

IUE Final Archive Calibration: Determination of the Camera Plate Scale

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The camera plate scale has been determined using the most recent values for the small-to-large aperture offsets and FES aperture center locations. An accurate definition of the plate scale is necessary for proper conversion from pixel space to angular measurement. This latest incarnation replaces the oft-quoted plate scale figure of 1.525 arcseconds per pixel (Bohlin *et al.* 1980), a value that is used for all three cameras. However, due to the differing plate distances between the large and small apertures for the long- and short-wavelength spectrographs, we have derived separate plate scales for each camera. In addition, the pixel separations between the large and small apertures for Bohlin's method were measured using IUESIPS line-by-line files. The large-to-small aperture pixel separations for NEWSIPS images differ from IUESIPS images by as much as 2% for the long-wavelength cameras.

Table 1: FES Geometric Measurements of Aperture Locations

	FES (X,Y)	
	(FES units)	(arcsec)
Short-Wavelength Small Aperture	(+243,-89)	
Short-Wavelength Large Aperture	(+94,-90)	
Difference	(+149,+1)	(39.9320,0.2617)
Resultant Distance		39.9329
Long-Wavelength Small Aperture	(+47,+65)	
Long-Wavelength Large Aperture	(-105,+51)	
Difference	(+153,+13)	(41.0040,3.4021)
Resultant Distance		41.1449

The aperture center locations were measured during one of the FES geometric calibration observing shifts and tabulated by Pitts (1988). The conversion from FES units to arcseconds was achieved through the application of the following formulae

(Holm 1978): 1 FES x-axis unit equals 0.2680 arcseconds and 1 FES y-axis unit equals 0.2617 arcseconds.

The small-to-large aperture distances (Nichols *et al.* 1993), expressed in pixels, are listed in Table 2. These numbers were measured via examination of NEWSIPS SILO (line-by-line) images which have exposures in both apertures. Dividing the pixel offsets into the respective resultant FES aperture distances from Table 1 yields the final plate scale values.

Table 2: NEWSIPS Camera Plate Scale Values

Camera	Small to Large Offset (pixels)	Small to Large Offset (arcsec)	Plate Scale (arcsec/pixel)
LWP	26.3	41.1449	1.5644
LWR	26.5	41.1449	1.5526
SWP	26.1	39.9329	1.5300

References

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