The University of Hong Kong

PHYS3650

Observational Astronomy

Data Analysis Project

By Daniel Lam, Brian Chan

Deadline: before final exam (to be confirmed)

1 BACKGROUND

In this project, we will perform some basic analysis on real astronomical images taken by the Hubble Space Telescope. The software we use is called DS9, which can be downloaded here: <u>http://ds9.si.edu/site/Download.html</u>.

A description of DS9 from the software website:

SAOImage DS9 is an astronomical imaging and data visualization application. DS9 supports FITS images and binary tables, multiple frame buffers, region manipulation, and many scale algorithms and colormaps. It provides for easy communication with external analysis tasks and is highly configurable and extensible via XPA and SAMP.

Unlike most laboratory manuals, we do not provide detailed step-by-step instructions. The procedures will only be roughly outlined. Students are expected to identify problems and seek solutions on their own.

2 IMAG E FILES

The image in F606W filter, obtained in the *Hubble* Space Telescope (HST), can be downloaded at: http://hla.stsci.edu/cgi-bin/getdata.cgi?dataset=hst_09709_t0_wfpc2_f606w_wf

3 TASKS

Establish a reliable growth curve. Using the growth curve, compute the brightness of star A at (pixel_x,pixel_y)=(943,1285.5) and star B at (pixel_x,pixel_y)=(1439,1255) in the F606W image. A total count rate of 1 e- s-1 corresponds to an A B magnitude of 25.14 in F606W.

Apart from the related lecture notes, you can refer to the two Help Files for more information about growth curves. The Help Files may not give you all information you need to complete this task, and you may need to actively search for other resources when meeting problems.

4 QUESTIONS

- 1. In the F606W image, compute intensity profiles for 5 bright stars to establish a reliable growth curve. Plot the growth curve on a graph and state the parameters you used in constructing the aperture.
- 2. Why do you choose these stars?
- 3. Compute the AB magnitude of star A and star B with the assistance of growth curve you obtained in 1.

5 SUBMISSION

You need to submit your project to my email (henry913@connect.hku.hk) by deadline, with subject "OA project YOUR NAME". Please attach the following files in the email.

- 1. Answers to the questions section, in word or pdf format. Please use the filename (YOUR_NAME.pdf or YOUR_NAME.docx).
- 2. Region file you used in F606W image (YOUR_NAME_F606W.reg), add numbers to the end of file name if you use multiple region files.