

2. In IDL, plot your flux values versus the aperture size for each star, and visually compare the plots. A little example IDL code:
`IDL> apertures = [3,8,10] & brightness1 = [200,12,860] & brightness2=[40,700,60]`
`IDL> plot, apertures, brightness1, xtitle='Aperture Radii (pixels)', ytitle='Brightness (ADU)'`
`IDL> oplot, apertures, brightness2`
3. Assume that our largest aperture radius (14 pixels) captures all of the light we received from each star. Remake the plots from step 2, but normalize the brightness values (in other words, divide them) by the brightness for the 14 pixel aperture radius. Repeat the comparison.
4. Compute and write down the *instrumental magnitude*, m , of each source from the brightness as measured with the 14 pixel aperture, b , like so: $m = 25 - 2.5 \log b$ (Note: here we have adopted an arbitrary *magnitude zero point* of 25, as is done in both ATV and PhotVis.)
5. What fraction of the total light is detected within the FWHM (ie. aperture radius = FWHM / 2)? What fraction of the total light is detected within 2 x FWHM (ie. aperture radius = FWHM)?

Part III: PhotVis, an IDL Photometry and Visualization Tool

1. Run a full source extraction with PhotVis with standard inputs twice, once each for Sigma Thresholds of 10 and 20. For each setting, write down the number of objects detected (upper right of the main PhotVis window) and save your photometry results to a file (name each file differently!). Close PhotVis.
2. For each Sigma Threshold setting, do the following:
 - (a) Restore the saved results per the instructions printed to your terminal by the PhotVis “Save Photometry Results” process.
 - (b) Examine the resulting array, `pv_dat`, in your IDL session. How many columns and rows does the array have? Note these numbers for each file.
 - (c) Plot the flux (mag) versus uncertainty (err) columns and visually compare each. The units of both are magnitudes. Remember, to pull one column from a two-dimensional array, use indexes like: `pv_dat[5, *]` to pull out all the entries from the 6th column of `pv_dat`.
3. Compare the flux versus uncertainty plot for each. What is the range of uncertainties in each? What is the range of magnitudes in each?