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Johnson *BV* and Cousins *RI* photometry of some cool giant stars

Saul J. Adelman, Brennin S. Colegrove, and Stephanie L. Woodrow
Department of Physics, The Citadel, 171 Moultrie Street, Charleston, SC 29409, USA

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Abstract

We examine Johnson *BV* and Cousins *RI* photometry of the cool giant stars HR 1105, HD 35155, HR 4088, TU CVn, IT Vir, and HR 7442, that the first author obtained with the Four College Automated Photoelectric Telescope. The new data for HR 1105 show that its variability is more complex than previously thought. Except a 0.3 phase gap in the photometry of HD 35155, the amplitude of variability is fairly constant. For HR 4088, except for one season, we did not find any periods shorter than 100 days. For the barium star IT Vir assuming the orbital period is the photometric period, the light curves consist of two similar subparts each one-half of the orbital period long. But there are problems with concluding that this star is an ellipsoidal variable. For HR 7442, more data is needed to derive an accurate period. A few observations are also presented of HR 1556, HR 363, HD 58521, and HD 49368.

1 Introduction

Single-channel observations of several cool giant stars were obtained with the Four College Automated Photoelectric Telescope (FCAPT) located first on Mt. Hopkins, AZ, USA and later at the Fairborn Observatory, Washington Camp, AZ, using Johnson *BV* and Cousins *RI* photometry. The first observing season was Sept. 1990–July 1991. Adelman & Dennis (2005) performed multiperiodic analyses of photometry of the S-type AGB stars RS Cnc, ST Her, OP Her, and HR Peg and found problems with the stability of the modes derived using Period98 (Sperl 1998). Adelman & Harrell (2006) found the primary periods of NZ Gem, HD 77247, RT Vir, and 104 Her. Here we study HR 1105 and HD 35155,which are S-type binary stars (Brown et al. 1990), HR 4088, TU CVn, IT Vir, the coolest known barium star, and HR 7442. For HR 1556, HR 363, HD 58521, and HD 49368 the few obtained FCAPT observations are given. Some FCAPT photometry of HR 1105 and HD 35155 were reported previously by Adelman (1998) and Adelman (1997), respectively.

Many of the stars studied are S stars, or have positions in the HR Diagram close to those of S stars. These stars are a class of late-type giants whose spectra resemble those of M stars, but also have the distinctive molecular bands of ZrO (Merrill 1922). Peculiar S-type red giants have envelopes enriched in carbon and heavy elements by the s-process (Smith & Lambert 1990). They are considered SARVs or small amplitude red variables. Intrinsic S stars have high luminosities, exhibit Tc lines in their spectra, and partake in the MSC evolution sequence along the AGB. Their chemical peculiarities result from intrinsic nucleosynthetic processes whose products are mixed with the surface layers. Extrinsic S stars belong to binary systems and have evolved from the hotter lower luminosity binary barium stars. Presumably the current primary stars acquired their s-processed material from their now white dwarf companions. Infrared measurements indicate that there is very little circumstellar material in such systems (Groenewegen 1993).

2 The observations

The comparison and check stars were selected from presumably non-variable cool stars using HIPPARCOS photometry (ESA 1997). The dark count was measured for each group of variable (v), check (ch), and comparison (c) stars. Then through each of the four filters, the sky-ch-c-v-c-v-c-v-c-ch-sky measures were made where sky is a sky observation. Table 1 gives important information on the variable, comparison, and check stars from Hoffleit (1982), Hoffleit et al. (1983), and/or SIMBAD. An estimate of the accuracy of the photometry can be derived from the standard deviations of the means of ch$-$c star values. Finding suitable constant comparison and check stars can be a problem especially as the period of observations increases. Tables 2–9 contain for each filter, the photometric data for v$-$c and c$-$ch, their averages, and standard deviations. We talk about the data obtained during each observing season which begins usually in September and ends in the following July. During the summers when the local monsoon season occurs, observations are not possible. To find the periods we used the Scargle periodogram (Scargle 1982, Horn & Baliunas 1986), Period04 (Lenz & Breger 2005), and self-correlation techniques (Percy & Mohammed 2004).

The analysis of HIPPARCOS photometry of HR 363, HR 1105, HR 1556, HD 35155, HD 49368, HD 58521, HR 4088, TU CVn, IT Vir, and HR 7442 reveals amplitudes of 0.09, 0.10, 0.09, 0.21, 0.16, 0.75, 0.06, 0.16, 0.25, and 0.18 mag, respectively (Adelman & Maher 1998). Most binary S stars have amplitudes in the 0.06 to 0.24 mag range and the intrinsic S stars have amplitudes between 0.3 and 1.0 mag. The amplitude of HD 58521's data indicates it is an intrinsic S star.

The [Fe/H] values are +0.12 for HR 7442 (Smith & Lambert 1986) and $-0.01, -0.52$, 0.11, -0.25, and +0.01 for HR 1105, HD 35155, HR 4088, HD 49368, and HD 58521, respectively (Smith & Lambert 1990). In this respect HD 35155 is Fe-poor, HD 49368 is marginally Fe-poor, and the other four stars have solar Fe abundances. Binary periods are known only for HR 363 (4593 days), HR 1105 (596.2 days), HD 35155 (640 days), HD 49368 (2995.9 days), and IT Vir (185.66 days), see Jorissen et al. (1998).

Table 1: Photometric Groups.

HD	Star Name	Type	V	$B-V$	Spectral Type	Neutral Density Filter
7351	HR 363	v	6.43	1.67	S	2
5575	68 Psc	c	5.42	1.08	G6	2
6301	HR 303	ch	6.19	0.42	F7	2
22649	HR 1105	v	5.10	+1.63	S3.5/2	3
23089	HR 1129	c	4.80	+0.80	G0 III + A3 V	4
23005	HR 1124	ch	5.82	+0.35	F0 IV	4
30959	HR 1556	v	4.74	1.84	S	5
33276	15 Ori	c	4.82	1.08	F2 IV	4
30869	BD+31 728	ch	5.27	0.50	F7	3
35155	V1261 Ori	v	6.87	+1.77	S	2
36379	HIP 25840	c	6.91	+0.56	G0	2
35536	HR 1799	ch	5.61	1.56	K5 III	2
49368	BD+05 1414	v	7.70	+1.78	S	3
48348	HR 2474	c	6.19	+1.37	K0	3
46241	12 Mon	ch	5.84	+0.99	K0 V	3
58521	BD+46 1271	v	6.98	1.73	S	3
56963	HR 2776	c	5.77	0.32	A7 s	3
58661	HR 2844	ch	5.72	-0.10	HgMn	3
90254	HR 4088	v	5.61	+1.62	M3 IIIabs	4
91612	HR 4146	c	5.08	+0.94	G9 IIICN-1.5Fe-1	4
90512	HIP 51179	ch	6.66	+0.85	G5III	4
112264	HR 4909	v	5.86	1.55	M5 III	3
115735	21 CVn	c	5.15	0.44	A0 V	4
111421	11 CVn	ch	6.26	0.72	A6m	3
121447	BD-17 3961	v	7.81	1.75	K4 III	2
120544	HR 5202	c	6.53	0.51	F6 IV/V	3
117246	BD-17 3862	ch	6.89	1.38	K4 III	3
184786	HR 7442	v	5.96	+1.64	M4.5 IIIas	3
181096	HR 7327	c	5.58	+0.27	F0 III:	3
185657	HR 7447	ch	6.47	+0.98	G6 V	3

Note on type of star: v = variable, c= comparison star, and ch = check star
Note on neutral density filters : 1 = none, 2 = 1.25 mag., 3 = 2.50 mag., 4 = 3.75 mag., 5 = 5.00 mag.

3 Discussion

3.1 HR 1105

Adelman (1998) found that HR 1105 (BD Cam, HD 22649), an S3.5/2 type star, has a stable periodic light variability with a period from a Scargle periodogram analysis of 24.76 days

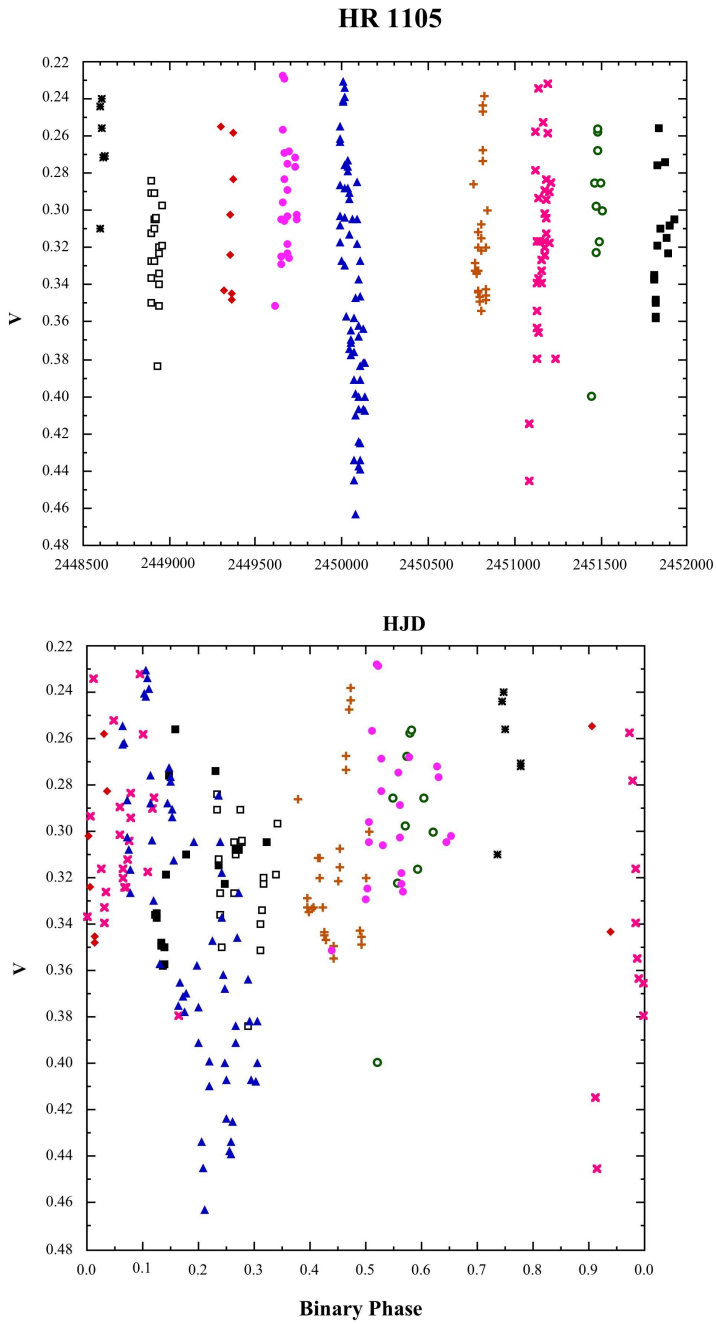

Figure 1: *Top:* HR 1105 V magnitudes as a function of HJD. *Bottom:* V magnitudes as a function of the binary phase. $*$ representing values from observing season 2, $\square$ season 3, $\blacklozenge$ season 4, $\bullet$ season 5, $\blacktriangle$ season 6, $+$ season 8, $\times$ season 9, $\circ$ season 10, and $\blacksquare$ season 11. The primary is in front of the companion between phases 0.61 and 0.11.

superimposed upon longer term changes. Griffin (1984) previously discovered that it was a spectroscopic binary with an orbital period of 596.21±0.19 days. The two extrema of the radial velocity curve are near phases 0.11 and 0.61. At the former phase the radial velocity is most positive and at the later the most negative. So the primary is in front of the companion between phases 0.61 and 0.11. The white dwarf companion was detected using IUE spectra (see Peery 1986; Ake, Johnson & Peery 1988; Johnson, Ake & Ameen 1993). The ultraviolet spectrum is similar to those of other interacting binary stars. Adelman (1998) obtained 6, 20, 9, 22, and 63 FCAPT *BVRI* observations of HR 1105 and its comparison and check stars in observing seasons 2, 3, 4, 5, and 6. To these data, we add 28, 35, 10, and 18 good observations in observing seasons 8 (1997–98), 9 (1998–1999), 10 (1999–2000), and 11 (2000–2001), respectively. The values are in Table 2.

Figure 1 shows the V values as a function of Heliocentric Julian Date and as a function of the binary (orbital) phase. For most observing seasons the amplitude of variation is about the same, but seasons 6 and 8 have much greater values. To some extent this may reflect the number of values obtained in the season. The coverage of phases 0.55–0.95 is sparse and thus limits what can be said about looking at the twin phases – where one star is in front of and the other behind any material in the system – and the inverse case half a period apart. The minimum near phase 0.25 is due to season 6 values, but those from observing season 3 are brighter. This suggests a real difference for HR 1105 between these two sets of observations at a similar orbital phase. Hence to understand this system better and to help in identifying the source(s) of variability more complete photometry is required.

When we tried to find periods using the entire data set, we found 25.32 and 25.94 days with the Scargle periodogram and with Period04, respectively, while a self-correlation analysis suggest a period around 25 days. When we plotted V vs. a 25.32 day period, only for season 6 did we get a decent looking light curve. Then for seasons 3, 5, 6, 8, and 9 which have at least 20 good observations, we repeated the Scargle periodogram analysis for these data sets alone. Only for season 6 did we find a period with a power S/N to be greater than that for 1% significance. It was 21.48 compared to 13.81 for 1% significance. This frequency corresponds to a period of 25.08 days. Thus only for one observing season was a period about a month long found. HR 1105 is clearly a complex system for which more than 50 photometric values need to be taken during each observing season.

3.2 HD 35155

Jorissen et al. (1992) discovered that the extrinsic S star HD 35155 exhibits intrinsic photometric variations superimposed upon an eclipsing behavior tied to the orbital motion. It was monitored as part of the Long-Term Photometry of Variables program at ESO (Sterken 1983). The details of the orbit are given in Jorissen & Mayor (1992).

