AY257 Fall 2018

Homework #3B: Surface Photometry of Large Galaxies

There are three CCD FITS files at:

http://www.ucolick.org/~bolte/AY257/HMWK4_2015

These have been bias-corrected and flat-fielded.

n3379_sh.fits and n3379_long.fits are short and long R-band exposures respectively
of the elliptical galaxy NCG 3379. h22_comb.fits is a deep B-band exposure of the
Hickson Compact Group #22.

1. Combine the short and long exposure frames of NGC3379 into a single, higher-
   dynamic range image of the galaxy. Describe your process for doing this merging
   of images. Useful tasks in IRAF: *imstat, imreplace, imarith, imcomb*

2. Fit elliptical isophotes to NGC3379 using ELLIPSE (see below for options). Is there
   a significant B4 term?

3. Build a model using *bmodel* in the same package and subtract it from the original
   image.

4. Using *isoplot*, plot out the radial profile of NGC3379. Compare your profile to one
   from the literature.   Is NGC3379 an exponential-profile galaxy or an $r^{1/4}$-law
   galaxy or neither?

5. Fit ellipses to the three largest galaxies in the H22 field, build models based on
   these fits and subtract the fits from the original frame. Compare the radial profiles
   of the three galaxies.

In IRAF or PYRAF this is done via: *stsdas.analysis.isophotes.ellipse.*

For a more complete Python experience:

https://photutils.readthedocs.io/en/stable/isophote.html

https://photutils.readthedocs.io/en/stable/api/photutils.isophote.Ellipse.html#pho
tutils.isophote.Ellipse