

May 30, 2008

## **COS ETC 17.2 - Pending Work**

The COS ETC 17.2 was released on May 19, 2008. Here we summarize the work that is still pending and that has not been implemented in this release. This work will only be implemented for the COS ETC 18.1 release. This list will be updated as we become aware of more issues/problems that need to be solved.

### **SPECTROSCOPY**

- A warning needs to be added to the output when the S/N requested by the user is  $> 40$  for the FUV and  $> 100$  for the NUV. S/N larger than these values can only be achieved with additional calibration steps.

- Default wavelength associated with each grating and central wavelength setting will be automatically filled in: currently there is only default mode (G130M, 1309 central wavelength, and 1310 Å for spectroscopic calculations. This will be modified so that when the user selects a different grating and central wavelength combination the wavelength used for the calculation will be automatically filled in.

- 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. The throughput files need to be corrected to avoid this issue.

### **IMAGING**

- At this time there is no pending work specifically for this observing mode.

### **IMAGING TARGET ACQUISITION**

- Warning needs to be added to the output if exposure time required to achieve  $S/N = 40$  is longer than 25 mins (1500 sec): the imaging target acquisition procedure requires that two images be obtained and this should occur within one orbital visibility period (typically about 50 minutes).

### **GENERAL**

- The source spectrum selected by the user can be plotted after performing the calculation by clicking on the 'Source Spectrum' button in the output page. However the source spectrum plotted only covers the wavelength range seen by COS for the observing mode

selected. If there is a large gap in wave coverage in the middle of the range a straight line is plotted instead of the real spectrum. This will be corrected so that the whole source spectrum is plotted.

- The spectra of some HST Standard Stars needs to be corrected: Some of the HST Standard Star spectra are contaminated, to varying degrees, by geocoronal Ly $\alpha$  emission (some of these stars were observed with IUE). This can lead to bright object protection flags being raised, can affect the estimated buffer time, and could lead to a choice of a different observation mode (ACCUM instead of TTAG). Note that this applies only to the FUV detector and to gratings/central wavelength combinations that cover the Ly $\alpha$  region at 1216 Å: G130M for all central wavelength settings; and G140L for the 1105 Å central wavelength setting. The stars affected by this are G93–48, LB227, LDS 749B, HZ 4, GD 50, GD 108, GRW +70 5824, and HZ 21.

- Extinction curves available need to be updated: the options currently available are 1) 'Average Galactic', 2) 'LMC extinction', 3) 'SMC extinction', and 4) 'Starburst'. Option 1) is from Seaton (MNRAS, 187, 73, 1979) and is outdated and incorrect, while option 2) applies mostly to the 30 Doradus region in the LMC.

- The COS ETC counts table that can be downloaded by the user displays counts per resolution element but wavelength bins per pixel. Users that integrate the counts in the table for any given wavelength range will get 6 or 3 (FUV, NUV) times as many counts as the real ones. Also, the column labeled 'Read Noise' is not applicable to COS and needs to be deleted.

- Shape of Ly $\alpha$  airglow line needs to be modified to take into account that the COS aperture is circular. To simplify the calculations a square aperture has been assumed. Even though this has probably a small effect, using a square aperture does not take into account counts in the wings that could potentially affect other lines in this spectral region.

- Normalization using NICMOS bands is currently giving an error: Section 4 of the COS ETCs allows the user to normalize the input spectrum by selecting, amongst other options, the NICMOS F110W and F160W bands. Normalization by these bands is not correctly implemented and the software returns an error.