

AST 152M: Stellar Astronomy Lab

Fall 2005

Lab 5: Creating an Observing List

Due 11/23/2005

This lab is to be done by each student individually and submitted separately. Please do not work with each other. As always, you are welcome to ask the instructor for help. You are highly encouraged to finish this lab early.

Overview

You have been given 4 nights on the 4meter telescope at Cerro Tololo Interamerican Observatory (CTIO) in Chile beginning on July 24, 2006. Before you arrive at the telescope for this observing run, you need to have compiled a list of target objects, and some order you will observe them in. Your goal is to confirm the B-V color trend for the full range of spectral types in main sequence stars. Your sample needs to include 20 stars with a spectral class range from type O to M, but constrained to luminosity class V (main sequence). In order to achieve the necessary precision in your photometric measurements, you need to observe each target star for a certain length of time depending on its brightness (see table below). Using the various available catalogs in the library or online, choose your target list and the order you would observe each star during the course of the four nights that you will have the telescope. In order to maximize your sensitivity, you want to observe each star near its time of transit, when possible.

Observatory Data

CTIO

time zone = UT - 4 hours (assume no daylight savings time)

altitude = 2215 meters

latitude = -30.16527778 degrees (South)

longitude = 70.815 degrees (West)

Star Catalogs

For compiling your source list, you will find resources in Périquier Library such as the Bright Star catalog, SAO catalog, and the Astronomical Almanac. Additionally, there are resources available on-line, including the following sites that you may find useful.

<http://vizier.u-strasbg.fr/vizier/cats/New.htx>

<http://simbad.u-strasbg.fr/sim-fid.pl>

<http://astro.estec.esa.nl/Hipparcos/catalog.html>

<http://tdc-www.harvard.edu/software/catalogs/sao.html>

You may also find the program, Starry Night, installed on ugrad02 (and possibly others) in Windows, to be of some use.

Object Integration Time Guide

Use the following table as a guide for how long you will need to observe each of your target stars.

Target Brightness	Total integration time needed
$(m_V) = 0 - 5.9$	30 minutes
$(m_V) = 6 - 10.9$	1 hour
$(m_V) = 11 - 15.9$	2 hours
$(m_V) = 16 - 20.9$	4 hours

Questions

As you compile your observing list, you will need to answer the following questions.

What time of night does each object transit in your local sky at CTIO? What is the LST on July 24th at sunset, local midnight, and sunrise from CTIO? Where is the moon in the sky relative to your objects? What phase is it in? What is the local time of moonrise and moonset? What is the local time of sunset and sunrise?

Write up

Present your target list of stars including name, coordinates, spectral type, and apparent magnitude in V. Discuss your selection criteria in terms of right ascension and declination as it relates to the time of year and time of night of your observations, and location of the observatory. List the order in which you would observe each of your target stars giving the local time of night you would acquire each object with the telescope and the time spent taking data on the source. Be sure to clearly explain how you made these decisions, including any calculations that you did.