

## Lab 7. CLEA Photometry

### Equipment

- Computer; CLEA Software; One Sheet of transparent paper
- Optional: Excel Spread Sheet

### Mini Lecture prior to Lab

- Please explain to the students of observing at national observatories, how to apply for telescope time, how to prepare for the observing run, and how to do the actual observing in the console room.
- The rest of the lab is relatively self-explanatory and students can do it on their own, even at home.

### General Procedure & Lab Setup

- Just let the students turn on the computer and follow the instructions.
- Give them half an hour (max) to read the instructions and learn how to use the program. Some students will want to be walked through how to use the program, but this is really not needed – they only need to read the instructions.
- If students work in groups of two, one student could do the plot in Part I, while the other starts reading up on how to run the program of Part II. After a while they could exchange notes and swap tasks. This saves time.
- Please encourage the students (relatively early in the lab) to apply for time on a larger telescope.
- The “Manual” Option in Part III is sometimes faster than the “Excel” Option. The Excel Option is really only meant for students who have some type of computer experience and who seem to have a relatively good grasp on the rest of the lab.
- Please do not let any students leave the lab without having plotted at least a handful of data points into the HRD.

### Notes & Suggestions

- This lab CAN be done within the allocated time, provided the students really get on with collecting the data. Some students might take forever, particularly if they do not focus on the lab. Please make sure they use a LARGE telescope.
- Collecting the data can be work-intensive, but like it is with any number crunching exercise, the students will “push bottoms”, sometimes even without knowing what they are doing. If you notice that, please remind them of the purpose of the lab and (almost more importantly) make the connection to the previous photometry lab where they had to do the photometry itself step by step. This might even make them appreciate the current computerized exercise.
- When it looks that the students will not finish the lab in time there are some options (a) Turn on all the computers in the lab and split up partners; (b) Cheat and re-start the program until the students get time on a larger telescope; (c) Split up the labor between two groups, have group 1 do stars 1 to 15, and group 2 stars 15 to 30.

### General Concepts & What students might get out of this Lab

- How modern day astronomers use telescopes to obtain their data, and how they “reduce” that data.
- How to interpret the Hertzsprung Russell Diagram
- How to determine the distance to a cluster.

### Scientific Methodologies

- Critically thinking about the accuracy of their final result and the suitability of the method they used.