Adelman (1997) discussed 16 and 25 sets of *BVRI* observations of HD 35155 obtained during seasons 4 and 6, respectively. Here 76, 57, 57, and 41 sets of similar data obtained in observing seasons 8 (1997–98), 9 (1998–99), 10 (1999–2000), and 11 (2000–2001), respectively, are included in Table 3. A Scargle periodogram analysis suggests a period of 37.24 days while Period04 indicates periods of 36.68 and 287.62 days, and a self-correlation analysis yields a period near 36.5 days. Thus a period of 36.7±0.5 days would appear to

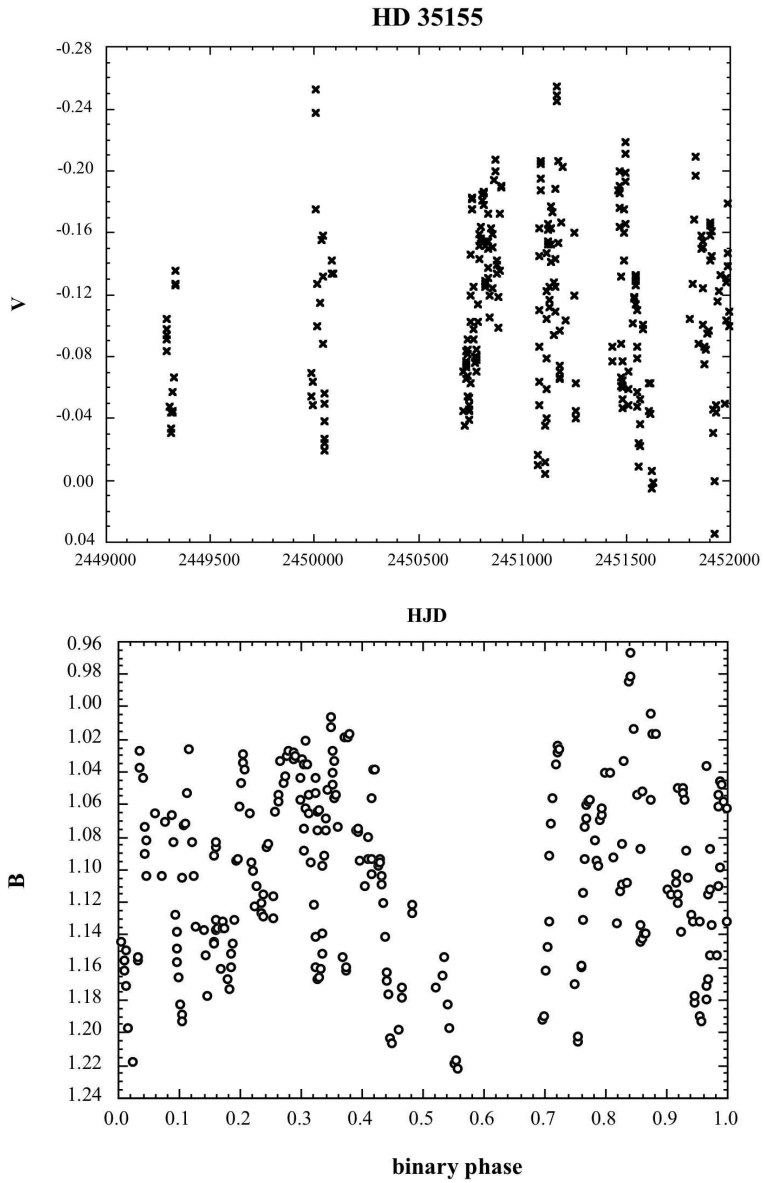

Figure 2: *Top:* HD 35155 V magnitudes as a function of HJD. In the right half of the diagram, the amplitudes of the variations are similar between years. *Bottom: B* magnitudes as a function of the binary phase. There is no confirmation that an eclipse occurs at the same phase as it does in the discovery figure of Jorissen et al. (1992).

be present. However, a plot of V with this period is mostly scatter. This suggests looking at each observing season separately. The only two periods found were 36.78 days for season 9 and 225.75 days for season 8. In this system the white dwarf companion has been seen in the ultraviolet (Johnson, Ake & Ameen 1993). In Fig. 2, we plotted the V magnitudes as a function of HJD, and the B photometry versus binary phase. For the upper part of

this figure, the amplitudes remain approximately constant between observing seasons. The eclipse is not at the phase 0.13 as that in the discovery figure of Jorissen et al. (1992). It might be located in the 0.3 phase gap about half a cycle later. Here we see that outside of eclipse the amplitude is fairly constant.

3.3 HR 4088

HR 4088 (DE Leo, 44 Leo, HD 90254) is a M3 IIIas star. Brown et al. (1990) do not consider it an S star as its spectrum is not enriched in s-process elements. The FCAPT obtained 31 sets of *BVRI* photometry during observing season 8 (1997–98), 52 during observing season 9 (1998–99), 77 during observing season 10 (1999–2000), 56 during observing season 11 (2000–2001), and 30 during observing season 12 (2001–02), see Table 4. Figure 3 displays this data. The four light curves appear to be approximately in phase. A conservative estimate of the amplitudes are 0.06, 0.05, 0.06, and 0.02 mag for B, V, R, and I, respectively.

We used the Scargle periodogram on data from each season's data and on the entire set of data. Only for season 10 did we find any possible periods with a power S/N to be greater than that for 1% significance. The two results were for 1.0821 days and 12.837 days. Other than these we did not find consistently believable periods of less than 100 days with the three period determination methods. Additional observations with several measurements per night could check on relatively short periods and provide more details on the variability.

3.4 TU CVn

Percy, Wilson & Henry (2001) obtained up to 5000 nights of *VRI* photometry of a group of 34 small-amplitude red variables from the automated Fairborn-10 telescope. One of these stars was TU CVn (= HD 112264 = HR 4049 = HIP 63024), spectral type M5 III, for which they used HR 4919 as their comparison star and HR 4843 as their check star. They found a period of 44.2 days. Our observations cover three observing seasons (11, 12, and 13) with 64, 36, and 13 observations, respectively.

Unfortunately these observations used several choices of neutral density filters. Thus in Table 5 we present only those data with a fair number of similar values. In Figure 4, we plot the V data for observing season 11. It is similar to, but not identical to, the data shown by Percy et al. (2001).

3.5 IT Vir

IT Vir (= HD 121447 = BD −17 3961) is the coolest known barium star with an orbital period of 185.66 days (Jorissen et al. 1995). Its spectral type is K7IIIBa5. Table 6 contains the apparently good data that was obtained. As for TU CVn, there are neutral density filter changes. We examined the B photometry for observing seasons 9–12 with a Scargle periodogram (Scargle 1982, Horne & Baliunas 1986) and found a significant period of 93.86 days which is close to one half of the orbital period.

In Figure 5 we plot the B, R, and I phase diagrams using the ephemeris of Jorissen et al. (1995): HJD (max radial velocity) = 2448036.33±0.42 + (185.66±0.07) E.

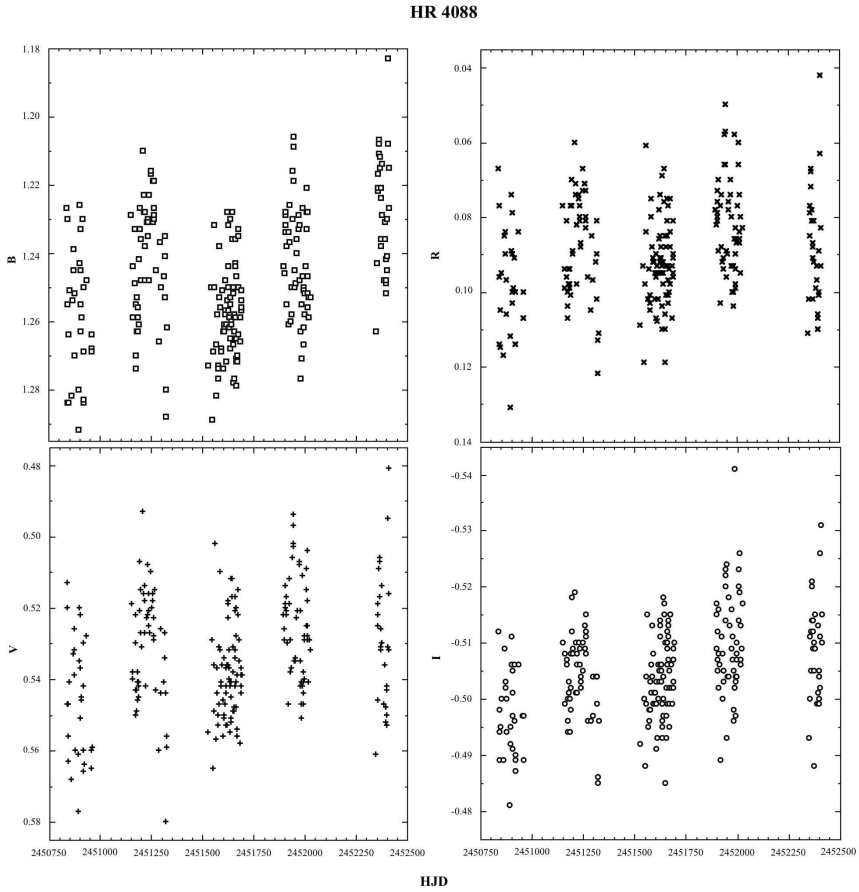

Figure 3: Johnson *BV* and Cousins *RI* single-channel photometry for HR 4088 from the FCAPT.

The photometric variability appears to repeat twice for one orbital period of IT Vir. Both halves of the photometric light curve are similar, but additional observations are necessary to determine how identical they are. The first minimum appears to be slightly narrower than the second. There are also wavelength dependent differences. The *V* photometry was not plotted due to difficulties in it. IT Vir is brightest at the extrema of the radial velocities. Our photometry covers phases near phase 0.0 not available to Jorissen et al. (1995). Additional observations of IT Vir are desirable to solve the various issues raised by our FCAPT photometry in combination with earlier obtained data.

Jorissen et al. (1995)'s model to explain the photometric variations of IT Vir with $P_{orb}/2$ is that of ellipsoidal variations. But this interpretation is not without problems since the giant does not appear to rotate synchronously with its orbital motion, as is expected for a tidally deformed star which exhibits ellipsoidal variations. The amplitudes of the present

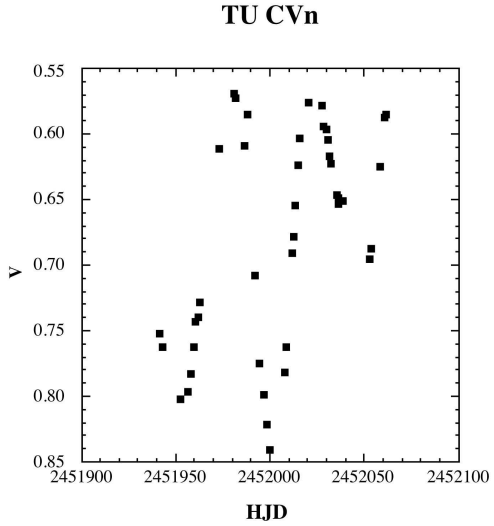

Figure 4: Differential V photometry of TU CVn from observing season 11 shows the general characteristics of similar data obtained and plotted by Percy et al. (2001). The mean ch−c standard deviation is 0.006 mag.

data are inconsistent with ellipsoidal variations which should be grey. Figure 5 shows that the peak-to-peak amplitudes of variation are about 0.06 mag. in B and about 0.04 mag. in both R and I. Figure 6 plots the $B-R$ values against the corresponding $R-I$ values. It further emphasizes that the $B-R$ variations are almost 1.5 times as large as those for $R-I$. This is another way to show the chromosity of IT Vir and that it does not have a grey variability.

3.6 HR 7442

HR 7742 (V1743 Cyg, HD 184786, HIP 96198) is a M5 IIIas cool variable star. It is not an S star as its spectrum is not enriched in s-process elements (Brown et al. 1990). The FCAPT obtained 109 sets of good *BVRI* photometry, 58 in observing season 10 (1999–2000), 28 in observing season 12 (2001–2002), and 23 in observing season 13 (2002–2003) (see Table 7). Fig. 7 shows these observations as a function of Heliocentric Julian Date. Amplitudes based on observing season 10 are 0.18 mag for B, 0.20 mag for V, 0.16 mag for R, and 0.08 mag for I. The B,V, and R light curves are in phase and I probably is also. Some I values from observing season 13 were not plotted due to a neutral density filter being different than that used for the rest of the data.

The gaps due to missing observations make finding any period difficult. Analyses of this data using Period04 suggest a period near 90 days. The Scargle periodogram suggests values near 72.5 and 90.0 days while self-correlation techniques indicate that a period near 73 days. Additional observations might well clarify both the size of the amplitudes and which periods are present. For observing seasons 12 and 13 it is likely we are seeing only part of the range of variability.

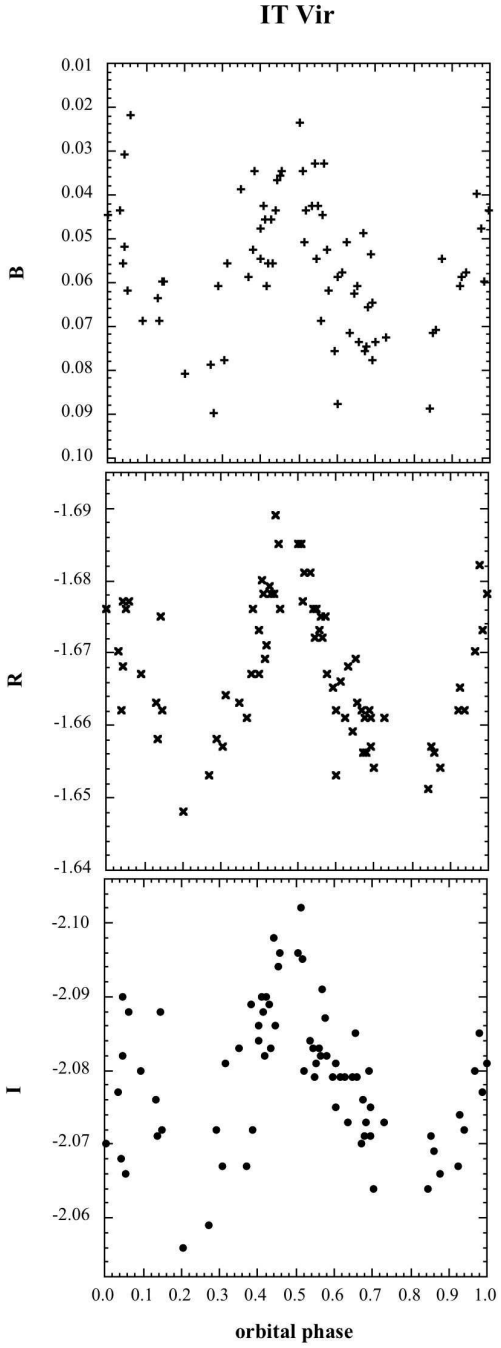

Figure 5: Differential *BRI* Photometery of IT Vir as a function of the orbital period of Jorissen et al. (1995). There are two photometric minima and two maxima for each orbital period. The two halves of the photometric light curve are similar, but not exactly identical and there are wavelength dependent differences.

