the new MIRRORA curve is about 20% lower, moving the blue cutoff from 1400 to about 1650 \AA . This will make a significant reduction in the count rates for blue objects.

GENERAL

- An FOS-based QSO spectrum has been added to the 'Non-stellar objects' category of spectral distributions. This spectrum covers the wavelength range $100 - 3387 \text{ \AA}$ at $z = 0$.

- The option to use normalization by Galex magnitudes, FUV and NUV bands, has been added. Users are reminded that the Galex FUV and NUV magnitudes used for normalization should be in the ABMAG system in contrast with the other magnitude normalizations that use the VEGAMAG system.

- A reminder has been added to the output of all relevant COS ETCs regarding the buffer time to use in APT: For APT purposes, the recommended buffer time should be $2/3$ of the buffer time calculated by the ETC, or the exposure time, whichever is shorter.

- A warning has been added for cases where the input spectrum does not cover the wavelength range of the observing mode selected.

- A new link has been added to the top of the page of each of the COS ETCs: *'Please read the current release notes, updated on xx-xx-xxxx'*. This link directs the user to the most up-to-date information about issues discovered with the current ETC release and how to address them.

- The default wavelength for flux normalization (section 4) for all COS ETCs has been changed to 1310 Å, which is more appropriate for COS than the previous wavelength used.

Table 1. FUV Wavelength Ranges.

Grating	Wave. Setting (Å)	Segment B (Å)	Segment A (Å)
G130M	1291	1132.5 – 1273.5	1291.5 – 1432.5
G130M	1300	1141.5 – 1282.5	1300.5 – 1441.5
G130M	1309	1150.5 – 1291.5	1309.5 – 1450.5
G130M	1318	1159.5 – 1300.5	1318.5 – 1459.5
G130M	1327	1168.5 – 1309.5	1327.5 – 1468.5
G160M	1577	1382.5 – 1555.5	1577.5 – 1751.5
G160M	1589	1394.5 – 1567.5	1589.5 – 1763.5
G160M	1600	1405.5 – 1578.5	1600.5 – 1774.5
G160M	1611	1416.5 – 1589.5	1611.5 – 1785.5
G160M	1623	1428.5 – 1601.5	1623.5 – 1797.5
G140L	1105	HVLOW, no counts	1105.5 – 2252.5
G140L	1230	dark counts only	1230.5 – 2377.5

Table 2. NUV Wavelength Ranges.

