Week 5 Exercise 1 (Part A)

As you may have heard Arne Henden say many times, taking images in at least two filters and transforming target magnitudes to a standard system (e.g., Johnson-Cousins BVRI) is a goal all photometrists should strive for. The data is more accurate (and comparable) and thus more valuable to researchers. As usual the decision to follow this recommendation is driven by $$ because you will need a filter wheel and multiple filters to achieve this objective. Never fear, your V data is valuable, especially if you use an "ideal" comp because transformation is negligible if your comp and target have the same color!

But for ALL the cases where you are not so lucky, you need two or more filters. We will pursue generating your transformation coefficients shortly but today we will use VPhot to calculate standard magnitudes for your targets. We will start with R CrB images. So select them and look at the image list.

1. How many different filters are used in these images? What are they?

a) Three (3)

b) B,V and I

2. How many different pairs of filters may we transform? Give the formula that tells you how many pairs exist. Remember BV and VB are the same. I'm making you think about math again just for the heck of it. You can give up if you want to. The main thing to think about is that as you pair filters you will end up with some replicate measures of magnitude. It is desired (required) that you NOT report these replicate magnitudes.

a) N!/(N-n)! = (3x2x1)/(3-2)! = 6/1 = 6 combinations. however as you mentioned BV and VB are the same so the formula we need is:

b) N! / n(N-n)! which gives us: (3x2x1)/(2x(3-2)! = 6/2 = 3. Thus there are only 3 choices we have for the filter combinations that VPhot will use.

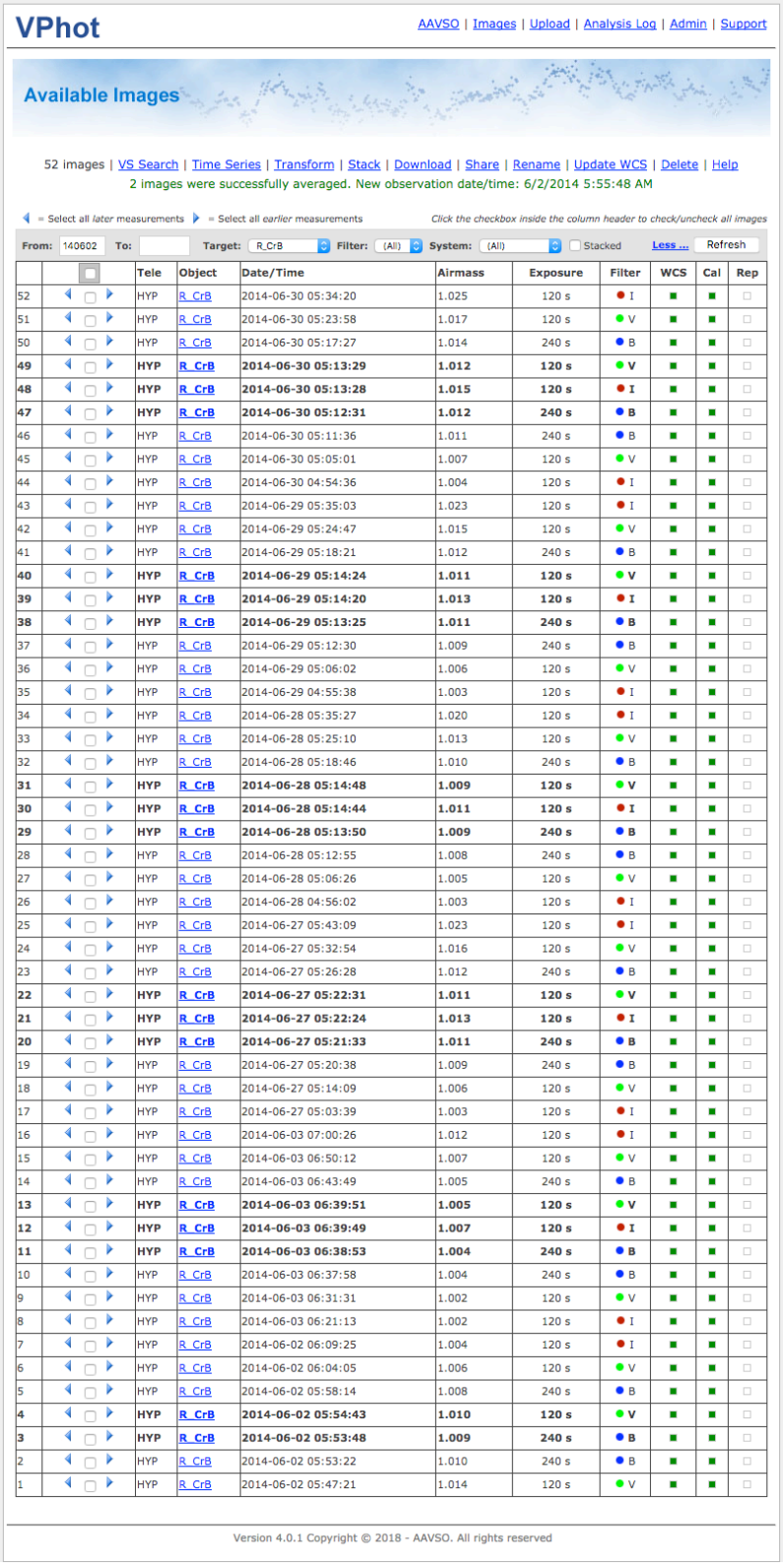
3. There a few different days of imaging included. How many filter images were collected on the night of 140602?