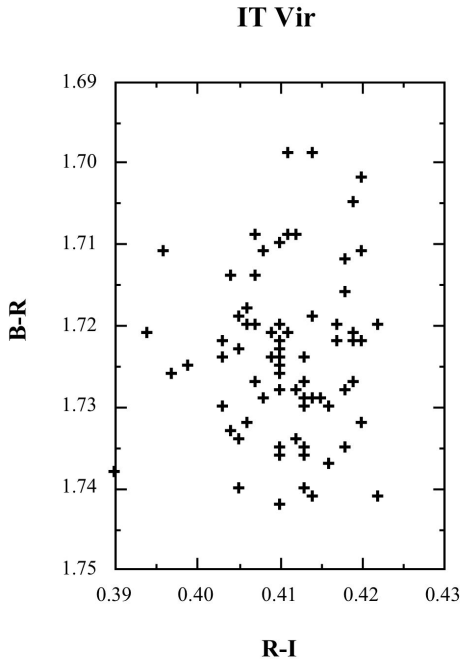

Figure 6: $B-I$ vs. $R-I$ values for IT Vir. This figure emphasizes that the changes in the photometric indices are not grey. The peak-to-peak photometric variations are about 0.06 mag. in B and about 0.04 mag. in R and I.

3.7 HR 1556, HR 363, HD 58521, and HD 49368

The first author also obtained a small number of good sets of observations for a few other cool giant stars. Although these values (Tables 8 and 9) are by themselves unable to give complete pictures of the optical photometric behaviors of these stars, they may be of use when combined with those of other studies.

Our 21 observations of the S3.5/1 star HR 1556 (= HD 30959 = HIP 22667 = 4 Ori = σ^1 Ori) shows it is a definite variable. Its spectral type is M3. Percy et al. (2001) find it has a period of 35 to 40 days. These observations were taken after the end of theirs. Jorissen et al. (1998) note that its period is $>$ 1900 days. Brown et al. (1990) found it was an intrinsic S star with Tc lines.

The Ms star HR 363 (= HD 7351 = DT Psc) is an S star whose orbital period is 4593 days (Jorissen et al. 1998). The 15 sets of FCAPT photometry shows that this star is variable, possibility with a small amplitude.

The S star HD 49368 (= V613 Mon = BD+05 1414) has an orbital period of 2995.9 days (Jorissen et al. 1998). The 6 sets of photometry suggest modest variability.

The M5 Ib-II star HD 58521 (= Y Lyn = BD+46 1271) according to Percy et al. (2001) has periods of 100 days and 1400 days in the light curve. From 14 sets of observations we

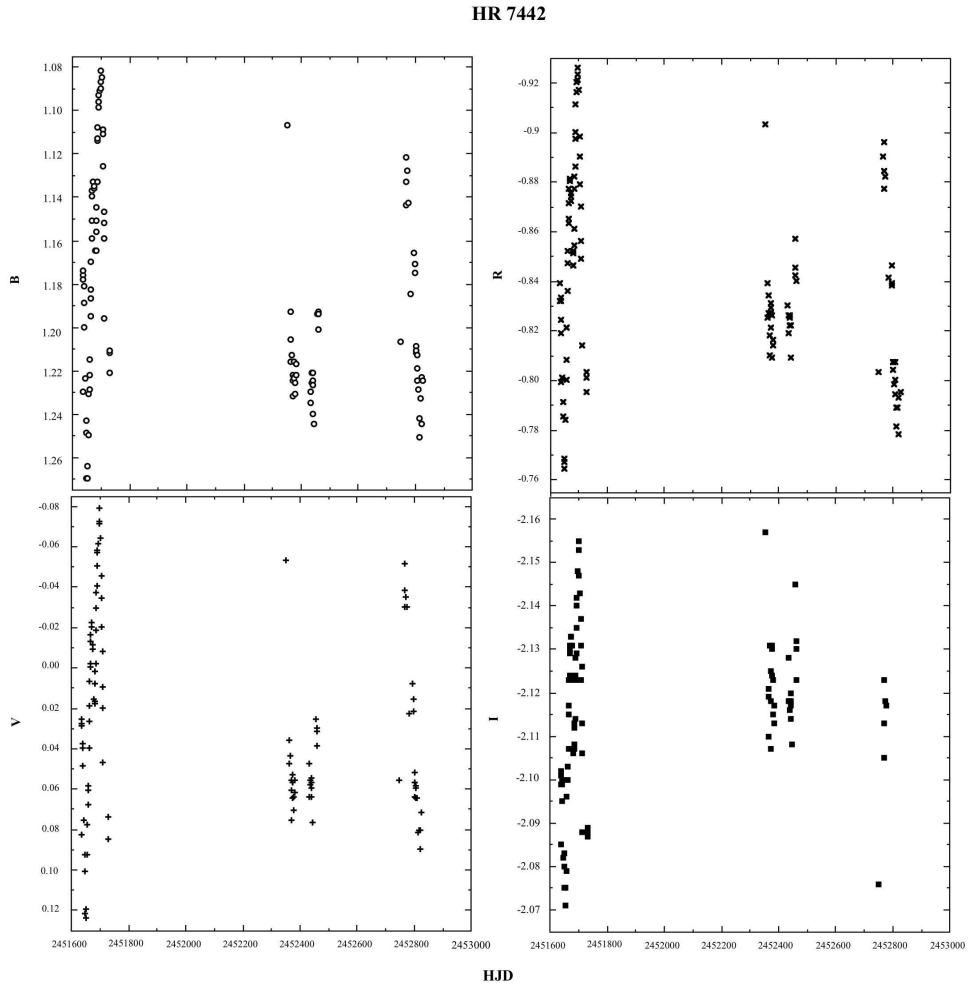

Figure 7: Johnson *BV* and Cousins *RI* single-channel photometry for HR 7442 from the FCAPT.

agree that this star is a large amplitude variable. It is an intrinsic S star with Tc lines (Brown et al. 1990)

4 Final Comments

Cool giant stars are particularly difficult to study photometrically due to the long periods of their binary and pulsational periods of at least several weeks and often in the range of several years. To obtain both types of periods, observations need to be made every few nights during the observing seasons as we have done. Our success or lack thereof indicates

that more observations are desirable over more observing seasons. Working with a second observatory whose weather is not the same as Fairborn Observatory might help with the final coverage. To check short periods, multiple observations need to be made some nights. The study of these stars would also benefit from more detailed flux measurements.

Acknowledgements

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Table 2: *BVRI* Photometry of HR 1105.

HJD	B(v−c)	B(v−ch)	V(v−c)	V(ch−c)	R(v−c)	R(v−ch)	I(v−c)	I(ch−c)
2450771.7323	1.178	1.807	0.287	1.483	−0.305	1.246	−1.192	0.965
2450780.7953	1.216	1.811	0.329	1.490	−0.272	1.253	−1.179	0.971
2450781.7354	1.215	1.819	0.333	1.492	−0.265	1.250	−1.177	0.974
2450782.7035	1.213	1.816	0.335	1.489	−0.265	1.250	−1.179	0.969
2450786.7334	1.210	1.810	0.334	1.485	−0.266	1.246	−1.177	0.974
2450787.7001	1.213	1.818	0.333	1.493	−0.264	1.254	−1.180	0.978
2450792.7123	1.193	1.825	0.312	1.502	−0.287	1.264	−1.184	0.984
2450793.6975	1.191	1.824	0.312	1.490	−0.284	1.256	−1.180	0.981
2450794.6797	1.202	1.821	0.321	1.494	−0.275	1.254	−1.179	0.981
2450797.6722	1.216	1.816	0.333	1.490	−0.260	1.246	−1.170	0.969
2450798.7847	1.224	1.819	0.344	1.494	−0.257	1.255	−1.172	0.977
2450799.6942	1.227	1.825	0.345	1.499	−0.255	1.257	−1.172	0.979
2450800.6736	1.232	1.836	0.347	1.504	−0.257	1.260	−1.168	0.978
2450808.7026	1.233	1.807	0.350	1.485	−0.254	1.251	−1.167	0.976
2450809.7803	1.234	1.813	0.355	1.486	−0.247	1.249	−1.167	0.973
2450814.6576	1.212	1.817	0.322	1.488	−0.270	1.255	−1.182	0.973
2450815.6694	1.206	1.825	0.316	1.497	−0.284	1.255	−1.184	0.973
2450816.6604	1.198	1.799	0.308	1.479	−0.286	1.245	−1.190	0.968
2450821.7429	1.161	1.805	0.274	1.479	−0.312	1.242	−1.198	0.963
2450822.7433	1.148	1.809	0.268	1.489	−0.319	1.249	−1.204	0.971
2450825.7444	1.139	1.805	0.248	1.481	−0.335	1.241	−1.212	0.965
2450826.6649	1.136	1.826	0.244	1.500	−0.333	1.258	−1.212	0.976
2450827.6882	1.126	1.822	0.239	1.490	−0.342	1.259	−1.218	0.982
2450837.6964	1.227	1.815	0.343	1.489	−0.263	1.251	−1.176	0.969
2450838.6984	1.236	1.806	0.349	1.482	−0.261	1.253	−1.173	0.968
2450839.6964	1.223	1.804	0.346	1.472	−0.255	1.237	−1.173	0.961
2450844.6925	1.207	1.779	0.321	1.461	−0.280	1.226	−1.184	0.951
2450847.6734	1.194	1.807	0.301	1.482	−0.300	1.253	−1.195	0.970
season 8								
average	1.200	1.814	0.316	1.488	−0.280	1.251	−1.184	0.972
std. dev.	0.031	0.011	0.034	0.009	0.027	0.008	0.014	0.007
2451088.9324	1.291	1.818	0.415	1.492	−0.205	1.256	−1.149	0.981
2451089.9304	1.297	1.813	0.415	1.493	−0.202	1.248	−1.149	0.979
2451090.8255	1.276	1.833	0.446	1.496	−0.206	1.254	−1.182	0.989
2451125.7870	1.144	1.801	0.258	1.486	−0.317	1.246	−1.200	0.975
2451128.7525	1.158	1.788	0.279	1.467	−0.306	1.232	−1.192	0.960
2451131.7930	1.192	1.814	0.317	1.493	−0.276	1.256	−1.186	0.977
2451132.7897	1.212	1.811	0.340	1.482	−0.267	1.251	−1.174	0.975
2451133.7871	1.222	1.816	0.355	1.494	−0.254	1.254	−1.171	0.977
2451134.8557	1.241	1.826	0.364	1.505	−0.240	1.259	−1.161	0.986
2451139.8147	1.254	1.829	0.380	1.495	−0.232	1.262	−1.157	0.978
2451140.8052	1.243	1.820	0.366	1.490	−0.237	1.250	−1.163	0.976
2451142.7203	1.218	1.813	0.337	1.480	−0.269	1.245	−1.175	0.966
2451144.7217	1.171	1.809	0.294	1.484	−0.296	1.245	−1.187	0.969
2451148.7280	1.106	1.806	0.235	1.480	−0.343	1.250	−1.209	0.974
2451156.7425	1.195	1.820	0.317	1.493	−0.270	1.257	−1.180	0.981

Table 2: *BVRI* Photometry of HR 1105 – continued.

HJD	B(v−c)	B(v−ch)	V(v−c)	V(ch−c)	R(v−c)	R(v−ch)	I(v−c)	I(ch−c)
2451159.7185	1.210	1.808	0.340	1.484	−0.258	1.250	−1.178	0.972
2451160.6950	1.208	1.822	0.333	1.495	−0.267	1.254	−1.181	0.977
2451161.6984	1.198	1.793	0.327	1.471	−0.273	1.244	−1.185	0.970
2451169.7012	1.132	1.823	0.253	1.491	−0.331	1.257	−1.208	0.980
2451176.7003	1.168	1.822	0.290	1.493	−0.296	1.259	−1.186	0.997
2451177.7003	1.176	1.818	0.302	1.491	−0.289	1.252	−1.197	0.982
2451179.6782	1.186	1.823	0.317	1.496	−0.279	1.259	−1.185	0.977
2451180.7091	1.195	1.826	0.321	1.505	−0.272	1.265	−1.185	0.990
2451181.6963	1.201	1.814	0.325	1.493	−0.272	1.255	−1.167	0.993
2451183.6935	1.200	1.824	0.325	1.500	−0.272	1.262	−1.185	0.984
2451185.6964	1.192	1.802	0.313	1.476	−0.288	1.248	−1.193	0.970
2451186.7290	1.178	1.805	0.305	1.483	−0.291	1.240	−1.192	0.967
2451187.7284	1.171	1.814	0.295	1.482	−0.298	1.257	−1.196	0.973
2451188.6869	1.165	1.833	0.284	1.501	−0.306	1.262	−1.198	0.986
2451198.6957	1.119	1.808	0.233	1.484	−0.347	1.251	−1.226	0.973
2451201.6851	1.144	1.828	0.259	1.499	−0.326	1.263	−1.213	0.987
2451206.6744	1.190	1.794	0.318	1.475	−0.278	1.238	−1.191	0.966
2451211.6594	1.176	1.812	0.291	1.492	−0.298	1.253	−1.229	1.007
2451213.6535	1.172	1.848	0.286	1.514	−0.306	1.280	−1.209	0.998
2451240.6083	1.252	1.791	0.380	1.468	−0.237	1.234	−1.167	0.960
season 9								
average	1.202	1.815	−0.320	1.489	−0.277	1.253	−1.186	0.979
std. dev.	0.064	0.013	0.049	0.011	0.036	0.009	0.019	0.011
2451452.0165	1.214	1.795	0.400	1.492	−0.239	1.261	−1.167	0.993
2451468.9544	1.171	1.826	0.286	1.496	−0.310	1.252	−1.207	0.987
2451473.9433	1.234	1.826	0.323	1.496	−0.285	1.257	−1.198	0.979
2451480.9497	1.256	1.830	0.298	1.506	−0.311	1.265	−1.219	0.992
2451483.9454	1.169	1.816	0.268	1.489	−0.326	1.248	−1.219	0.980
2451486.9235	1.154	1.816	0.258	1.489	−0.333	1.258	−1.208	0.981
2451487.9330	1.151	1.803	0.257	1.481	−0.332	1.241	−1.215	0.971
2451494.8497	1.210	1.832	0.317	1.511	−0.282	1.269	−1.194	0.998
2451501.8684	1.207	1.833	0.286	1.507	−0.316	1.271	−1.216	0.991
2451511.8708	1.209	1.813	0.301	1.480	−0.300	1.244	−1.204	0.961
season 10								
average	1.198	1.819	0.299	1.495	−0.303	1.257	−1.205	0.983
std. dev.	0.035	0.013	0.042	0.011	0.029	0.010	0.016	0.011
2451809.9585	1.206	1.799	0.336	1.480	−0.273	1.245	−1.186	0.966
2451810.9835	1.215	1.810	0.337	1.484	−0.266	1.247	−1.187	0.976
2451811.9684	1.231	1.819	0.335	1.495	−0.268	1.261	−1.194	0.989
2451815.9704	1.230	1.805	0.349	1.484	−0.256	1.250	−1.182	0.973
2451816.9803	1.238	1.813	0.348	1.491	−0.258	1.250	−1.187	0.981
2451817.9564	1.236	1.811	0.358	1.491	−0.254	1.252	−1.183	0.981
2451818.9292	1.236	1.830	0.357	1.499	−0.257	1.261	−1.180	0.986
2451819.9702	1.229	1.800	0.350	1.475	−0.262	1.243	−1.183	0.966
2451821.9633	1.203	1.800	0.319	1.481	−0.280	1.240	−1.197	0.972
2451823.9793	1.169	1.821	0.276	1.500	−0.315	1.256	−1.213	0.986
2451830.9190	1.131	1.800	0.256	1.476	−0.333	1.238	−1.217	0.973
2451842.8761	1.205	1.800	0.310	1.486	−0.284	1.249	−1.196	0.977
2451873.8570	1.155	1.805	0.274	1.479	−0.314	1.247	−1.200	0.976
2451877.8430	1.198	1.807	0.315	1.483	−0.277	1.245	−1.186	0.975
2451884.8343	1.203	1.824	0.323	1.496	−0.270	1.260	−1.180	0.983
2451895.7880	1.190	1.830	0.308	1.499	−0.283	1.260	−1.183	0.984
2451898.7724	1.196	1.798	0.308	1.477	−0.292	1.242	−1.195	0.987
2451928.6986	1.175	1.794	0.305	1.474	−0.280	1.243	−1.176	0.970
season 11								
average	1.203	1.809	0.320	1.486	−0.279	1.249	−1.190	0.978
std. dev.	0.030	0.011	0.030	0.009	0.022	0.007	0.011	0.007