Grating	Wave. Setting (Å)	Stripe A (Å)	Stripe B (Å)	Stripe C (Å)
G185M	1786	1670.5 – 1704.5	1769.5 – 1803.5	1869.0 – 1902.5
G185M	1817	1701.5 – 1735.5	1800.5 – 1834.5	1899.5 – 1933.5
G185M	1835	1719.0 – 1753.5	1818.5 – 1852.5	1916.0 – 1950.5
G185M	1850	1734.5 – 1768.5	1833.5 – 1867.5	1932.0 – 1965.5
G185M	1864	1748.5 – 1782.5	1847.5 – 1881.5	1945.5 – 1979.5
G185M	1882	1766.5 – 1800.5	1865.5 – 1899.5	1964.5 – 1998.5
G185M	1890	1774.5 – 1808.5	1872.5 – 1906.5	1972.0 – 2005.5
G185M	1900	1783.5 – 1817.5	1882.5 – 1916.5	1981.5 – 2015.5
G185M	1913	1796.5 – 1830.5	1895.5 – 1929.5	1993.5 – 2027.5
G185M	1921	1804.5 – 1838.5	1903.5 – 1937.5	2002.5 – 2036.5
G185M	1941	1825.5 – 1859.5	1924.5 – 1958.5	2023.5 – 2057.5
G185M	1953	1837.0 – 1872.0	1936.5 – 1970.5	2034.2 – 2068.5
G185M	1971	1854.5 – 1888.5	1953.5 – 1987.5	2052.5 – 2086.5
G185M	1986	1870.0 – 1904.5	1969.5 – 2003.5	2068.5 – 2103.0
G185M	2010	1894.0 – 1928.5	1993.5 – 2027.5	2092.5 – 2126.5
G225M	2186	2070.5 – 2104.5	2169.5 – 2203.5	2268.5 – 2303.0
G225M	2217	2101.5 – 2135.5	2200.5 – 2234.5	2299.0 – 2333.5
G225M	2233	2117.5 – 2151.5	2215.5 – 2249.5	2314.0 – 2348.5
G225M	2250	2134.5 – 2168.5	2233.5 – 2267.5	2332.5 – 2366.5
G225M	2268	2152.5 – 2186.5	2251.5 – 2285.5	2350.5 – 2384.5
G225M	2283	2167.5 – 2201.5	2266.5 – 2300.5	2364.5 – 2398.5
G225M	2306	2190.5 – 2224.5	2288.5 – 2322.5	2387.5 – 2422.0
G225M	2325	2208.5 – 2242.5	2307.5 – 2341.5	2406.5 – 2440.5
G225M	2339	2223.5 – 2257.5	2322.5 – 2356.5	2421.5 – 2455.5
G225M	2357	2241.0 – 2275.5	2340.5 – 2374.5	2439.0 – 2473.5
G225M	2373	2256.5 – 2290.5	2355.0 – 2390.0	2454.5 – 2488.5
G225M	2390	2274.5 – 2308.5	2373.5 – 2407.5	2472.5 – 2506.5
G225M	2410	2294.5 – 2328.5	2393.5 – 2427.5	2492.5 – 2526.5
G285M	2617	2480.5 – 2521.0	2596.5 – 2637.0	2711.5 – 2751.5
G285M	2637	2500.5 – 2540.5	2616.5 – 2656.5	2731.5 – 2771.5

Table 2—Continued

Grating	Wave. Setting (Å)	Stripe A (Å)	Stripe B (Å)	Stripe C (Å)
G285M	2657	2520.5 – 2560.5	2636.5 – 2676.5	2751.5 – 2792.0
G285M	2676	2539.5 – 2579.5	2655.5 – 2695.5	2770.0 – 2810.5
G285M	2695	2558.5 – 2598.5	2674.5 – 2714.5	2789.5 – 2829.5
G285M	2709	2572.5 – 2612.5	2688.5 – 2728.5	2803.5 – 2843.5
G285M	2719	2582.5 – 2622.5	2698.5 – 2738.5	2813.5 – 2853.5
G285M	2739	2602.5 – 2642.5	2718.5 – 2763.0	2837.5 – 2877.5
G285M	2850	2714.5 – 2754.5	2829.5 – 2869.5	2945.5 – 2985.5
G285M	2952	2815.5 – 2855.5	2931.5 – 2971.5	3046.5 – 3087.0
G285M	2979	2842.5 – 2882.5	2958.5 – 2998.5	3073.5 – 3113.5
G285M	2996	2859.5 – 2899.5	2975.5 – 3016.0	3090.5 – 3130.5
G285M	3018	2881.5 – 2921.5	2997.5 – 3037.5	3112.5 – 3152.5
G285M	3035	2898.5 – 2938.5	3014.5 – 3054.5	3129.5 – 3169.5
G285M	3057	2920.5 – 2960.5	3036.5 – 3076.5	3151.5 – 3191.5
G285M	3074	2937.5 – 2977.5	3053.5 – 3093.5	3168.5 – 3208.5
G285M	3094	2957.5 – 2997.5	3073.5 – 3114.0	3188.0 – 3228.0
G230L	2635	1335.0 – 1732.0	2436.0 – 2833.0	2 nd order light
G230L	2950	1651.0 – 2049.0	2751.0 – 3149.0	2 nd order light
G230L	3000	1701.0 – 2099.0	2801.0 – 3199.0	2 nd order light
G230L	3360	2060.0 – 2457.0	3162.0 – 3559.5	2 nd order light