

EM2D Use Case

Story

I would like to identify emission lines in 2D data and not simply in 1D extracted spectra as the latter assume that we know where the emission line originate in the host galaxy. I can use my knowledge of the grism to: 1) Find an emission line a drizzled grism image 2) Compute the x,y coordinate of this line in one of the input distorted FLT file 3) Compute coordinate of the trace that goes through the pixel determined in step 2. 4) Remap that trace from pixel coordinates back to RA,Dec on the sky 5) Repeat Steps 1-4 for the other PAs 6) Take the ensemble of all the traces we computed and compute all intersections. Retain those where at least N trace intersect at the same pixel and which lead to a derived observed wavelength for the original emission line that is consistent.

Inputs

- I have a set of full FLT dispersed images taken at at least 2 position angles on the sky, preferably 3.
- I have an estimate of the continuum levels of the sources in the field and full simulations of each FLT files already
- I have a large mosaic of the field so that I can identify the actual host galaxy later on

Outputs

- A list of RA,Dec and observed wavelengths.

Computations

- I need a way to accurately detect emission lines (using SExtractor or photutils) in a combined, astrodrizzled, high signal-to-noise dispersed image. Potentially removing continuum light using simulations or smoothing
- I need a good calibration of the disperser/grism and an accurate way to compute a spectra trace that goes through a specific pixel coordinate of a dispersed FLT

Drawbacks

- Requires good astrometric calibration of the grism
- Requires multiple PA observations
- Some parameters such as number of traces that need to intersect and to within what fraction of a pixel and how consistent should the observed wavelength end up being between the different PAs need to be determined.
- In the very low signal to noise mode, and with a limited number of PAs, false positives are still possible
- The method works less well for spatially extended emission line regions (see MAP2D)