Table 3: *BVRI* Photometry of HD 35155.

HJD	B(v−c)	B(v−ch)	V(v−c)	V(ch−c)	R(v−c)	R(v−ch)	I(v−c)	I(ch−c)
2450719.9216	1.137	0.379	−0.070	1.361	−0.833	1.857	−1.820	2.316
2450722.9212	1.153	0.380	−0.044	1.354	−0.811	1.849	−1.815	2.314
2450724.9155	1.178	0.373	−0.035	1.360	−0.806	1.857	−1.809	2.319
2450730.8899	1.145	0.370	−0.065	1.360	−0.825	1.854	−1.815	2.313
2450731.8879	1.146	0.372	−0.072	1.352	−0.833	1.846	−1.820	2.310
2450732.8884	1.137	0.381	−0.076	1.368	−0.838	1.859	−1.821	2.317
2450733.8869	1.131	0.380	−0.074	1.358	−0.840	1.854	−1.818	2.312
2450734.8877	1.136	0.366	−0.083	1.353	−0.844	1.851	−1.827	2.315
2450739.0247	1.161	0.383	−0.090	1.370	−0.850	1.864	−1.841	2.328
2450739.8744	1.132	0.377	−0.084	1.369	−0.847	1.860	−1.830	2.318
2450740.8787	1.136	0.372	−0.081	1.362	−0.836	1.853	−1.829	2.313
2450741.8634	1.136	0.380	−0.067	1.368	−0.823	1.855	−1.828	2.320
2450742.8601	1.136	0.379	−0.054	1.357	−0.824	1.859	−1.823	2.315
2450745.8612	1.168	0.366	−0.045	1.357	−0.804	1.851	−1.816	2.315
2450747.8587	1.174	0.367	−0.038	1.360	−0.799	1.855	−1.803	2.312
2450748.8453	1.160	0.378	−0.044	1.363	−0.801	1.854	−1.812	2.318
2450749.8422	1.152	0.372	−0.048	1.369	−0.809	1.860	−1.814	2.318
2450750.8398	1.146	0.379	−0.053	1.366	−0.816	1.867	−1.823	2.317
2450751.8345	1.131	0.377	−0.062	1.362	−0.827	1.857	−1.823	2.317
2450754.8297	1.095	0.375	−0.102	1.352	−0.861	1.846	−1.840	2.315
2450755.8265	1.094	0.368	−0.119	1.358	−0.866	1.844	−1.842	2.318
2450757.8244	1.062	0.371	−0.145	1.353	−0.892	1.848	−1.848	2.314
2450759.8208	1.047	0.358	−0.174	1.350	−0.914	1.849	−1.859	2.319
2450760.8174	1.035	0.370	−0.181	1.354	−0.912	1.847	−1.854	2.311
2450761.8137	1.030	0.363	−0.182	1.352	−0.916	1.841	−1.860	2.315
2450762.8117	1.039	0.365	−0.174	1.353	−0.910	1.849	−1.858	2.315
2450768.7917	1.066	0.360	−0.124	1.348	−0.869	1.841	−1.835	2.308
2450770.7862	1.096	0.362	−0.097	1.343	−0.853	1.849	−1.829	2.317
2450771.7889	1.101	0.363	−0.090	1.349	−0.842	1.843	−1.828	2.313
2450773.7833	1.123	0.371	−0.079	1.363	−0.829	1.849	−1.821	2.311
2450776.7693	1.110	0.362	−0.075	1.358	−0.831	1.852	−1.826	2.316
2450780.8189	1.121	0.361	−0.079	1.359	−0.829	1.845	−1.826	2.313
2450781.7557	1.127	0.379	−0.070	1.358	−0.834	1.854	−1.824	2.316
2450782.7503	1.129	0.384	−0.077	1.360	−0.834	1.851	−1.821	2.319
2450783.8411	1.116	0.366	−0.084	1.363	−0.839	1.845	−1.835	2.300
2450786.7436	1.087	0.372	−0.102	1.349	−0.858	1.844	−1.830	2.306
2450787.7364	1.085	0.379	−0.113	1.358	−0.860	1.847	−1.833	2.313
2450794.7179	1.065	0.367	−0.158	1.360	−0.889	1.846	−1.831	2.304
2450798.8154	1.055	0.362	−0.151	1.354	−0.890	1.848	−1.848	2.312
2450799.7116	1.059	0.376	−0.142	1.364	−0.889	1.854	−1.845	2.314
2450800.7012	1.034	0.358	−0.155	1.354	−0.903	1.851	−1.855	2.313
2450803.8749	1.047	0.372	−0.156	1.355	−0.893	1.844	−1.858	2.310
2450806.7145	1.043	0.356	−0.163	1.344	−0.899	1.837	−1.860	2.307
2450808.7205	1.031	0.369	−0.180	1.360	−0.919	1.850	−1.864	2.307
2450809.8045	1.028	0.372	−0.184	1.360	−0.916	1.847	−1.866	2.316
2450814.6754	1.033	0.373	−0.186	1.357	−0.920	1.852	−1.875	2.317
2450815.6875	1.029	0.368	−0.185	1.353	−0.926	1.851	−1.875	2.314
2450816.6793	1.031	0.373	−0.177	1.350	−0.916	1.848	−1.870	2.315
2450821.7605	1.044	0.362	−0.154	1.355	−0.894	1.845	−1.856	2.313
2450822.7612	1.058	0.360	−0.151	1.356	−0.885	1.847	−1.855	2.317
2450825.7834	1.075	0.358	−0.126	1.350	−0.869	1.841	−1.841	2.309
2450826.6987	1.089	0.357	−0.124	1.351	−0.868	1.842	−1.844	2.312
2450827.7187	1.063	0.358	−0.128	1.349	−0.877	1.839	−1.843	2.308
2450837.7224	1.044	0.364	−0.172	1.362	−0.907	1.851	−1.860	2.315
2450838.7236	1.053	0.368	−0.154	1.367	−0.902	1.859	−1.860	2.324
2450839.7223	1.065	0.364	−0.149	1.360	−0.885	1.843	−1.856	2.316
2450840.7135	1.076	0.362	−0.137	1.365	−0.887	1.851	−1.854	2.314
2450841.7601	1.064	0.352	−0.130	1.349	−0.875	1.846	−1.849	2.321
2450844.7104	1.098	0.359	−0.105	1.353	−0.852	1.848	−1.836	2.313
2450847.6904	1.092	0.357	−0.119	1.349	−0.864	1.843	−1.846	2.313
2450855.7203	1.041	0.365	−0.162	1.353	−0.904	1.845	−1.856	2.306
2450856.7189	1.048	0.356	−0.158	1.350	−0.900	1.840	−1.855	2.306
2450857.6982	1.057	0.367	−0.150	1.362	−0.901	1.855	−1.857	2.321
2450861.7095	1.074	0.376	−0.123	1.353	−0.873	1.845	−1.843	2.311
2450868.6889	1.019	0.382	−0.193	1.368	−0.924	1.852	−1.879	2.320

Table 3: *BVRI* Photometry of HD 35155 – continued.

HJD	B(v−c)	B(v−ch)	V(v−c)	V(ch−c)	R(v−c)	R(v−ch)	I(v−c)	I(ch−c)
2450872.6722	1.019	0.365	−0.207	1.360	−0.937	1.848	−1.876	2.315
2450873.6723	1.017	0.377	−0.199	1.356	−0.934	1.846	−1.879	2.314
2450881.6547	1.076	0.359	−0.141	1.354	−0.888	1.848	−1.859	2.316
2450882.6643	1.077	0.370	−0.133	1.358	−0.882	1.846	−1.852	2.316
2450883.6479	1.075	0.377	−0.139	1.364	−0.886	1.857	−1.864	2.323
2450885.6493	1.095	0.370	−0.118	1.347	−0.871	1.849	−1.845	2.310
2450889.6325	1.111	0.369	−0.098	1.352	−0.851	1.845	−1.842	2.317
2450893.6333	1.080	0.373	−0.135	1.361	−0.882	1.851	−1.850	2.311
2450896.6103	1.057	0.368	−0.172	1.353	−0.907	1.845	−1.866	2.317
2450898.6112	1.039	0.374	−0.189	1.361	−0.940	1.861	−1.870	2.314
2450900.6124	1.039	0.376	−0.190	1.358	−0.929	1.847	−1.877	2.316
season 8								
average	1.086	0.369	−0.122	1.357	−0.870	1.850	−1.843	2.314
std. dev.	0.045	0.008	0.047	0.006	0.019	0.006	0.010	0.005
2451077.9382	1.192	0.378	−0.009	1.357	−0.791	1.853	−1.798	2.315
2451079.9393	1.190	0.380	−0.016	1.357	−0.789	1.857	−1.798	2.318
2451081.9334	1.162	0.378	−0.048	1.361	−0.807	1.848	−1.800	2.315
2451082.9303	1.148	0.379	−0.063	1.363	−0.825	1.860	−1.807	2.310
2451083.9403	1.132	0.382	−0.086	1.366	−0.841	1.861	−1.820	2.320
2451084.9203	1.092	0.386	−0.109	1.358	−0.869	1.852	−1.834	2.316
2451086.9194	1.072	0.385	−0.144	1.358	−0.896	1.862	−1.840	2.314
2451087.9197	1.057	0.377	−0.162	1.359	−0.907	1.849	−1.849	2.319
2451091.9034	1.036	0.364	−0.187	1.345	−0.929	1.853	−1.860	2.306
2451092.9054	1.024	0.376	−0.194	1.352	−0.936	1.853	−1.862	2.312
2451093.9063	1.029	0.373	−0.204	1.362	−0.929	1.848	−1.869	2.314
2451094.9029	1.026	0.368	−0.206	1.364	−0.933	1.857	−1.868	2.319
2451110.8575	1.171	0.374	−0.035	1.357	−0.793	1.842	−1.809	2.313
2451114.9163	1.206	0.366	−0.003	1.356	−0.773	1.848	−1.797	2.315
2451115.8501	1.203	0.377	−0.011	1.367	−0.778	1.858	−1.797	2.321
2451117.8373	1.160	0.371	−0.039	1.354	−0.805	1.848	−1.814	2.316
2451118.8408	1.159	0.374	−0.058	1.358	−0.816	1.849	−1.811	2.315
2451119.8329	1.131	0.368	−0.078	1.355	−0.838	1.847	−1.818	2.304
2451120.8337	1.115	0.366	−0.104	1.353	−0.852	1.847	−1.836	2.316
2451121.8373	1.094	0.371	−0.122	1.360	−0.876	1.850	−1.846	2.323
2451122.9464	1.074	0.366	−0.146	1.356	−0.884	1.846	−1.848	2.314
2451123.9724	1.061	0.366	−0.152	1.353	−0.892	1.843	−1.849	2.310
2451124.9024	1.069	0.364	−0.154	1.359	−0.894	1.852	−1.857	2.317
2451125.9633	1.059	0.371	−0.161	1.355	−0.900	1.847	−1.861	2.316
2451126.9529	1.058	0.369	−0.165	1.353	−0.891	1.840	−1.860	2.316
2451132.9802	1.082	0.389	−0.124	1.368	−0.873	1.857	−1.856	2.322
2451134.9701	1.095	0.385	−0.111	1.370	−0.865	1.857	−1.858	2.323
2451136.9629	1.098	0.374	−0.116	1.362	−0.869	1.856	−1.851	2.315
2451138.9597	1.070	0.381	−0.140	1.361	−0.886	1.856	−1.861	2.321
2451139.9570	1.067	0.368	−0.152	1.357	−0.896	1.848	−1.864	2.316
2451140.9533	1.063	0.369	−0.162	1.362	−0.906	1.849	−1.867	2.316
2451142.9523	1.041	0.371	−0.176	1.358	−0.915	1.849	−1.872	2.313
2451148.9301	1.041	0.376	−0.173	1.361	−0.915	1.849	−1.878	2.322
2451152.8927	1.093	0.361	−0.127	1.353	−0.862	1.836	−1.853	2.311
2451156.8800	1.133	0.369	−0.093	1.362	−0.853	1.857	−1.836	2.313
2451159.8203	1.114	0.356	−0.108	1.346	−0.861	1.841	−1.836	2.309
2451160.7970	1.109	0.360	−0.124	1.355	−0.865	1.843	−1.839	2.309
2451161.7990	1.085	0.361	−0.142	1.350	−0.883	1.843	−1.852	2.314
2451163.8767	1.034	0.370	−0.188	1.366	−0.918	1.843	−1.875	2.312
2451167.8674	0.985	0.374	−0.248	1.368	−0.968	1.848	−1.893	2.322
2451169.8604	0.967	0.359	−0.254	1.348	−0.973	1.842	−1.895	2.307
2451170.7723	0.982	0.356	−0.244	1.357	−0.967	1.847	−1.893	2.315
2451173.8104	1.014	0.361	−0.206	1.355	−0.936	1.845	−1.882	2.313
2451176.8484	1.055	0.372	−0.153	1.356	−0.892	1.844	−1.872	2.314
2451180.8427	1.134	0.367	−0.073	1.349	−0.829	1.838	−1.830	2.305
2451181.8301	1.145	0.366	−0.065	1.353	−0.821	1.842	−1.829	2.308
2451182.8302	1.143	0.366	−0.066	1.361	−0.825	1.849	−1.831	2.313
2451183.8354	1.140	0.372	−0.070	1.362	−0.834	1.857	−1.837	2.320
2451185.8273	1.140	0.393	−0.096	1.380	−0.848	1.865	−1.831	2.323
2451191.8136	1.058	0.369	−0.166	1.358	−0.900	1.839	−1.869	2.314
2451196.7985	1.017	0.377	−0.202	1.355	−0.934	1.852	−1.876	2.310
2451213.7543	1.116	0.374	−0.103	1.359	−0.854	1.851	−1.849	2.309

Table 3: *BVRI* Photometry of HD 35155 – continued.