a) 5 filter images were collected on (Ix1,Bx2,Vx2)

4. What was the order in which these images were taken? There is a best filter order to do this but it is generally ignored!

a) The order is (V,B,B,V,I)

5. Stack images that have the same filter for this day. Provide a screen capture of the image list after you do all the stacking. Stacking images is not required but is good practice to improve your precision. Taking duplicate images is good practice that is often ignored since observers are hungry for quantity of target magnitudes.



VPhot

AAVSO | Images | Upload | Analysis Log | Admin | Support

Available Images

52 images | VS Search | Time Series | Transform | Stack | Download | Share | Rename | Update WCS | Delete | Help

2 images were successfully averaged. New observation date/time: 6/2/2014 5:55:48 AM

= Select all later measurements = Select all earlier measurements Click the checkbox inside the column header to check/uncheck all images

From: 140602 To: Target: R_CrB Filter: (All) System: (All) Stacked Less ... Refresh

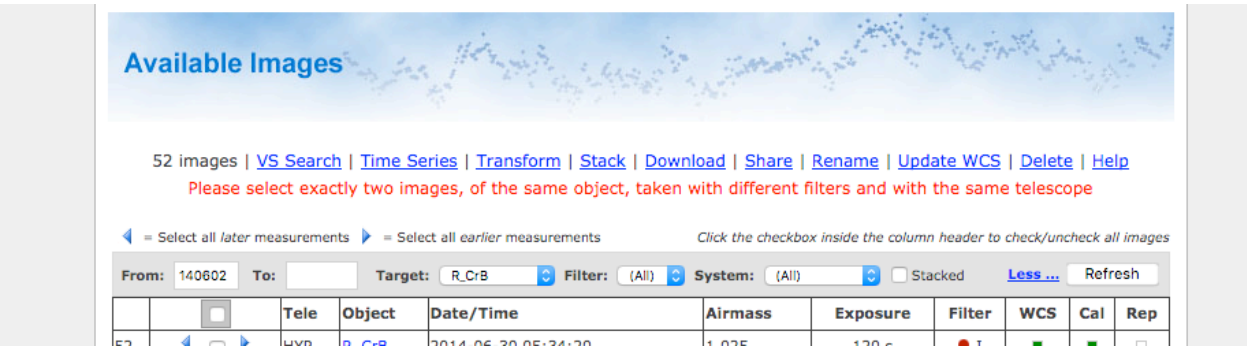
		Tele	Object	Date/Time	Airmass	Exposure	Filter	WCS	Cal	Rep
52		HYP	R_CrB	2014-06-30 05:34:20	1.025	120 s	I			
51		HYP	R_CrB	2014-06-30 05:23:58	1.017	120 s	V			
50		HYP	R_CrB	2014-06-30 05:17:27	1.014	240 s	B			
49		**HYP**	**R_CrB**	**2014-06-30 05:13:29**	**1.012**	**120 s**	**V**			
48		**HYP**	**R_CrB**	**2014-06-30 05:13:28**	**1.015**	**120 s**	**I**			
47		**HYP**	**R_CrB**	**2014-06-30 05:12:31**	**1.012**	**240 s**	**B**			
46		HYP	R_CrB	2014-06-30 05:11:36	1.011	240 s	B			
45		HYP	R_CrB	2014-06-30 05:05:01	1.007	120 s	V			
44		HYP	R_CrB	2014-06-30 04:54:36	1.004	120 s	I			
43		HYP	R_CrB	2014-06-29 05:35:03	1.023	120 s	I			
42		HYP	R_CrB	2014-06-29 05:24:47	1.015	120 s	V			
41		HYP	R_CrB	2014-06-29 05:18:21	1.012	240 s	B			
40		**HYP**	**R_CrB**	**2014-06-29 05:14:24**	**1.011**	**120 s**	**V**			
39		**HYP**	**R_CrB**	**2014-06-29 05:14:20**	**1.013**	**120 s**	**I**			
38		**HYP**	**R_CrB**	**2014-06-29 05:13:25**	**1.011**	**240 s**	**B**			
37		HYP	R_CrB	2014-06-29 05:12:30	1.009	240 s	B			
