PHOTOMETRY Flow of a Photometry Project

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BRIEF



Overview

The video lesson assumes you have already reviewed the "Photometry an Overview", "Comparison Stars", and "Aperture Photometry" lessons.

In this project, we'll discuss the basic outline of a Photometry project from start to finish in order to put a global context to it.





Steps

- 1. Determine your project type: Exoplanets, Variable Stars, Asteroids, etc
- 2. Locate the target in the sky
 - Determine what star is the Target Star
 - If possible, determine what stars are NOT variable and can be used as Comparison Stars
- 3. Determine the best time for availability of imaging (ex. Airmass)
- 4. Determine the best telescope to use for imaging
 - NOTE: This includes which filters to use as well
- 5. Schedule the images for acquisition







Paths after Image Acquisition

After the image set has been acquired, they need to be processed

- Darks, Flats, Bias
- RA/Dec
- Cosmic Rays
- Image review for bad and good images





Post-Processing Path: Other than OSS Pipeline

- 1. Open all images
- 2. If these have been calibrated (i.e. Darks, Bias, Flats), then proceed to step 3, if not, perform calibration before proceeding to step 3.
- 3. Place Aperture over the Target Star
- 4. Locate your Comparison Stars (Comp Stars)
 - 1. If the magnitude of these stars are NOT known, you can still use them provided that the are NOT variable.
 - 2. If the magnitudes are unknown, then the resultant plot of the Target Star variability will be a relative one compared to the Comp Star. REMEMBER: The Comp Star's purpose is to provide a baseline from which to measure the Target Star.
 - 3. If the magnitudes ARE known, then insert those so that a more accurate magnitude variation of the Target Star can be made
- 5. Calculate the Target Star Flux changes
- 6. Review the plot from the software package (ex. AIJ, Maxim, Mira)
- 7. Perform period analysis in program such as Peranso or AAVSO







Error Determination

To determine error measurement, use the differential count of the comp star counts by subtracting the average of all comparison star count values over the period from the comparison comp star count value.

The root mean square, rms, of the differential comp star measurements is an estimate of the errors.

Use the following formula.

$$rms = \sqrt{\frac{\sum counts^2}{N}}$$

Counts = average comp star's count N = total number of counts



Summary

This lesson provided an overview of how the flow of a Photometry project would occur from the identification of an object, to the final measurement.

This is generic in sense and may need to be adapted according to your tools and processes.

The software products mentioned within are suggestions and are not the only means by which to perform this work.



Questions?