HJD	B(v−c)	B(v−ch)	V(v−c)	V(ch−c)	R(v−c)	R(v−ch)	I(v−c)	I(ch−c)
2451250.6494	1.037	0.378	−0.159	1.357	−0.917	1.856	−1.863	2.313
2451253.6403	1.088	0.373	−0.119	1.356	−0.864	1.849	−1.848	2.315
2451256.6330	1.134	0.382	−0.062	1.365	−0.820	1.857	−1.819	2.317
2451260.6237	1.153	0.383	−0.044	1.363	−0.801	1.851	−1.810	2.315
2451261.6243	1.153	0.381	−0.039	1.366	−0.803	1.858	−1.805	2.321
season 9								
average	1.093	0.372	−0.122	1.359	−0.870	1.850	−1.845	2.315
std. dev.	0.057	0.008	0.063	0.006	0.050	0.007	0.027	0.005
2451434.9635	1.117	0.378	−0.086	1.350	−0.846	1.850	−1.836	2.312
2451435.9854	1.130	0.366	−0.076	1.351	−0.846	1.854	−1.840	2.317
2451466.8824	1.033	0.387	−0.187	1.373	−0.931	1.858	−1.872	2.320
2451467.9653	1.036	0.367	−0.199	1.362	−0.931	1.855	−1.880	2.319
2451468.8744	1.021	0.384	0.190	1.358	−0.933	1.851	−1.883	2.318
2451470.8743	1.036	0.372	−0.185	1.357	−0.928	1.852	−1.876	2.312
2451472.8648	1.054	0.377	−0.175	1.358	−0.921	1.857	−1.867	2.318
2451473.8655	1.066	0.379	−0.163	1.366	−0.911	1.856	−1.866	2.320
2451475.8576	1.096	0.368	−0.131	1.357	−0.887	1.858	−1.860	2.319
2451478.8439	1.122	0.374	−0.088	1.363	−0.845	1.849	−1.850	2.317
2451479.8544	1.142	0.368	−0.066	1.351	−0.837	1.848	−1.837	2.313
2451480.8602	1.160	0.360	−0.060	1.352	−0.820	1.838	−1.831	2.312
2451481.8524	1.168	0.352	−0.046	1.351	−0.811	1.841	−1.824	2.311
2451483.8584	1.166	0.362	−0.052	1.361	−0.818	1.854	−1.823	2.317
2451484.9829	1.161	0.362	−0.059	1.356	−0.820	1.848	−1.828	2.316
2451486.8443	1.152	0.380	−0.064	1.363	−0.826	1.858	−1.821	2.313
2451487.8493	1.140	0.377	−0.076	1.354	−0.836	1.857	−1.831	2.319
2451491.9256	1.069	0.362	−0.159	1.360	−0.900	1.856	−1.859	2.312
2451490.8201	1.076	0.371	−0.141	1.353	−0.887	1.846	−1.857	2.313
2451492.8354	1.051	0.368	−0.174	1.358	−0.916	1.844	−1.867	2.314
2451496.9803	1.013	0.369	−0.218	1.348	−0.941	1.847	−1.891	2.315
2451498.9763	1.027	0.380	−0.198	1.360	−0.930	1.851	−1.885	2.321
2451499.8944	1.034	0.367	−0.192	1.364	−0.923	1.852	−1.876	2.316
2451495.8704	1.007	0.378	−0.210	1.358	−0.943	1.850	−1.887	2.324
2451501.7899	1.055	0.381	−0.165	1.361	−0.906	1.850	−1.869	2.317
2451509.7858	1.154	0.361	−0.070	1.348	−0.831	1.841	−1.825	2.314
2451511.7682	1.162	0.357	−0.058	1.349	−0.821	1.849	−1.817	2.311
2451512.7588	1.160	0.366	−0.048	1.355	−0.814	1.849	−1.816	2.314
2451535.8754	1.094	0.367	−0.101	1.337	−0.887	1.851	−1.831	2.319
2451538.8666	1.094	0.377	−0.117	1.360	−0.857	1.850	−1.836	2.318
2451539.8648	1.103	0.374	−0.118	1.367	−0.866	1.855	−1.853	2.331
2451545.8233	1.098	0.365	−0.125	1.354	−0.872	1.846	−1.837	2.311
2451546.7693	1.096	0.352	−0.130	1.345	−0.870	1.841	−1.838	2.304
2451547.7605	1.094	0.363	−0.132	1.358	−0.872	1.850	−1.838	2.312
2451548.7704	1.096	0.366	−0.131	1.359	−0.879	1.855	−1.840	2.314
2451549.7617	1.104	0.358	−0.128	1.356	−0.868	1.846	−1.836	2.312
2451550.7347	1.109	0.361	−0.113	1.346	−0.861	1.851	−1.834	2.313
2451551.7564	1.121	0.364	−0.109	1.352	−0.859	1.850	−1.831	2.314
2451553.7468	1.142	0.363	−0.086	1.358	−0.839	1.851	−1.827	2.312
2451554.7474	1.163	0.358	−0.078	1.362	−0.824	1.848	−1.818	2.322
2451555.6775	1.169	0.362	−0.056	1.352	−0.815	1.847	−1.814	2.319
2451556.7344	1.177	0.360	−0.047	1.356	−0.808	1.852	−1.812	2.321
2451558.7005	1.204	0.366	−0.023	1.359	−0.783	1.849	−1.799	2.322
2451560.7260	1.207	0.362	−0.008	1.358	−0.770	1.852	−1.793	2.318
2451567.7637	1.199	0.355	−0.021	1.359	−0.781	1.846	−1.795	2.312
2451570.7653	1.173	0.370	−0.036	1.354	−0.794	1.847	−1.793	2.311
2451571.7712	1.179	0.370	−0.052	1.366	−0.813	1.859	−1.811	2.320

Table 3: *BVRI* Photometry of HD 35155 – continued.

HJD	B(v−c)	B(v−ch)	V(v−c)	V(ch−c)	R(v−c)	R(v−ch)	I(v−c)	I(ch−c)
2451581.7313	1.127	0.359	−0.100	1.357	−0.850	1.847	−1.823	2.316
2451582.7339	1.122	0.363	−0.097	1.343	−0.850	1.830	−1.824	2.291
2451607.6765	1.173	0.365	−0.044	1.350	−0.802	1.848	−1.803	2.312
2451613.6505	1.165	0.362	−0.062	1.354	−0.805	1.839	−1.811	2.315
2451615.6479	1.154	0.374	−0.062	1.366	−0.816	1.853	−1.814	2.323
2451619.6397	1.183	0.351	−0.042	1.345	−0.799	1.835	−1.802	2.307
2451621.6303	1.198	0.371	−0.005	1.356	−0.769	1.846	−1.791	2.315
2451627.6195	1.219	0.371	0.006	1.358	−0.761	1.848	−1.785	2.313
2451628.6180	1.217	0.370	0.002	1.356	−0.765	1.850	−1.788	2.318
2451629.6135	1.223	0.369	0.002	1.364	−0.763	1.856	−1.796	2.308
season 10								
average	1.123	0.367	−0.097	−1.356	−0.850	1.849	−1.834	2.315
std. dev.	0.059	0.008	0.061	0.007	0.052	0.006	0.028	0.006
2451807.9980	1.108	0.375	−0.104	1.356	−0.857	1.850	−1.847	2.323
2451822.9485	1.088	0.362	−0.126	1.351	−0.870	1.843	−1.852	2.317
2451824.9960	1.052	0.368	−0.168	1.359	−0.909	1.861	−1.872	2.326
2451833.9753	1.005	0.355	−0.208	1.353	−0.935	1.846	−1.878	2.311
2451834.9547	1.017	0.346	−0.196	1.343	−0.926	1.844	−1.876	2.312
2451850.9837	1.113	0.364	−0.088	1.351	−0.839	1.847	−1.830	2.316
2451861.9700	1.050	0.371	−0.149	1.357	−0.882	1.843	−1.852	2.318
2451866.9343	1.050	0.361	−0.157	1.350	−0.890	1.844	−1.847	2.309
2451867.9457	1.053	0.370	−0.154	1.367	−0.889	1.854	−1.852	2.323
2451868.9534	1.058	0.367	−0.150	1.363	−0.885	1.851	−1.845	2.318
2451871.9535	1.089	0.373	−0.123	1.359	−0.861	1.843	−1.843	2.322
2451873.9424	1.105	0.365	−0.100	1.360	−0.847	1.846	−1.826	2.304
2451875.9344	1.128	0.373	−0.086	1.365	−0.836	1.855	−1.829	2.322
2451877.9343	1.132	0.372	−0.074	1.356	−0.827	1.850	−1.821	2.314
2451884.9124	1.132	0.374	−0.084	1.362	−0.825	1.853	−1.820	2.317
2451894.8883	1.116	0.362	−0.094	1.356	−0.838	1.846	−1.824	2.314
2451895.8850	1.113	0.374	−0.096	1.357	−0.847	1.855	−1.827	2.316
2451904.8627	1.062	0.372	−0.141	1.353	−0.881	1.853	−1.833	2.313
2451905.8584	1.055	0.367	−0.157	1.358	−0.896	1.848	−1.843	2.306
2451907.8504	1.046	0.375	−0.166	1.353	−0.899	1.844	−1.851	2.319
2451908.8483	1.048	0.365	−0.164	1.355	−0.898	1.845	−1.846	2.317
2451909.8488	1.059	0.380	−0.160	1.361	−0.898	1.853	−1.850	2.320
2451913.8344	1.063	0.373	−0.144	1.355	−0.878	1.840	−1.845	2.315
2451920.8180	1.156	0.371	−0.045	1.352	−0.796	1.844	−1.816	2.314
2451921.8124	1.172	0.373	−0.030	1.351	−0.793	1.851	−1.790	2.301
2451923.8054	1.198	0.374	0.001	1.353	−0.758	1.843	−1.792	2.312
2451928.7844	1.218	0.365	0.035	1.360	−0.730	1.850	−1.767	2.312
2451934.7849	1.156	0.384	−0.043	1.362	−0.802	1.860	−1.818	2.328
2451935.7754	1.154	0.375	−0.048	1.368	−0.799	1.854	−1.810	2.320
2451941.7568	1.091	0.385	−0.115	1.363	−0.858	1.851	−1.833	2.325
2451944.7517	1.083	0.385	−0.122	1.366	−0.872	1.859	−1.840	2.317
2451952.7303	1.066	0.370	−0.132	1.360	−0.872	1.855	−1.832	2.309
2451976.6604	1.149	0.369	−0.049	1.353	−0.820	1.851	−1.819	2.320
2451981.6444	1.105	0.385	−0.103	1.367	−0.856	1.852	−1.839	2.319
2451982.6406	1.073	0.371	−0.127	1.349	−0.891	1.850	−1.866	2.317
2451984.6383	1.072	0.372	−0.130	1.355	−0.888	1.851	−1.857	2.324
2451986.6284	1.053	0.373	−0.146	1.364	−0.887	1.855	−1.854	2.316
2451988.6200	1.026	0.348	−0.178	1.329	−0.926	1.824	−1.889	2.286
2451992.6090	1.084	0.367	−0.138	1.354	−0.879	1.847	−1.847	2.312
2451994.6074	1.104	0.362	−0.108	1.349	−0.865	1.844	−1.838	2.314
2451995.6080	1.135	0.370	−0.099	1.368	−0.856	1.860	−1.832	2.317
season 11								
average	1.094	0.370	−0.114	−1.357	−0.860	1.849	−1.838	2.315
std. dev.	0.048	0.008	0.061	0.007	0.044	0.007	0.024	0.007

Table 4: *BVRI* Photometry of HD 4088.

