Option D – Guidance for Practical 1

Image analysis of Cepheids to determine astronomical distances

Safety

Although great care has been taken in checking the accuracy of the information provided in this guidance, Cambridge University Press shall not be responsible for any errors, omissions or inaccuracies.

Teachers and technicians should always follow their school and departmental safety policies. You must ensure that you consult your employer's model risk assessments and modify them as appropriate to meet local circumstances before starting any practical work. Risk assessments will depend on your own skills and experience, the skills and experience of your students, and the facilities available to you. Everyone has a responsibility for his or her own safety and for the safety of others. The notes below should not be regarded as a risk assessment.

You should carry out the practical yourself before presenting it to students. Make sure you are comfortable with the procedures, and can anticipate any difficulties your students may encounter.

Guidance

Students will practice image analysis and using these measurements to determine the distance of a galaxy.

Apparatus and materials

Each student will need:

- A laptop/computer with:
  - access to the internet
  - Salsa J software and Stackreg and TurboReg plugins installed
  - 20 image files of a section of the sky on 20 different days

Setting up the practical

Before this exercise, the image analysis software needs to be installed in the laptops/computers (if you do not have an administrator account, ICT support will have to do this step).

You will also need to download and save in the computer, or a network drive, the image files to be analysed and Excel answer file for the student to enter their measurements.

- Salsa J 2.3 software can be downloaded from this link:
  http://www.euhou.net/index.php/salsaj-software-mainmenu-9/download-mainmenu-10?task=view&id=8
  (there are files for Windows, Linux and Mac OS X, as well as the Stackreg and TurboReg plugins)
- Images can be downloaded from this link:
  http://www.euhou.net/docupload/files/Exercises/Cepheids/cepheids.zip
- Answerfile.xls can be downloaded and extracted from the zip file, euhou_exercises_files.zip, from: http://www.euhou.net/index.php/exercises-mainmenu-13/astronomy-with-salsaj-mainmenu-185

A simpler version of this exercise that avoids the image analysis is available from Cavendish Outreach at Cambridge University. It includes a student worksheet, a presentation with teacher's notes and an Excel spreadsheet and can be found at:
http://www-outreach.phy.cam.ac.uk/resources/astro/KS5/cepheid/index.php.