Effective date: 9 January 1980

IUE DATA REDUCTION

XII. Absolute Calibration of Low Dispersion Spectra

As of 9 January 1980 low dispersion net spectra are provided on the IUE Guest Observer magnetic tapes in both an instrumental and an absolutely-calibrated form. Prior to this time, the data contained in the area of the tape file designated as "absolutely calibrated" were an exact repeat of the instrumental intensities. The instrumental net intensities in flux numbers (FN) are given just as they have always been, and the absolutely-calibrated net intensities are calculated by multiplying the instrumental net intensities by the adopted inverse sensitivity function S_λ^{-1}. The functions S_λ^{-1} adopted herein for the LWR and SWP cameras are those presented by Bohlin and Snijders in IUE Newsletter 2 (Photometric Calibration of the IUE - Memo VI Joint US/UK/ESA Calibration for Low Dispersion Large Aperture, 18 September 1978) and in Bohlin, et al. 1980, Astron. & Astrophys. (in press), with the three following modifications:

1) The Bohlin-Snijders function for LWR has been modified slightly at 1900 Å and 1850 Å. See Bohlin, Holm, & Snijders, 1979, IUE Newsletter 8, Photometric Calibration of the IUE-Memo VII.

2) The modified Bohlin-Snijders functions have been interpolated using a 3-point parabolic fit to the logarithm to yield values every 10 Å in LWR and every 5 Å in SWP.

3) These interpolated functions have been truncated (i.e., set to zero) outside of rather conservative wavelength limits in order to suppress the correction of noisy flux points at the extreme wavelengths where the spectral response is low.

The adopted S_λ^{-1} functions are listed in Tables 1 and 2 as functions of the wavelength in angstroms; the units of S_λ^{-1} are erg cm^{-2}Å^{-1} FN^{-1} where FN is the extracted IUE response.

Several points must be made in regard to the "absolutely-calibrated spectra," and the S_λ^{-1} functions used to obtain them.

1) All intensities are time-integrated, it being currently impossible to divide out by the actual exposure time in seconds in an automatic way because the actual exposure times are not suitably stored in the image header records. The values presented are FNxS_λ^{-1} (erg cm^{-2}Å^{-1}), and can be converted to absolute flux by dividing by the actual exposure time in seconds.

2) The adopted S_λ^{-1} functions are those pertinent to the intensity transfer functions (ITF) in use since 22 May 1978 and to the EXTLOW extraction program also in use since 22 May 1978. The correction of the SWP ITF error on 7 July 1979

SWP Low Resolution Interpolated Inverse Sensitivity Function (Erg $cm^{-2}\text{Å}^{-1}FN^{-1}$)

