THE LWP CAMERA: GETTING TO KNOW YOU

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The LWP camera has been the default long-wavelength camera now for over seven months. The IUE staff and Guest Observers have been learning about the LWP, just as we did for the LWR and SWP cameras back in 1978. Basic information on the LWP is given by the references listed in the last "IUE News" (NASA IUE Newsletter No. 23). However, there are always detailed but useful bits of information that only come with experience. Here are some of the "tidbits" about the LWP camera that we have collected so far.

Exposure Times The following equations are approximate scaling factors to estimate LWP exposures from previous LWR exposures (all large aperture spectra):

T (LWP low disp) = 0.8 * T (LWR low disp) for 2800 A

T (LWP low disp) = 1.1 * T (LWR low disp) for 2400 A

T (LWP high disp) = 0.9 * T (LWR high disp) for 2800 A continuum

T (LWP high disp) = 0.8 * T (LWR high disp) for MgII emission lines

Scaling LWP low dispersion spectra to high dispersion (large aperture):

T (LWP high disp) = 70 * T (LWP low disp) for continuum sources

High Dispersion Wavelength Coverage Gaps in high dispersion wavelength coverage exist in the lower orders of the LWP echelle spectra, just as they do for the other two cameras. The regions of coverage for orders 77 and less are given in the following table.

Table 1

Wavelength Coverage in the Lower Orders of the LWP Camera

Order	Wavelength Range
77	2983 - 3022 A
76	3023 - 3061
75	3064 - 3101
74	3106 - 3142
73	3150 - 3184
72	3195 - 3226

Radiation Sensitivity The LWP is more sensitive to radiation than the other two cameras. The nominal relation for the radiation background, 10^{FPM} DN/hour, must be multiplied by about 1.3 to 1.4 for the LWP camera near 2800 A.

Intensity Transfer Function The LWP camera characteristics have changed somewhat since the period of time when its ITF was created. Consequently there are some nonlinearities in the ITF; these are more or less comparable with the nonlinearities seen in the LWR (see the report by Oliversen in this Newsletter). The background flux numbers for short exposures are often negative numbers due to these nonlinearities. There is noticeable noise at the shorter wavelength portion of the low dispersion spectrum which is apparently caused by a geometric mismatch between the ITF and the spectral data. The spectra used for the absolute calibration are affected by these problems; thus there is some uncertainty in the calibration at the shorter wavelengths. These problems are not major. However the IUE Project is planning to obtain a new LWP ITF in order to improve the quality of the spectral data. The observations are scheduled for this September.

Maximum DN levels are given in Table 2 for an LWP low dispersion spectrum in which the photometric accuracy of the ITF is preserved. Above these DN levels the ITF must be extrapolated.

Table 2

Maximum DN Levels for Best Accuracy in LWP Spectra

Wavelength	Max DN
2100 A	205
2300	220
2500	240
2700	245
2900	245
3100	245
3300	245

Ripple Correction The current ripple correction used in the standard image processing for LWP high dispersion spectra is not very good. The IUE staff is working to improve it; however GOs may wish to try empirical corrections of their high dispersion data at the RDAF or at their own analysis facilities.

Scan Problems It has been known for some time that the LWP may occasionally experience problems in performing a read scan. The ground software is written to deal with these "bad scans", so the chance of losing an image to a scan failure is very small. Indeed, since the LWP camera has become the default camera, the frequency of these bad scans has dropped dramatically. Apparently the camera functions best when used often.

Reseau Motion Anomaly A few months ago, the anomalous motion of the LWP camera reseaux was noted on several wavelength calibration and spectral images. A shift of about 2 pixels was noticed for the reseau marks in the upper half of the image. These shifts correlate very well with the occurence of LWP "bad scans"; if bad scans are experienced during the read of the image, there is a 75% chance that the reseaux pattern would be shifted. This shift is only about a factor of 2 larger than the usual geometric errors. However observers examining high dispersion spectra, especially at the shorter wavelengths, should be alert to the possible misextraction of the data due to this shift. As noted above, the frequency of bad scans on the LWP has gone down dramatically now that the camera is in general use so this problem should rarely be encountered.

Camera Defects There is a large hole in the target, near 2880 A in order 80 for high dispersion spectra (this is not the reseau mark flagged at 2875 A). In addition there is a "bright spot", an artifact of the UV-flood images used to construct the LWP ITF, which falls in order 93 near 2482 A. Neither of these defects may be obvious from the extracted data nor flagged by the extraction routine, but the usefulness of the data in these regions is definitely affected. There is a troublesome reseau mark just off the high dispersion spectrum next to the MgII k line. It is usually included in the spectrum extraction at 2797 A. None of these defects lie near the low dispersion spectrum.

Finally, there is a "kink" in the LWP low dispersion spectrum at about 3240 A. This is apparently due to a 50 micron (one pixel = 37 microns) shear dislocation between fiber optic bundles in the camera. It should not appreciably affect the extracted data.

SHAZAM!

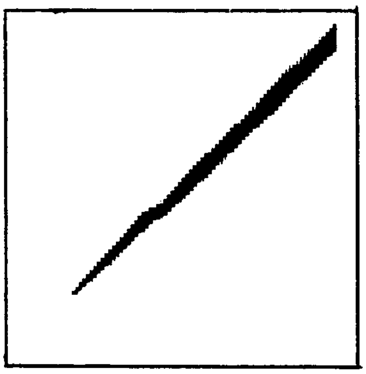

Figure 1: LWP low dispersion spectrum at the long wavelength end, copied off the expanded image at the observing console. The kink lies at about 3240 A.