HJD	B(v−c)	B(v−ch)	V(v−c)	V(ch−c)	R(v−c)	R(v−ch)	I(v−c)	I(ch−c)
2450838.8774	1.227	- 1.494	0.513	−1.561	0.067	−1.579	−0.512	−1.601
2450839.8732	1.230	−1.498	0.520	−1.559	0.077	−1.578	−0.512	−1.600
2450841.8743	1.255	−1.483	0.547	−1.563	0.096	−1.577	−0.498	−1.591
2450843.9094	1.284	−1.495	0.556	−1.558	0.114	−1.581	−0.494	−1.599
2450844.8364	1.284	−1.492	0.563	−1.556	0.115	−1.576	−0.489	−1.597
2450847.8503	1.264	−1.476	0.547	−1.566	0.105	−1.581	−0.495	−1.598
2450850.8464	1.251	−1.484	0.541	−1.553	0.095	−1.577	−0.500	−1.596
2450861.8060	1.282	−1.492	0.568	−1.557	0.117	−1.584	−0.489	−1.602
2450867.8044	1.254	−1.495	0.533	−1.567	0.085	−1.582	−0.509	−1.592
2450872.7749	1.245	−1.484	0.532	−1.558	0.090	−1.581	−0.502	−1.601
2450873.7853	1.239	−1.485	0.526	−1.559	0.084	−1.575	−0.503	−1.601
2450876.7812	1.252	−1.476	0.539	−1.551	0.097	−1.579	−0.500	−1.597
2450877.8076	1.270	−1.476	0.560	−1.550	0.106	−1.570	−0.494	−1.597
2450893.7285	1.292	−1.472	0.577	−1.549	0.131	−1.571	−0.481	−1.591
2450896.7556	1.280	−1.476	0.561	−1.554	0.112	−1.580	−0.492	−1.586
2450898.7494	1.243	−1.467	0.535	−1.549	0.089	−1.578	−0.495	−1.616
2450900.7404	1.226	−1.480	0.520	−1.552	0.074	−1.571	−0.511	−1.598
2450903.7439	1.233	−1.481	0.522	−1.553	0.079	−1.583	−0.506	−1.604
2450904.7333	1.245	−1.481	0.537	−1.561	0.099	−1.579	−0.505	−1.605
2450906.7174	1.255	−1.473	0.551	−1.556	0.103	−1.582	−0.491	−1.598
2450907.7104	1.263	−1.479	0.545	−1.554	0.100	−1.585	−0.501	−1.601
2450908.7204	1.259	−1.480	0.546	−1.552	0.099	−1.577	−0.497	−1.596
2450917.6974	1.230	−1.480	0.530	−1.554	0.091	−1.576	−0.506	−1.598
2450918.6904	1.250	−1.483	0.542	−1.557	0.100	−1.575	−0.496	−1.614
2450919.6903	1.269	−1.480	0.560	−1.559	0.114	−1.586	−0.490	−1.609
2450921.6764	1.284	−1.492	0.566	−1.564	0.114	−1.578	−0.487	−1.608
2450922.6768	1.283	−1.485	0.564	−1.562	0.114	−1.586	−0.489	−1.595
2450933.6502	1.248	−1.488	0.528	−1.561	0.084	−1.587	−0.506	−1.612
2450957.6699	1.268	−1.478	0.565	−1.564	0.107	−1.581	−0.497	−1.601
2450959.6764	1.269	−1.493	0.560	−1.557	0.107	−1.577	−0.489	−1.604
2450961.6645	1.264	−1.484	0.559	−1.553	0.100	−1.582	−0.497	−1.601
season 8								
average	1.258	−1.483	0.546	−1.557	0.099	−1.579	−0.498	−1.600
std. dev.	0.019	0.008	0.017	0.005	0.015	0.004	0.008	0.007
2451153.0457	1.229	−1.479	0.519	−1.555	0.077	−1.568	−0.510	−1.606
2451159.9823	1.259	−1.486	0.540	−1.568	0.099	−1.587	−0.508	−1.593
2451160.9787	1.244	−1.479	0.538	−1.560	0.094	−1.573	−0.499	−1.602
2451171.9808	1.233	−1.492	0.522	−1.564	0.081	−1.579	−0.507	−1.608
2451173.0424	1.249	−1.484	0.530	−1.568	0.096	−1.583	−0.506	−1.600
2451174.0567	1.255	−1.483	0.543	−1.565	0.104	−1.582	−0.500	−1.603
2451176.0542	1.270	−1.495	0.550	−1.565	0.107	−1.587	−0.494	−1.603
2451177.0484	1.274	−1.488	0.549	−1.568	0.100	−1.588	−0.496	−1.606
2451181.0349	1.253	−1.491	0.543	−1.573	0.094	−1.584	−0.501	−1.608
2451181.9880	1.263	−1.498	0.538	−1.571	0.094	−1.593	−0.503	−1.614
2451183.0142	1.263	−1.494	0.541	−1.574	0.098	−1.586	−0.494	−1.617
2451186.0043	1.256	−1.494	0.546	−1.574	0.099	−1.595	−0.494	−1.616
2451187.0124	1.259	−1.500	0.545	−1.576	0.098	−1.594	−0.500	−1.618
2451188.0059	1.263	−1.503	0.541	−1.570	0.094	−1.581	−0.498	−1.600
2451188.9997	1.261	−1.496	0.542	−1.563	0.101	−1.594	−0.502	−1.607
2451192.0076	1.242	−1.501	0.521	−1.577	0.077	−1.592	−0.508	−1.606
2451193.9762	1.227	−1.502	0.507	−1.571	0.070	−1.598	−0.518	−1.603
2451196.9704	1.233	−1.497	0.515	−1.573	0.077	−1.595	−0.512	−1.601
2451198.9765	1.236	−1.497	0.527	−1.575	0.090	−1.600	−0.509	−1.608
2451201.9778	1.248	−1.496	0.531	−1.568	0.089	−1.588	−0.508	−1.602
2451208.9633	1.210	−1.505	0.493	−1.577	0.060	−1.581	−0.519	−1.606
2451215.9258	1.228	−1.494	0.516	−1.551	0.071	−1.586	−0.501	−1.612

Table 4: *BVRI* Photometry of HD 4088 – continued.

HJD	B(v−c)	B(v−ch)	V(v−c)	V(ch−c)	R(v−c)	R(v−ch)	I(v−c)	I(ch−c)
2451216.9423	1.223	−1.487	0.518	−1.557	0.074	−1.579	−0.510	−1.592
2451218.9354	1.228	−1.485	0.514	−1.553	0.082	−1.583	−0.508	−1.605
2451219.9334	1.238	−1.492	0.527	−1.557	0.082	−1.582	−0.506	−1.613
2451221.9107	1.248	−1.470	0.542	−1.554	0.098	−1.569	−0.501	−1.594
2451229.9365	1.231	−1.492	0.523	−1.558	0.074	−1.574	−0.510	−1.599
2451230.9004	1.231	−1.497	0.508	−1.553	0.075	−1.577	−0.510	−1.607
2451232.8974	1.230	−1.487	0.522	−1.560	0.080	−1.582	−0.509	−1.595
2451235.8624	1.231	−1.497	0.516	−1.551	0.077	−1.585	−0.506	−1.605
2451236.8742	1.235	−1.487	0.521	−1.555	0.081	−1.588	−0.504	−1.619
2451237.8844	1.248	−1.482	0.525	−1.553	0.087	−1.575	−0.502	−1.604
2451240.8723	1.223	−1.477	0.527	−1.555	0.088	−1.586	−0.503	−1.611
2451249.8503	1.217	−1.484	0.510	−1.551	0.067	−1.580	−0.510	−1.597
2451250.8487	1.216	−1.480	0.520	−1.557	0.073	−1.571	−0.505	−1.600
2451256.8322	1.219	−1.491	0.516	−1.553	0.071	−1.590	−0.509	−1.609
2451257.8274	1.231	−1.489	0.518	−1.559	0.071	−1.591	−0.513	−1.602
2451261.8034	1.227	−1.475	0.523	−1.554	0.083	−1.582	−0.515	−1.600
2451262.8135	1.230	−1.481	0.529	−1.546	0.080	−1.569	−0.511	−1.606
2451264.8104	1.229	−1.492	0.528	−1.550	0.081	−1.575	−0.508	−1.601
2451265.8187	1.219	−1.467	0.515	−1.559	0.073	−1.577	−0.512	−1.609
2451274.7603	1.245	−1.490	0.543	−1.557	0.096	−1.579	−0.496	−1.596
2451288.7302	1.266	−1.485	0.560	−1.561	0.105	−1.574	−0.496	−1.591
2451295.7224	1.237	−1.491	0.526	−1.557	0.085	−1.582	−0.504	−1.594
2451298.7139	1.250	−1.505	0.544	−1.565	0.097	−1.588	−0.497	−1.603
2451312.6888	1.247	−1.486	0.541	−1.571	0.092	−1.591	−0.504	−1.601
2451317.6634	1.235	−1.499	0.527	−1.569	0.081	−1.581	−0.504	−1.608
2451318.6676	1.241	−1.481	0.534	−1.558	0.090	−1.577	−0.504	−1.616
2451319.6644	1.253	−1.484	0.544	−1.575	0.102	−1.589	−0.499	−1.611
2451322.6644	1.288	−1.488	0.580	−1.563	0.122	−1.584	−0.485	−1.611
2451324.6584	1.280	−1.498	0.559	−1.568	0.113	−1.593	−0.486	−1.610
2451325.6588	1.262	−1.497	0.556	−1.576	0.111	−1.604	−0.496	−1.613
season 9								
average	1.243	−1.490	0.531	−1.563	0.088	−1.584	−0.504	−1.605
std. dev.	0.018	0.009	0.016	0.009	0.013	0.008	0.007	0.007
2451528.9824	1.273	−1.495	0.555	−1.556	0.109	−1.579	−0.492	−1.606
2451545.9047	1.250	−1.483	0.529	−1.556	0.093	−1.579	−0.500	−1.608
2451549.9005	1.289	−1.492	0.565	−1.554	0.119	−1.571	−0.488	−1.602
2451555.8847	1.269	−1.491	0.549	−1.557	0.098	−1.581	−0.499	−1.599
2451556.8824	1.250	−1.491	0.536	−1.551	0.084	−1.588	−0.504	−1.609
2451559.8694	1.232	−1.487	0.502	−1.558	0.061	−1.579	−0.515	−1.596
2451567.8457	1.282	−1.479	0.557	−1.563	0.102	−1.57 0	−0.495	−1.607
2451570.8577	1.267	−1.484	0.544	−1.560	0.102	−1.574	−0.496	−1.601
2451571.8564	1.258	−1.480	0.537	−1.558	0.094	−1.578	−0.498	−1.597
2451577.8554	1.277	−1.490	0.550	−1.569	0.105	−1.577	−0.503	−1.598
2451578.8625	1.273	−1.491	0.553	−1.563	0.103	−1.581	−0.498	−1.599
2451579.8579	1.274	−1.488	0.547	−1.554	0.101	−1.583	−0.501	−1.610
2451581.8292	1.253	−1.487	0.531	−1.558	0.080	−1.585	−0.506	−1.597
2451584.8329	1.238	−1.490	0.510	−1.565	0.075	−1.584	−0.513	−1.615
2451588.8354	1.256	−1.504	0.532	−1.561	0.088	−1.589	−0.504	−1.612
2451590.8393	1.268	−1.485	0.541	−1.564	0.091	−1.579	−0.499	−1.611
2451592.8076	1.269	−1.505	0.542	−1.574	0.092	−1.590	−0.508	−1.611
2451595.8002	1.251	−1.490	0.536	−1.566	0.092	−1.587	−0.501	−1.607
2451601.7993	1.263	−1.494	0.546	−1.569	0.095	−1.579	−0.499	−1.606
2451602.7925	1.274	−1.490	0.556	−1.554	0.102	−1.581	−0.501	−1.611
2451605.7994	1.262	−1.493	0.551	−1.567	0.107	−1.597	−0.491	−1.616
2451606.7965	1.263	−1.497	0.550	−1.570	0.096	−1.578	−0.499	−1.616
2451607.7812	1.261	−1.499	0.534	−1.568	0.090	−1.584	−0.503	−1.605
2451612.7808	1.248	−1.507	0.547	−1.571	0.108	−1.593	−0.493	−1.614
2451613.7668	1.257	−1.484	0.542	−1.562	0.095	−1.587	−0.500	−1.601
2451614.7789	1.258	−1.494	0.544	−1.558	0.093	−1.574	−0.500	−1.604
2451615.7724	1.261	−1.486	0.537	−1.563	0.095	−1.581	−0.506	−1.600
2451617.7505	1.261	−1.487	0.553	−1.569	0.102	−1.593	−0.500	−1.611
2451619.7617	1.272	−1.497	0.553	−1.563	0.102	−1.573	−0.505	−1.600
2451620.7564	1.254	−1.485	0.536	−1.556	0.086	−1.582	−0.503	−1.593
2451623.7494	1.228	−1.491	0.519	−1.560	0.078	−1.587	−0.513	−1.608
2451625.8244	1.232	−1.485	0.518	−1.556	0.074	−1.587	−0.514	−1.593
2451626.7435	1.244	−1.482	0.523	−1.558	0.085	−1.577	−0.511	−1.595
2451627.7374	1.250	−1.487	0.536	−1.568	0.092	−1.582	−0.506	−1.603
2451628.7382	1.257	−1.487	0.537	−1.565	0.091	−1.579	−0.506	−1.598

Table 4: *BVRI* Photometry of HD 4088 – continued.