λ (Å)	S_λ^{-1}	λ (Å)	S_λ^{-1}	λ (Å)	S_λ^{-1}
900.00,	0.00	1450.00,	2.750-14	1720.00,	2.421-14
1189.80,	0.00	1455.00,	2.794-14	1725.00,	2.390-14
1190.00,	4.481-14	1460.00,	2.838-14	1730.00,	2.356-14
1195.00,	4.021-14	1465.00,	2.882-14	1735.00,	2.322-14
1200.00,	3.650-14	1470.00,	2.926-14	1740.00,	2.288-14
1205.00,	3.397-14	1475.00,	2.970-14	1745.00,	2.254-14
1210.00,	3.178-14	1480.00,	3.020-14	1750.00,	2.220-14
1215.00,	2.987-14	1485.00,	3.067-14	1755.00,	2.178-14
1220.00,	2.822-14	1490.00,	3.111-14	1760.00,	2.140-14
1225.00,	2.680-14	1495.00,	3.152-14	1765.00,	2.106-14
1230.00,	2.562-14	1500.00,	3.190-14	1770.00,	2.076-14
1235.00,	2.459-14	1505.00,	3.221-14	1775.00,	2.050-14
1240.00,	2.370-14	1510.00,	3.250-14	1780.00,	2.032-14
1245.00,	2.294-14	1515.00,	3.279-14	1785.00,	2.015-14
1250.00,	2.230-14	1520.00,	3.305-14	1790.00,	1.999-14
1255.00,	2.184-14	1525.00,	3.330-14	1795.00,	1.984-14
1260.00,	2.145-14	1530.00,	3.367-14	1800.00,	1.970-14
1265.00,	2.111-14	1535.00,	3.396-14	1805.00,	1.956-14
1270.00,	2.083-14	1540.00,	3.416-14	1810.00,	1.943-14
1275.00,	2.060-14	1545.00,	3.428-14	1815.00,	1.932-14
1280.00,	2.048-14	1550.00,	3.430-14	1820.00,	1.920-14
1285.00,	2.038-14	1555.00,	3.409-14	1825.00,	1.910-14
1290.00,	2.030-14	1560.00,	3.386-14	1830.00,	1.900-14
1295.00,	2.024-14	1565.00,	3.362-14	1835.00,	1.892-14
1300.00,	2.020-14	1570.00,	3.337-14	1840.00,	1.884-14
1305.00,	2.020-14	1575.00,	3.310-14	1845.00,	1.876-14
1310.00,	2.020-14	1580.00,	3.281-14	1850.00,	1.870-14
1315.00,	2.022-14	1585.00,	3.251-14	1855.00,	1.865-14
1320.00,	2.026-14	1590.00,	3.221-14	1860.00,	1.861-14
1325.00,	2.030-14	1595.00,	3.191-14	1865.00,	1.857-14
1330.00,	2.032-14	1600.00,	3.160-14	1870.00,	1.853-14
1335.00,	2.037-14	1605.00,	3.126-14	1875.00,	1.850-14
1340.00,	2.045-14	1610.00,	3.093-14	1880.00,	1.847-14
1345.00,	2.056-14	1615.00,	3.061-14	1885.00,	1.845-14
1350.00,	2.070-14	1620.00,	3.030-14	1890.00,	1.843-14
1355.00,	2.090-14	1625.00,	3.000-14	1895.00,	1.841-14
1360.00,	2.113-14	1630.00,	2.974-14	1900.00,	1.840-14
1365.00,	2.136-14	1635.00,	2.947-14	1905.00,	1.840-14
1370.00,	2.162-14	1640.00,	2.919-14	1910.00,	1.840-14
1375.00,	2.190-14	1645.00,	2.890-14	1915.00,	1.840-14
1380.00,	2.222-14	1650.00,	2.860-14	1920.00,	1.840-14
1385.00,	2.255-14	1655.00,	2.829-14	1925.00,	1.840-14
1390.00,	2.289-14	1660.00,	2.797-14	1930.00,	1.840-14
1395.00,	2.324-14	1665.00,	2.765-14	1935.00,	1.840-14
1400.00,	2.360-14	1670.00,	2.733-14	1940.00,	1.840-14
1405.00,	2.401-14	1675.00,	2.700-14	1945.00,	1.840-14
1410.00,	2.441-14	1680.00,	2.663-14	1950.00,	1.840-14
1415.00,	2.481-14	1685.00,	2.628-14	1950.20,	0.00
1420.00,	2.521-14	1690.00,	2.594-14	2400.00,	0.00
1425.00,	2.560-14	1695.00,	2.561-14		
1430.00,	2.596-14	1700.00,	2.530-14		
1435.00,	2.633-14	1705.00,	2.505-14		
1440.00,	2.671-14	1710.00,	2.478-14		
1445.00,	2.710-14	1715.00,	2.450-14		

Table 2

LWR Low Resolution Interpolated Inverse Sensitivity Function (Erg $cm^{-2}\mathring{A}^{-1}FN^{-1}$)

