Definitions:

- $m_s = \text{Plate Scale (arcsec/pixel)}$
- $W = \text{Slit Width (arcsec)}$
- $B_{\lambda i} = \text{Surface Brightness per angstrom (erg cm}^{-2} \text{ sec}^{-1} \text{ Å}^{-1} \text{ arcsec}^{-2})$
- $F_{\lambda i} = \text{Flux per Angstrom (erg cm}^{-2} \text{ sec}^{-1} \text{ Å}^{-1})$

To convert to the physical units of $F_{\lambda}$, the following conversion is given in the data handbook:

$$F_{\lambda i} = B_{\lambda i} \cdot W \cdot m_s. \quad (1)$$

If the spatial scales were exactly the same, then we would get an exact match with these correct units. However the MAMA scale is half the size of the CCD scale. This means in order to get an exact match, we have to look at a combination of rows.

I will assume that the center of the two spatial profiles are exactly matched. (This can be done before hand with a simple shift of the columns in iraf.) This means if we take the center to be perfectly matched, we will want the central row plus half of the flux of both the pixel row above and the pixel row below:

$$F_{\lambda, \text{tot}} = 0.5F_{\lambda, \text{row}_{+1}} + F_{\lambda, \text{row}_0} + 0.5F_{\lambda, \text{row}_{-1}}. \quad (2)$$

The central row where we take the entire flux can be calculated as described in 1. However, where we only want “half” of the light from the pixel row, I need to scale the plate scale, to mimick an observation from a pixel half the size of the physical pixel:

$$F_{\lambda, \text{row}_{\pm1}} = B_{\lambda, \text{row}_{\pm1}} \cdot 0.5(m_s) \cdot W. \quad (3)$$

If we combine this into one simple equation, we get:

$$F_{\lambda, \text{tot}} = (0.25B_{\lambda, \text{row}_{-1}} + B_{\lambda, \text{row}_0} + 0.25B_{\lambda, \text{row}_{-1}}) \cdot m_s \cdot W. \quad (4)$$

This measurement will be calculated for each row going outwards from the nucleus for all UV spectra.