Stellar Photometry

ASTR250

March 15, 2018

Goals

1. Obtain calibrated magnitudes for the stars in the Stein 2051 field
2. Gain some appreciation for the faintest stars that can be detected with this telescope in the given observing time

Question 1 Create an astropy table that contains the RA, Dec, X-Pixel and Y-Pixel location and the `aperture_sum` of the star.

Question 2 Determine the magnitude of Stein 2051 by using each of the three calibrator stars to obtain the calibration constant.

Question 3 Use each calibrator to estimate the magnitude of the other two calibrator stars. Are the measured differences inside the error bars reported by the APASS catalog?

Question 4 If you make a histogram of the number of sources at a given magnitude what does that tell you about the faintest objects you can detect given the MINERVA-Red telescope and a 30 second exposure in the i' band? (hint you will want to use a semilogy plot).

Question 5 In ICE13 we made a loglog histogram plot of the of the pixel values. Please remake this plot while also plotting the aperture sum values. Note you will need to scale the values of the aperture sum based on the size of the aperture so that you obtain the "typical" brightness per pixel of a star, to be compared to the histogram of pixels values. If you do this correctly, they should line up on top of each other. Similar to question four, what does this tell us about the detection limit for sources in terms of the number of standard deviations above the background?