

ASTR 288C - Astronomy Research Techniques

Fall 2019

Homework Assignment No. 5

1. In class we discussed the idea of creating a mask for an image and how we could implement such a procedure in IDL. Write an IDL procedure that takes an image array "IM" and puts a circular spot of radius "R" and center located at xc,yc on the image, such that the circle contains zeros, while the rest of the image is not affected. Call the returned image "IMX". (Hint: You may find the "where" statement useful.)
2. Go to the Hubble Legacy website
<http://hla.stsci.edu/hlaview.html>
and search for images of the planetary nebula BD+30 3639 (also called PK64+5D1).
Find the narrow band H-beta image (f487n) taken in 1994
(proposal 05403 - HARRINGTON): hst_05403_02_wfpc2_f487n_pc_drz.fits
Download the file and display it using the IDL readfits procedure.
3. Look at the header. Find the inverse sensitivity PHOTFLAM and the filter bandwidth PHOTBW. What is the product of these values? (You will need this number to convert counts to flux in ergs/s.)
4. Isolate a box containing the nebula but not too much sky outside it. Get the total flux in the box in counts. What is the flux in cgs units? (Ground based observations give $F(H\beta) = 9.7 \times 10^{-11} \text{ erg s}^{-1}$.)
5. Use the IDL procedure you wrote for the first question to remove the central star from the image. Evaluate the flux without the central star. By what fraction does the flux change?

Due: 14 October 2019