Lab 5 - Photometry of a Globular Cluster

Goal 1: Make an Observing Plan
Goal 2: Make an HR Diagram

Objects To Observe

M13
M2
M72

Observing Target:
M13
16 41 41.634 +36 27 40.75 (Infrared) (from http://simbad.u-strasbg.fr/simbad/sim-id?Ident=M13)

Hourly Airmass Table for M13 for Oct 6, 2022

Note: The effective elevation doesn't seem well formed. Using 500 meters.

*** Hourly airmass for M13 ***

Epoch 2000.00: RA 16 41 41.0, dec 36 27 36
Epoch 2022.76: RA 16 42 29.8, dec 36 25 03

At midnight: UT date 2022 Oct 6, Moon 0.88 illum, 96 degr from obj

Local	UT	LMST	HA	secz	par.angl.	SunAlt	MoonAlt
20 00	14 00	19 28	2 45	1.222	88.9	-11.1	27.8
21 00	15 00	20 28	3 46	1.469	81.2	...	36.4
22 00	16 00	21 28	4 46	1.937	74.2	...	42.3
23 00	17 00	22 28	5 46	2.971	67.1	...	44.5
0 00	18 00	23 29	6 46	6.497	59.5	...	42.3
1 00	19 00	0 29	7 46	(down)	51.0	...	36.4
2 00	20 00	1 29	8 46	(down)	41.3	...	27.8
3 00	21 00	2 29	9 47	(down)	30.0	...	17.5
4 00	22 00	3 29	10 47	(down)	17.1	...	6.1
5 00	23 00	4 29	11 47	(down)	3.1	...	...
6 00	0 00	5 30	-11 13	(down)	-11.1	...	...
7 00	1 00	6 30	-10 13	(down)	-24.5	-7.2	...

Standard Star:

1. How often are you going to observe them? (Are you going to bounce back and forth?) **At least 3 times.**
2. Are you going to observe standards before or after your target observation or both? **Both and in the middle of our observing time!**
3. Are you going to do all your V-filter observations first and then your I-filter observations or are you going to do both V and I at the same time? **We'll observe the different filters separately. (Standars stars in V, standard stars in I, cluster in V, cluster in I, etc…) At least 2 exposures of each.**

~~Potential Standard Stars from Stellarium:~~

- ~~HD 150998 (16 43 04.2229659000 +36 30 34.714)~~
- ~~HD 151086 (16 43 39.8142917352 +36 22 49.897423740)~~
- ~~HIP 81685 (07 36 07.0735561631 -03 06 38.741979616)~~

Standard Stars from Landolt List:

- Vega (vega is super bright, so be careful not to oversaturate the ccd - start worrying around ~30,000 counts)
- G138 25

Landolt Targets

StarDesignation RA(2000) Dec(2000) V B-V U-B V-R R-I V-I
--- --- --- --- --- --- --- --- ---
G138 25 16:25:14 +15:41:15 13.513 1.419 1.265 0.883 0.796 1.685
Separation: 1.4061506193428321

StarDesignation RA(2000) Dec(2000) V B-V U-B V-R R-I V-I
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PG1633+099 16:35:24 +09:47:45 14.397 -0.192 -0.974 -0.093 -0.116 -0.212
Separation: 1.7801385440477597

StarDesignation RA(2000) Dec(2000) V B-V U-B V-R R-I V-I
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PG1633+099A 16:35:26 +09:47:48 15.256 0.873 0.32 0.505 0.511 1.015
Separation: 1.7800562478891706

StarDesignation RA(2000) Dec(2000) V B-V U-B V-R R-I V-I
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PG1633+099B 16:35:34 +09:46:17 12.969 1.081 1.007 0.59 0.502 1.09
Separation: 1.7816336991216069

StarDesignation RA(2000) Dec(2000) V B-V U-B V-R R-I V-I
--- --- --- --- --- --- --- ---
PG1633+099C 16:35:38 +09:46:11 13.229 1.134 1.138 0.618 0.523 1.138
Separation: 1.7816926758223839

StarDesignation RA(2000) Dec(2000) V B-V U-B V-R R-I V-I
--- --- --- --- --- --- --- ---
PG1633+099D 16:35:40 +09:46:38 13.691 0.535 -0.025 0.324 0.327 0.65
Separation: 1.7811674371790416

Observatory Information for calculating airmass:

W Long (hms) 19 32 56.5
N Lat (dms) 29 38 34.6
Alt (m) 50
Time Zone: -5
Name: Eastern Day Time
Abbrev: EDT
DST: US convention
Date: 10/6/2022

- Saturation limit of CCD–be aware of exposure times so that we don't saturate CCD immediately

Observing Log

Took sky flats at ~6:30-7 PM local time
Took out CCD and turned off telescope afterwards, kept CCD turned on
At astronomical twilight,7:50 PM started to try and orient the telescope so that it could slew to targets - not very well. No stars auto appeared on the fov of the CCD
Original targets too dim, try these instead
001 - Object name
StarDesignation RA(2000) Dec(2000) V B-V U-B V-R R-I V-I
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111 773 19:37:17 +00:10:38 8.963 0.206 -0.21 0.119 0.144 0.262
Separation: 54.45338332240191
Could not locate the object. Tried to move to Deneb a couple of times to orient the telescope and slew back, but failed.
Tried to move to M13.
CCD rotated oddly while moving to M13
Trying to find M13. Could not find it.
Moving to Vega. Vega did not saturate, taking exposures.
Moving back towards M13, trying to find and focus.
Taking out CCD and putting in eyepiece to try and locate
Gave up on M13
It’s M2 time, very well centered! Yay.
Taking darks with exposure time of 20s.
Taking 20 biases at the end of the night.