HJD	B(v−c)	B(v−ch)	V(v−c)	V(ch−c)	R(v−c)	R(v−ch)	I(v−c)	I(ch−c)
2451630.7302	1.259	−1.488	0.540	−1.567	0.088	−1.583	−0.503	−1.603
2451632.7285	1.262	−1.484	0.532	−1.562	0.095	−1.574	−0.505	−1.596
2451633.7244	1.259	−1.487	0.541	−1.556	0.091	−1.583	−0.499	−1.596
2451634.7289	1.255	−1.478	0.542	−1.564	0.093	−1.568	−0.495	−1.602
2451635.6954	1.253	−1.489	0.542	−1.555	0.104	−1.593	−0.493	−1.605
2451637.6960	1.265	−1.481	0.555	−1.556	0.110	−1.577	−0.496	−1.593
2451638.6969	1.268	−1.492	0.551	−1.561	0.104	−1.589	−0.497	−1.605
2451639.6983	1.261	−1.486	0.552	−1.568	0.098	−1.578	−0.500	−1.603
2451640.6956	1.260	−1.496	0.545	−1.563	0.095	−1.581	−0.497	−1.601
2451641.6893	1.261	−1.492	0.541	−1.560	0.092	−1.576	−0.504	−1.601
2451645.7028	1.236	−1.489	0.517	−1.558	0.076	−1.584	−0.517	−1.597
2451638.6665	1.230	−1.481	0.512	−1.558	0.069	−1.573	−0.518	−1.602
2451647.6752	1.228	−1.480	0.512	−1.560	0.067	−1.575	−0.515	−1.600
2451650.6588	1.250	−1.484	0.531	−1.556	0.085	−1.593	−0.510	−1.599
2451651.6596	1.252	−1.474	0.538	−1.548	0.119	−1.589	−0.485	−1.588
2451652.6594	1.267	−1.478	0.549	−1.557	0.106	−1.585	−0.497	−1.603
2451653.6603	1.278	−1.482	0.548	−1.551	0.110	−1.582	−0.493	−1.604
2451654.6603	1.277	−1.486	0.549	−1.551	0.101	−1.571	−0.502	−1.588
2451657.6622	1.263	−1.492	0.542	−1.570	0.093	−1.581	−0.499	−1.599
2451658.6574	1.258	−1.494	0.532	−1.558	0.088	−1.577	−0.506	−1.605
2451659.6634	1.259	−1.486	0.534	−1.562	0.085	−1.578	−0.509	−1.604
2451660.6634	1.243	−1.488	0.521	−1.555	0.075	−1.579	−0.501	−1.598
2451661.6574	1.236	−1.485	0.517	−1.566	0.081	−1.591	−0.512	−1.607
2451663.6653	1.244	−1.485	0.520	−1.559	0.075	−1.582	−0.514	−1.607
2451664.6639	1.247	−1.494	0.528	−1.570	0.077	−1.588	−0.511	−1.609
2451665.6573	1.265	−1.492	0.541	−1.572	0.093	−1.580	−0.513	−1.605
2451666.6579	1.271	−1.492	0.548	−1.570	0.101	−1.577	−0.507	−1.609
2451667.7064	1.272	−1.491	0.556	−1.558	0.097	−1.585	−0.502	−1.608
2451668.6673	1.279	−1.482	0.556	−1.563	0.103	−1.576	−0.495	−1.613
2451669.6677	1.272	−1.484	0.554	−1.550	0.100	−1.586	−0.505	−1.601
2451671.6704	1.270	−1.497	0.539	−1.567	0.094	−1.572	−0.499	−1.613
2451674.6833	1.235	−1.491	0.522	−1.562	0.075	−1.597	−0.515	−1.603
2451675.6803	1.233	−1.477	0.515	−1.560	0.084	−1.573	−0.515	−1.602
2451677.6684	1.264	−1.496	0.529	−1.545	0.088	−1.580	−0.506	−1.604
2451678.6717	1.250	−1.477	0.535	−1.553	0.098	−1.590	−0.502	−1.594
2451684.6917	1.266	−1.490	0.558	−1.549	0.107	−1.588	−0.499	−1.599
2451687.6683	1.259	−1.488	0.544	−1.574	0.093	−1.572	−0.509	−1.608
2451688.6694	1.257	−1.483	0.539	−1.557	0.095	−1.573	−0.507	−1.607
2451689.6734	1.254	−1.485	0.537	−1.558	0.091	−1.577	−0.507	−1.600
season 10								
average	1.258	−1.488	0.539	−1.560	0.093	−1.581	−0.503	−1.603
std. dev.	0.013	0.006	0.013	0.007	0.011	0.007	0.007	0.007
2451690.6803	1.256	−1.491	0.537	−1.554	0.081	−1.579	−0.503	−1.604
2451691.6687	1.256	−1.486	0.542	−1.561	0.090	−1.570	−0.502	−1.615
2451692.6700	1.251	−1.488	0.539	−1.547	0.096	−1.583	−0.510	−1.584
2451897.9694	1.244	−1.491	0.522	−1.564	0.078	−1.582	−0.515	−1.613
2451898.9604	1.244	−1.487	0.529	−1.567	0.078	−1.580	−0.517	−1.593
2451900.9602	1.246	−1.491	0.526	−1.555	0.082	−1.574	−0.509	−1.608
2451904.9564	1.228	−1.494	0.519	−1.559	0.081	−1.578	−0.512	−1.595
2451906.0563	1.229	−1.483	0.514	−1.563	0.080	−1.583	−0.507	−1.597
2451905.9436	1.232	−1.485	0.520	−1.560	0.079	−1.590	−0.505	−1.606
2451907.9394	1.234	−1.495	0.522	−1.562	0.076	−1.584	−0.502	−1.604
2451908.9369	1.228	−1.476	0.521	−1.562	0.073	−1.580	−0.508	−1.600
2451909.9434	1.238	−1.497	0.517	−1.563	0.070	−1.583	−0.516	−1.597
2451913.9205	1.255	−1.486	0.530	−1.564	0.089	−1.568	−0.506	−1.607
2451920.9174	1.261	−1.492	0.547	−1.564	0.103	−1.574	−0.489	−1.610
2451923.9002	1.234	−1.483	0.519	−1.553	0.077	−1.585	−0.511	−1.605
2451924.8933	1.226	−1.488	0.512	−1.568	0.074	−1.587	−0.511	−1.608
2451928.8835	1.237	−1.487	0.529	−1.564	0.088	−1.582	−0.508	−1.605
2451930.8979	1.260	−1.491	0.538	−1.556	0.092	−1.581	−0.500	−1.600
2451934.8904	1.250	−1.493	0.537	−1.557	0.094	−1.582	−0.505	−1.602
2451935.8933	1.258	−1.489	0.537	−1.565	0.091	−1.578	−0.503	−1.614
2451941.9089	1.230	−1.497	0.506	−1.564	0.066	−1.582	−0.514	−1.596
2451942.9383	1.216	−1.483	0.502	−1.549	0.058	−1.578	−0.520	−1.596
2451943.9313	1.209	−1.495	0.494	−1.559	0.050	−1.578	−0.522	−1.599
2451943.8996	1.206	−1.489	0.497	−1.559	0.066	−1.582	−0.523	−1.597
2451946.9138	1.219	−1.487	0.503	−1.555	0.057	−1.577	−0.524	−1.591
2451950.8503	1.250	−1.482	0.535	−1.559	0.096	−1.578	−0.493	−1.600
2451952.8674	1.245	−1.486	0.535	−1.551	0.089	−1.575	−0.504	−1.615

Table 4: *BVRI* Photometry of HD 4088 – continued.

HJD	B(v−c)	B(v−ch)	V(v−c)	V(ch−c)	R(v−c)	R(v−ch)	I(v−c)	I(ch−c)
2451956.8604	1.249	−1.481	0.534	−1.559	0.090	−1.579	−0.504	−1.602
2451959.8816	1.236	−1.490	0.523	−1.553	0.076	−1.582	−0.518	−1.596
2451961.8244	1.240	−1.490	0.521	−1.560	0.078	−1.578	−0.513	−1.601
2451971.7965	1.233	−1.485	0.508	−1.559	0.074	−1.578	−0.509	−1.610
2451972.8226	1.229	−1.496	0.507	−1.564	0.070	−1.580	−0.516	−1.599
2451976.8104	1.232	−1.485	0.521	−1.549	0.080	−1.581	−0.511	−1.603
2451977.7570	1.248	−1.490	0.535	−1.547	0.093	−1.576	−0.507	−1.593
2451980.7724	1.263	−1.487	0.542	−1.553	0.100	−1.587	−0.498	−1.608
2451981.7690	1.277	−1.494	0.547	−1.550	0.100	−1.571	−0.496	−1.607
2451984.7934	1.271	−1.486	0.551	−1.566	0.104	−1.582	−0.505	−1.603
2451985.7945	1.271	−1.483	0.541	−1.562	0.100	−1.579	−0.502	−1.601
2451986.7572	1.255	−1.484	0.542	−1.562	0.093	−1.577	−0.502	−1.605
2451988.7460	1.227	−1.507	0.511	−1.572	0.058	−1.595	−0.541	−1.608
2451991.7669	1.247	−1.481	0.538	−1.553	0.086	−1.579	−0.504	−1.601
2451993.7333	1.267	−1.492	0.541	−1.559	0.098	−1.582	−0.497	−1.602
2451994.8455	1.250	−1.497	0.544	−1.550	0.094	−1.582	−0.503	−1.603
2451995.8424	1.262	−1.499	0.547	−1.562	0.099	−1.588	−0.507	−1.598
2451996.7265	1.262	−1.481	0.540	−1.572	0.090	−1.582	−0.504	−1.608
2451997.7479	1.251	−1.482	0.529	−1.542	0.083	−1.566	−0.510	−1.597
2451998.7234	1.258	−1.493	0.529	−1.574	0.086	−1.580	−0.508	−1.603
2451999.7159	1.252	−1.483	0.528	−1.559	0.087	−1.585	−0.507	−1.598
2452006.7002	1.244	−1.492	0.525	−1.563	0.077	−1.588	−0.514	−1.613
2452007.7096	1.233	−1.499	0.515	−1.568	0.066	−1.583	−0.520	−1.608
2452008.6942	1.228	−1.488	0.509	−1.567	0.060	−1.576	−0.523	−1.591
2452011.6794	1.221	−1.482	0.504	−1.557	0.060	−1.577	−0.519	−1.598
2452012.6804	1.228	−1.494	0.518	−1.556	0.074	−1.577	−0.519	−1.599
2452013.6824	1.247	−1.485	0.529	−1.556	0.084	−1.579	−0.526	−1.597
2452014.7049	1.252	−1.493	0.525	−1.567	0.086	−1.587	−0.513	−1.597
2452015.6713	1.256	−1.490	0.528	−1.556	0.087	−1.578	−0.506	−1.613
2452017.6952	1.253	−1.487	0.541	−1.565	0.095	−1.579	−0.507	−1.601
2452020.6944	1.259	−1.493	0.529	−1.555	0.080	−1.576	−0.509	−1.591
2452028.7459	1.253	−1.481	0.532	−1.551	0.083	−1.583	−0.517	−1.597
season 11								
average	1.243	−1.489	0.526	−1.559	0.082	−1.580	−0.510	−1.602
std. dev.	0.016	0.006	0.014	0.007	0.013	0.005	0.009	0.006
2452348.8233	1.263	−1.493	0.561	−1.576	0.111	−1.607	−0.493	−1.632
2452354.8260	1.243	−1.502	0.546	−1.582	0.102	−1.612	−0.500	−1.642
2452356.8153	1.222	−1.501	0.519	−1.575	0.077	−1.611	−0.511	−1.637
2452357.8400	1.217	−1.506	0.522	−1.587	0.079	−1.611	−0.512	−1.641
2452358.8140	1.221	−1.506	0.525	−1.581	0.085	−1.621	−0.505	−1.641
2452363.7584	1.211	−1.499	0.509	−1.577	0.072	−1.613	−0.514	−1.630
2452364.7795	1.207	−1.496	0.507	−1.568	0.067	−1.608	−0.521	−1.634
2452365.7418	1.208	−1.505	0.506	−1.574	0.068	−1.607	−0.520	−1.636
2452367.7470	1.212	−1.493	0.517	−1.570	0.078	−1.604	−0.512	−1.633
2452368.7277	1.215	−1.503	0.517	−1.579	0.081	−1.614	−0.514	−1.639
2452371.7361	1.236	−1.514	0.532	−1.586	0.088	−1.617	−0.509	−1.644
2452372.7553	1.238	−1.508	0.531	−1.578	0.091	−1.614	−0.505	−1.638
2452373.7549	1.221	−1.490	0.526	−1.561	0.102	−1.605	−0.488	−1.634
2452374.7094	1.224	−1.508	0.530	−1.586	0.087	−1.620	−0.510	−1.655
2452376.7480	1.229	−1.503	0.530	−1.567	0.092	−1.604	−0.509	−1.633
2452378.6974	1.214	−1.499	0.514	−1.569	0.081	−1.594	−0.515	−1.622
2452386.7240	1.248	−1.510	0.547	−1.577	0.099	−1.608	−0.499	−1.638
2452391.7163	1.231	−1.510	0.536	−1.581	0.097	−1.617	−0.499	−1.640
2452392.7241	1.236	−1.505	0.536	−1.573	0.093	−1.615	−0.513	−1.658
2452395.7294	1.242	−1.516	0.548	−1.587	0.110	−1.616	−0.501	−1.645
2452397.7102	1.249	−1.517	0.552	−1.583	0.110	−1.615	−0.499	−1.643
2452398.6924	1.248	−1.507	0.550	−1.582	0.107	−1.613	−0.500	−1.639
2452399.6830	1.252	−1.510	0.553	−1.588	0.106	−1.617	−0.505	−1.636
2452400.6834	1.245	−1.511	0.543	−1.581	0.101	−1.617	−0.504	−1.636
2452402.6755	1.241	−1.504	0.542	−1.581	0.100	−1.615	−0.502	−1.644
2452403.7057	1.230	−1.515	0.531	−1.586	0.089	−1.619	−0.511	−1.643
2452405.6775	1.208	−1.513	0.495	−1.579	0.063	−1.607	−0.526	−1.647
2452409.6543	1.183	−1.495	0.481	−1.566	0.042	−1.597	−0.531	−1.623
2452411.6717	1.215	−1.518	0.516	−1.586	0.083	−1.617	−0.515	−1.643
2452412.6869	1.227	−1.522	0.532	−1.586	0.093	−1.620	−0.510	−1.648
season 12								
average	1.228	−1.506	0.528	−1.578	0.088	−1.612	−0.508	−1.6390
std. dev.	0.017	0.008	0.018	0.007	0.016	0.007	0.009	0.008