36		HYP	R_CrB	2014-06-29 05:06:02	1.006	120 s	V			
35		HYP	R_CrB	2014-06-29 04:55:38	1.003	120 s	I			
34		HYP	R_CrB	2014-06-28 05:35:27	1.020	120 s	I			
33		HYP	R_CrB	2014-06-28 05:25:10	1.013	120 s	V			
32		HYP	R_CrB	2014-06-28 05:18:46	1.010	240 s	B			
31		**HYP**	**R_CrB**	**2014-06-28 05:14:48**	**1.009**	**120 s**	**V**			
30		**HYP**	**R_CrB**	**2014-06-28 05:14:44**	**1.011**	**120 s**	**I**			
29		**HYP**	**R_CrB**	**2014-06-28 05:13:50**	**1.009**	**240 s**	**B**			
28		HYP	R_CrB	2014-06-28 05:12:55	1.008	240 s	B			
27		HYP	R_CrB	2014-06-28 05:06:26	1.005	120 s	V			
26		HYP	R_CrB	2014-06-28 04:56:02	1.003	120 s	I			
25		HYP	R_CrB	2014-06-27 05:43:09	1.023	120 s	I			
24		HYP	R_CrB	2014-06-27 05:32:54	1.016	120 s	V			
23		HYP	R_CrB	2014-06-27 05:26:28	1.012	240 s	B			
22		**HYP**	**R_CrB**	**2014-06-27 05:22:31**	**1.011**	**120 s**	**V**			
21		**HYP**	**R_CrB**	**2014-06-27 05:22:24**	**1.013**	**120 s**	**I**			
20		**HYP**	**R_CrB**	**2014-06-27 05:21:33**	**1.011**	**240 s**	**B**			
19		HYP	R_CrB	2014-06-27 05:20:38	1.009	240 s	B			
18		HYP	R_CrB	2014-06-27 05:14:09	1.006	120 s	V			
17		HYP	R_CrB	2014-06-27 05:03:39	1.003	120 s	I			
16		HYP	R_CrB	2014-06-03 07:00:26	1.012	120 s	I			
15		HYP	R_CrB	2014-06-03 06:50:12	1.007	120 s	V			
14		HYP	R_CrB	2014-06-03 06:43:49	1.005	240 s	B			
13		**HYP**	**R_CrB**	**2014-06-03 06:39:51**	**1.005**	**120 s**	**V**			
12		**HYP**	**R_CrB**	**2014-06-03 06:39:49**	**1.007**	**120 s**	**I**			
11		**HYP**	**R_CrB**	**2014-06-03 06:38:53**	**1.004**	**240 s**	**B**			
10		HYP	R_CrB	2014-06-03 06:37:58	1.004	240 s	B			
9		HYP	R_CrB	2014-06-03 06:31:31	1.002	120 s	V			
8		HYP	R_CrB	2014-06-03 06:21:13	1.002	120 s	I			
7		HYP	R_CrB	2014-06-02 06:09:25	1.004	120 s	I			
6		HYP	R_CrB	2014-06-02 06:04:05	1.006	120 s	V			
5		HYP	R_CrB	2014-06-02 05:58:14	1.008	240 s	B			
4		**HYP**	**R_CrB**	**2014-06-02 05:54:43**	**1.010**	**120 s**	**V**			
3		**HYP**	**R_CrB**	**2014-06-02 05:53:48**	**1.009**	**240 s**	**B**			
2		HYP	R_CrB	2014-06-02 05:53:22	1.010	240 s	B			
1		HYP	R_CrB	2014-06-02 05:47:21	1.014	120 s	V			