$\lambda(\mathring{A})$	S_λ^{-1}	$\lambda(\mathring{A})$	S_λ^{-1}	$\lambda(\mathring{A})$	S_λ^{-1}
1500.00,	0.00	2400.00,	0.760-14	2920.00,	0.397-14
1899.80,	0.00	2410.00,	0.730-14	2930.00,	0.407-14
1900.00,	5.200-14	2420.00,	0.702-14	2940.00,	0.418-14
1910.00,	4.597-14	2430.00,	0.676-14	2950.00,	0.430-14
1920.00,	4.092-14	2440.00,	0.652-14	2960.00,	0.443-14
1930.00,	3.665-14	2450.00,	0.630-14	2970.00,	0.457-14
1940.00,	3.305-14	2460.00,	0.610-14	2980.00,	0.473-14
1950.00,	3.000-14	2470.00,	0.591-14	2990.00,	0.491-14
1960.00,	2.724-14	2480.00,	0.573-14	3000.00,	0.510-14
1970.00,	2.497-14	2490.00,	0.556-14	3010.00,	0.528-14
1980.00,	2.312-14	2500.00,	0.540-14	3020.00,	0.550-14
1990.00,	2.161-14	2510.00,	0.524-14	3030.00,	0.576-14
2000.00,	2.040-14	2520.00,	0.509-14	3040.00,	0.606-14
2010.00,	1.972-14	2530.00,	0.495-14	3050.00,	0.640-14
2020.00,	1.911-14	2540.00,	0.482-14	3060.00,	0.682-14
2030.00,	1.857-14	2550.00,	0.470-14	3070.00,	0.730-14
2040.00,	1.811-14	2560.00,	0.459-14	3080.00,	0.783-14
2050.00,	1.770-14	2570.00,	0.449-14	3090.00,	0.843-14
2060.00,	1.739-14	2580.00,	0.439-14	3100.00,	0.910-14
2070.00,	1.712-14	2590.00,	0.429-14	3110.00,	0.987-14
2080.00,	1.688-14	2600.00,	0.420-14	3120.00,	1.073-14
2090.00,	1.667-14	2610.00,	0.411-14	3130.00,	1.169-14
2100.00,	1.650-14	2620.00,	0.403-14	3140.00,	1.278-14
2110.00,	1.645-14	2630.00,	0.395-14	3150.00,	1.400-14
2120.00,	1.638-14	2640.00,	0.387-14	3160.00,	1.533-14
2130.00,	1.630-14	2650.00,	0.380-14	3170.00,	1.686-14
2140.00,	1.620-14	2660.00,	0.372-14	3180.00,	1.862-14
2150.00,	1.610-14	2670.00,	0.365-14	3190.00,	2.065-14
2160.00,	1.610-14	2680.00,	0.359-14	3200.00,	2.300-14
2170.00,	1.603-14	2690.00,	0.354-14	3200.20,	0.00
2180.00,	1.588-14	2700.00,	0.350-14	3600.00,	0.00
2190.00,	1.567-14	2710.00,	0.347-14		
2200.00,	1.540-14	2720.00,	0.345-14		
2210.00,	1.497-14	2730.00,	0.343-14		
2220.00,	1.453-14	2740.00,	0.341-14		
2230.00,	1.409-14	2750.00,	0.340-14		
2240.00,	1.364-14	2760.00,	0.339-14		
2250.00,	1.320-14	2770.00,	0.339-14		
2260.00,	1.275-14	2780.00,	0.339-14		
2270.00,	1.230-14	2790.00,	0.339-14		
2280.00,	1.186-14	2800.00,	0.340-14		
2290.00,	1.143-14	2810.00,	0.341-14		
2300.00,	1.100-14	2820.00,	0.342-14		
2310.00,	1.054-14	2830.00,	0.344-14		
2320.00,	1.011-14	2840.00,	0.346-14		
2330.00,	0.972-14	2850.00,	0.350-14		
2340.00,	0.934-14	2860.00,	0.355-14		
2350.00,	0.900-14	2870.00,	0.360-14		
2360.00,	0.871-14	2880.00,	0.366-14		
2370.00,	0.843-14	2890.00,	0.373-14		
2380.00,	0.815-14	2900.00,	0.380-14		
2390.00,	0.787-14	2910.00,	0.388-14		

did not change the SWP S_λ^{-1} by more than 5 percent, and so the Bohlin-Snijders-function is still appropriate for the new ITF. See the Memo VII referred to above and included in this Newsletter 8.

3) The adopted S_λ^{-1} functions were derived from large-aperture exposures so that only relative fluxes are provided for small-aperture exposures (which do not contain the total flux from point sources).

4) Even though the adopted S_λ^{-1} functions are conservatively truncated, the instrumental net intensities are still written to tape over the full wavelength range of the original extraction. The S_λ^{-1} values given by Bohlin and Snijders beyond the range of calibration adopted here may thus be applied to the instrumental net intensities by the Guest Observer, should he or she so desire.

5) Only the net intensities appearing in the "merged spectrum", or "eslo" tape file (i.e., the slit-integrated signal) are absolutely calibrated. The 55 pseudo orders comprising the gross spatially-resolved data set ("essr") are <u>not</u> absolutely calibrated; they remain instrumental <u>gross</u> intensities as before.

<u>CalComp Plots</u>

As of the effective date of this memo, the CalComp plots of the net and log of net spectra are given in absolutely-calibrated form. The plots of the gross and background spectra remain in instrumental (FN) units.

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