6. What emphasizes these stacked images?

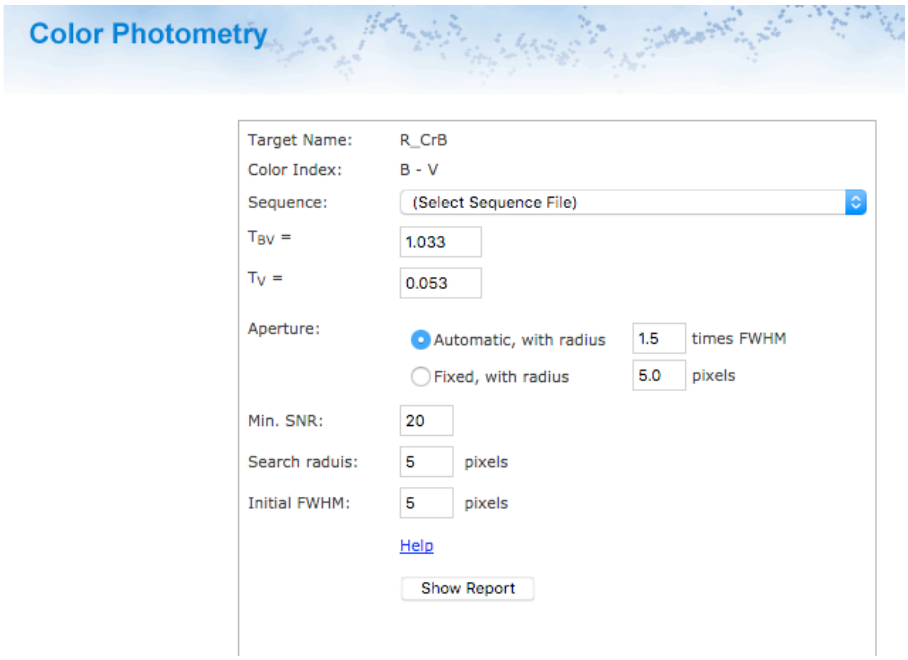
a) ***the stacked images are highlighted in bold. (Note the screen shot above)***

7. Now, rather than tell you, describe the process for transforming one pair (BV) of images? Provide a screen shot of the subsequent color photometry selection page.

a)First you must select two filtered images or you will get the following message:



b) Next click on Transform with he selected images. You get the following page:



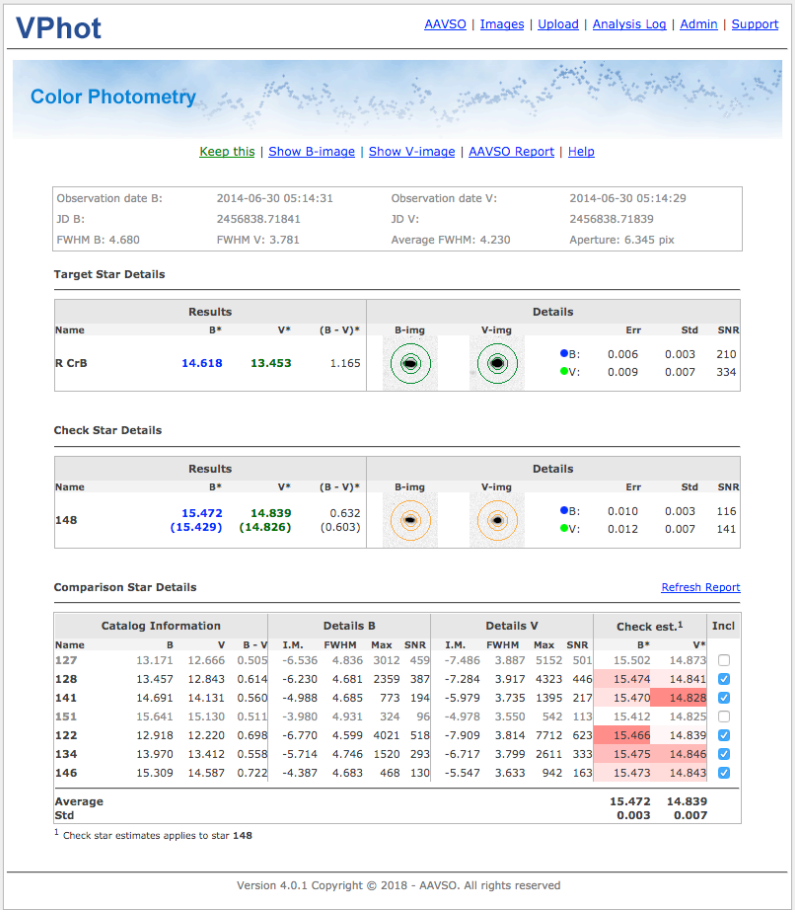
8. What did you do on this page to continue?

a) You must have a Sequence setup for a target, Select the aperture size then click on show report.

9. What two values are provided in two new/different boxes on this page? We'll talk about generating these values soon.

a) The two new boxes displayed on the this page are Tbv =1.033 and Tv = 0.053 . Which I assume are the color transform coefficients that has previously been entered by the observer on the telescope setup page under the Admin function click.

10. Provide a screen shot of the color photometry result page.



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Color Photometry

Keep this | Show B-image | Show V-image | AAVSO Report | Help

Observation date B:	2014-06-30 05:14:31	Observation date V:	2014-06-30 05:14:29
JD B:	2456838.71841	JD V:	2456838.71839
FWHM B: 4.680	FWHM V: 3.781	Average FWHM: 4.230	Aperture: 6.345 pix

Target Star Details

Results				Details				
Name	B*	V*	(B - V)*	B-img	V-img	Err	Std	SNR
R CrB	14.618	13.453	1.165			B: 0.006 V: 0.009	0.003 0.007	210 334

Check Star Details

Results				Details				
Name	B*	V*	(B - V)*	B-img	V-img	Err	Std	SNR
148	15.472 (15.429)	14.839 (14.826)	0.632 (0.603)			B: 0.010 V: 0.012	0.003 0.007	116 141

Comparison Star Details — Refresh Report

Catalog Information				Details B				Details V				Check est.[1]		Incl
Name	B	V	B - V	I.M.	FWHM	Max	SNR	I.M.	FWHM	Max	SNR	B*	V*	
127	13.171	12.666	0.505	-6.536	4.836	3012	459	-7.486	3.887	5152	501	15.502	14.873	☐
128	13.457	12.843	0.614	-6.230	4.681	2359	387	-7.284	3.917	4323	446	15.474	14.841	☑
141	14.691	14.131	0.560	-4.988	4.685	773	194	-5.979	3.735	1395	217	15.470	14.828	☑
151	15.641	15.130	0.511	-3.980	4.931	324	96	-4.978	3.550	542	113	15.412	14.825	☐
122	12.918	12.220	0.698	-6.770	4.599	4021	518	-7.909	3.814	7712	623	15.466	14.839	☑
134	13.970	13.412	0.558	-5.714	4.746	1520	293	-6.717	3.799	2611	333	15.475	14.846	☑
146	15.309	14.587	0.722	-4.387	4.683	468	130	-5.547	3.633	942	163	15.473	14.843	☑
Average												15.472	14.839	
Std												0.003	0.007	

[1] Check star estimates applies to star **148**