Table 5: *BVRI* Photometry of TU CVn

HJD	B(v−c)	B(v−ch)	V(v−c)	V(ch−c)	R(v−c)	R(v−ch)	I(v−c)	I(ch−c)
2451941.8794	2.419	0.979	0.752	1.359	−0.603	1.539	−2.439	1.697
2451942.8829	2.421	0.973	0.763	1.354	−0.588	1.529	−2.414	1.678
2451952.8564	2.450	0.976	0.802	1.350	−0.569	1.532	−2.407	1.677
2451956.8396	2.450	0.971	0.797	1.350	−0.568	1.533	−2.403	1.675
2451957.8549	2.418	0.998	0.783	1.356	−0.591	1.529	−2.424	1.664
2451959.8394	2.424	0.975	0.762	1.354	−0.594	1.532	−2.425	1.681
2451960.8354	2.411	0.977	0.743	1.357	−0.605	1.536	−2.433	1.677
2451961.8302	2.408	0.975	0.740	1.357	−0.620	1.533	−2.438	1.681
2451962.8244	2.391	0.971	0.728	1.358	−0.629	1.538	−2.443	1.682
2451972.8025	2.287	0.971	0.611	1.355	−0.702	1.531	−2.479	1.674
2451980.7794	2.233	0.978	0.569	1.360	−0.740	1.534	−2.504	1.674
2451981.7759	2.235	0.977	0.573	1.358	−0.739	1.533	−2.506	1.674
2451986.7643	2.270	0.974	0.609	1.360	−0.712	1.537	−2.483	1.677
2451987.7564	2.232	0.984	0.585	1.375	−0.725	1.546	−2.514	1.697
2451991.7473	2.347	0.970	0.708	1.352	−0.631	1.531	−2.444	1.679
2451994.7405	2.426	0.976	0.775	1.362	−0.602	1.551	−2.439	1.701
2451996.7336	2.435	0.985	0.799	1.361	−0.572	1.540	−2.412	1.687
2451998.7302	2.460	0.976	0.822	1.360	−0.546	1.535	−2.409	1.696
2451999.7235	2.472	0.974	0.841	1.350	−0.540	1.536	−2.391	1.682
2452007.6997	2.437	0.968	0.782	1.350	−0.579	1.537	−2.413	1.678
2452008.7012	2.412	0.973	0.763	1.350	−0.592	1.533	−2.418	1.676
2452011.6912	2.356	0.971	0.691	1.360	−0.648	1.534	−2.460	1.684
2452012.6885	2.345	0.972	0.678	1.351	−0.660	1.531	−2.464	1.675
2452013.6905	2.326	0.971	0.655	1.351	−0.683	1.531	−2.472	1.676
2452014.6857	2.298	0.978	0.624	1.359	−0.700	1.537	−2.489	1.684
2452015.6797	2.287	0.978	0.604	1.354	−0.719	1.536	−2.496	1.675
2452020.6668	2.252	0.978	0.576	1.354	−0.746	1.535	−2.511	1.678
2452027.6630	2.198	0.974	0.579	1.353	−0.729	1.523	−2.486	1.658
2452028.6643	2.250	0.975	0.594	1.354	−0.722	1.530	−2.496	1.680
2452029.6598	2.231	0.964	0.597	1.353	−0.718	1.530	−2.481	1.664
2452030.6736	2.237	0.979	0.605	1.355	−0.722	1.538	−2.480	1.669
2452031.6854	2.240	0.970	0.617	1.347	−0.697	1.533	−2.400	1.656
2452032.6664	2.235	0.975	0.623	1.348	−0.691	1.525	−2.461	1.661
2452035.7305	2.285	0.971	0.647	1.352	−0.672	1.532	−2.458	1.669
2452036.6834	2.291	0.974	0.654	1.349	−0.671	1.533	−2.464	1.673
2452036.6889	2.288	0.975	0.649	1.359	−0.678	1.543	−2.472	1.687
2452038.6825	2.283	0.979	0.651	1.363	−0.676	1.538	−2.467	1.678
2452052.7537	2.338	0.978	0.696	1.357	−0.642	1.527	−2.454	1.680
2452053.7684	2.329	0.975	0.687	1.355	−0.656	1.533	−2.461	1.680
2452058.7549	2.270	0.972	0.625	1.362	−0.695	1.534	−2.484	1.683
2452060.7036	2.220	0.966	0.588	1.346	−0.719	1.525	−2.488	1.658
2452061.7348	2.230	0.969	0.585	1.358	−0.729	1.530	−2.487	1.662
season 11								
average	2.329	0.975	0.679	1.356	−0.658	1.534	−2.458	1.677
std. dev.	0.083	0.006	0.082	0.005	0.060	0.005	0.033	0.010

Table 5: *BVRI* Photometry of TU CVn – continued.

HJD	B(v−c)	B(v−ch)	V(v−c)	V(ch−c)	R(v−c)	R(v−ch)	I(v−c)	I(ch−c)
2452335.8005	2.314	0.975	0.642	1.367	−0.699	1.552	−2.478	1.691
2452336.8063	2.425	0.981	0.654	1.380	−0.713	1.579	−2.529	1.734
2452337.7951	2.320	0.967	0.637	1.362	−0.707	1.556	−2.508	1.700
2452351.7635	4.832	−1.447	3.323	−1.220	2.015	−1.087	0.202	−0.966
2452358.7430	5.169	−1.370	3.465	−1.146	2.072	−1.009	0.204	−0.885
2452359.7431	5.115	−1.369	3.442	−1.140	2.055	−1.005	0.204	−0.896
2452362.8704	4.847	−1.351	3.361	−1.122	2.035	−0.998	0.201	−0.883
2452363.7660	4.844	−1.364	3.376	−1.137	2.051	−1.012	0.211	−0.889
2452364.7692	5.132	−1.375	3.467	−1.143	2.078	−1.014	0.214	−0.896
2452365.7673	4.968	−1.366	3.408	−1.135	2.049	−1.006	0.205	−0.887
2452371.7534	−0.128	−1.381	0.714	−1.148	−0.635	−1.020	0.122	−0.894
2452372.7462	−0.144	−1.383	0.695	−1.146	−0.653	−1.020	0.118	−0.895
2452373.7460	−0.176	−1.390	0.651	−1.145	−0.677	−1.030	0.094	−0.907
2452375.7326	−0.233	−1.377	0.594	−1.147	−0.724	−1.018	0.067	−0.901
2452385.7046	−0.335	−1.394	0.487	−1.158	−0.813	−1.022	0.016	−0.906
2452386.7080	−0.338	−1.397	0.489	−1.159	−0.819	−1.028	0.009	−0.905
2452390.6921	−0.329	−1.378	0.534	−1.151	−0.759	−1.023	0.043	−0.899
2452391.6902	−0.318	−1.380	0.558	−1.145	−0.727	−1.028	0.052	−0.894
2452392.6864	−0.249	−1.381	0.592	−1.151	−0.724	−1.030	0.064	−0.910
2452395.6846	−0.153	−1.388	0.680	−1.155	−0.670	−1.025	0.090	−0.893
2452397.6740	−0.105	−1.388	0.731	−1.158	−0.632	−1.025	0.120	−0.911
2452398.6771	−0.078	−1.382	0.751	−1.142	−0.615	−1.011	0.122	−0.884
2452399.6677	−0.068	−1.381	0.771	−1.142	−0.596	−1.014	0.137	−0.892
2452400.6670	−0.044	−1.387	0.787	−1.151	−0.585	−1.025	0.148	−0.903
2452402.6601	−0.024	−1.389	0.811	−1.153	−0.569	−1.027	0.153	−0.901
2452403.6600	−0.009	−1.390	0.825	−1.152	−0.554	−1.027	0.162	−0.903
2452405.6545	0.012	−1.385	0.842	−1.144	−0.541	−1.013	0.165	−0.901
2452408.6474	−0.018	−1.409	0.819	−1.165	−0.568	−1.038	0.152	−0.922
2452411.6360	−0.081	−1.382	0.769	−1.144	−0.600	−1.015	0.130	−0.898
2452412.6375	−0.109	−1.383	0.732	−1.146	−0.631	−1.020	0.107	−0.896
2452413.6382	−0.116	−1.398	0.725	−1.160	−0.633	−1.035	0.110	−0.912
2452414.6557	−0.134	−1.377	0.702	−1.149	−0.646	−1.014	0.101	−0.892
2452415.6823	−0.150	−1.384	0.689	−1.153	−0.660	−1.019	0.102	−0.894
2452416.6830	−0.184	−1.378	0.659	−1.144	−0.668	−1.015	0.096	−0.892
2452417.6651	−0.211	−1.381	0.628	−1.134	−0.706	−1.011	0.077	−0.890
season 12								
average	−0.149	−1.386	0.689	−1.150	−0.656	−1.022	0.102	−0.900
std. dev.	0.103	0.007	0.101	0.007	0.073	0.007	0.042	0.008
2452693.7882	0.752	0.404	−0.698	0.468	−0.543	0.462	−1.638	0.444
2452723.7700	0.672	0.395	−0.766	0.455	−0.596	0.440	−1.648	0.423
2452724.7683	0.644	0.390	−0.800	0.456	−0.617	0.440	−1.661	0.425
2452725.7721	0.621	0.392	−0.830	0.456	−0.649	0.448	−1.676	0.426
2452727.7600	0.558	0.391	−0.900	0.441	−0.703	0.436	−1.703	0.416
2452728.7576	0.514	0.388	−0.945	0.449	−0.730	0.442	−1.725	0.426
2452729.7544	0.485	0.385	−0.989	0.450	−0.770	0.443	−1.744	0.424
2452730.7750	0.455	0.392	−1.023	0.454	−0.794	0.447	−1.765	0.425
2452733.7650	0.395	0.396	−1.096	0.458	−0.851	0.449	−1.805	0.435
2452734.7443	0.389	0.392	−1.105	0.454	−0.858	0.446	−1.805	0.426
2452735.7390	0.376	0.390	−1.119	0.454	−0.874	0.446	−1.824	0.431
2452737.7405	0.394	0.386	−1.102	0.448	−0.857	0.439	−1.799	0.424
2452739.7270	0.404	0.377	−1.097	0.445	−0.855	0.440	−1.823	0.406
2452747.7096	0.567	0.404	−0.917	0.454	−0.718	0.455	−1.764	0.435
2452751.7852	0.627	0.404	−0.813	0.452	−0.640	0.443	−1.690	0.429
2452752.7575	0.638	0.408	−0.808	0.449	−0.625	0.443	−1.689	0.433
2452754.6853	0.691	0.393	−0.753	0.456	−0.589	0.445	−1.656	0.422
season 13								
average	0.540	0.393	−0.927	0.453	−0.722	0.445	−1.730	0.426
std. dev.	0.119	0.008	0.140	0.006	0.109	0.006	0.063	0.008

Table 6: *BVRI* Photometry of IT Vir.

HJD	B(v−c)	B(v−ch)	V(v−c)	V(ch−c)	R(v−c)	R(v−ch)	I(v−c)	I(ch−c)
2451304.8022	0.059	−1.252	1.510	−0.353	−1.662	0.087	−2.081	0.487
2451306.7135	0.058	−1.244	1.384	−0.342	−1.666	0.094	−2.079	0.486
2451308.7174	0.051	−1.258	1.400	−0.351	−1.661	0.095	−2.079	0.488
2451310.7023	0.072	−1.245	1.405	−0.345	−1.668	0.102	−2.073	0.486
2451312.7005	0.063	−1.238	1.396	−0.327	−1.659	0.100	−2.079	0.500
2451314.7746	0.074	−1.246	1.383	−0.337	−1.663	0.101	−2.079	0.490
2451317.6975	0.076	−1.240	1.413	−0.345	−1.656	0.100	−2.076	0.491
2451318.6806	0.075	−1.247	1.495	−0.343	−1.661	0.098	−2.071	0.487
2451319.6776	0.066	−1.242	1.475	−0.341	−1.656	0.082	−2.073	0.484
2451320.6740	0.054	−1.240	1.632	−0.349	−1.662	0.090	−2.080	0.486
2451321.6752	0.065	−1.263	1.840	−0.359	−1.661	0.105	−2.071	0.482
2451322.6775	0.074	−1.249	2.104	−0.356	−1.654	0.083	−2.064	0.474
season 9								
average	0.066	−1.247	1.536	−0.346	−1.661	0.095	−2.075	0.487
std. dev.	0.009	0.008	0.223	0.009	0.004	0.008	0.005	0.006
2451617.8401	0.061	−1.261	1.577	−0.350	−1.658	0.090	−2.072	0.478
2451628.8136	0.039	−1.241	1.794	−0.348	−1.663	0.083	−2.083	0.485
2451632.8045	0.059	−1.237	1.418	−0.340	−1.661	0.096	−2.067	0.489
2451634.7955	0.053	−1.240	1.408	−0.328	−1.667	0.091	−2.089	0.488
2451635.7950	0.035	−1.241	1.381	−0.351	−1.676	0.079	−2.072	0.480
2451638.7840	0.048	−1.250	1.406	−0.347	−1.673	0.092	−2.084	0.485
2451639.7852	0.043	−1.247	1.393	−0.345	−1.680	0.092	−2.090	0.483
2451640.7807	0.046	−1.247	1.417	−0.348	−1.678	0.094	−2.088	0.490
2451645.7700	0.044	−1.237	1.534	−0.341	−1.678	0.101	−2.098	0.493
2451638.7661	0.055	−1.234	1.806	−0.330	−1.667	0.100	−2.086	0.495
2451647.7600	0.036	−1.226	2.003	−0.337	−1.685	0.104	−2.094	0.489
2451648.7570	0.035	−1.252	1.757	−0.352	−1.676	0.089	−2.096	0.487
2451657.7364	0.024	−1.244	1.392	−0.345	−1.685	0.089	−2.096	0.490
2451658.7296	0.035	−1.256	1.378	−0.348	−1.685	0.098	−2.102	0.486
2451659.7331	0.051	−1.243	1.369	−0.339	−1.677	0.099	−2.095	0.493
2451660.7265	0.044	−1.247	1.357	−0.342	−1.681	0.100	−2.080	0.483
2451663.7170	0.043	−1.251	1.441	−0.345	−1.681	0.091	−2.084	0.485
2451664.7146	0.033	−1.242	1.380	−0.344	−1.676	0.096	−2.083	0.492
2451665.7150	0.055	−1.249	1.317	−0.335	−1.672	0.096	−2.079	0.483
2451666.7093	0.043	−1.242	1.456	−0.349	−1.676	0.099	−2.081	0.489
2451667.8130	0.069	−1.251	1.447	−0.344	−1.673	0.092	−2.083	0.482
2451668.7040	0.045	−1.238	1.401	−0.346	−1.675	0.098	−2.082	0.486
2451669.7106	0.033	−1.234	1.413	−0.334	−1.672	0.105	−2.091	0.485
2451670.8070	0.053	−1.236	1.425	−0.337	−1.675	0.088	−2.087	0.495
2451671.7071	0.062	−1.249	1.415	−0.346	−1.667	0.101	−2.082	0.490
2451674.7491	0.076	−1.254	1.544	−0.354	−1.665	0.092	−2.079	0.479
2451675.7465	0.088	−1.248	1.726	−0.340	−1.653	0.097	−2.075	0.498
2451685.7281	0.061	−1.245	1.924	−0.349	−1.669	0.091	−2.085	0.478
2451688.7592	0.049	−1.242	1.433	−0.345	−1.662	0.096	−2.070	0.487
2451692.7230	0.078	−1.242	1.435	−0.349	−1.657	0.090	−2.075	0.485
2451699.7280	0.073	−1.246	1.414	−0.346	−1.661	0.086	−2.073	0.493
season 10								
average	0.052	−1.244	1.501	−0.344	−1.671	0.094	−2.083	0.487
std. dev.	0.017	0.007	0.176	0.006	0.010	0.006	0.010	0.005
2451906.0450	0.089	−1.266	1.506	−0.363	−1.651	0.080	−2.064	0.469
2451908.0424	0.072	−1.256	1.444	−0.355	−1.657	0.085	−2.071	0.473
2451909.0397	0.071	−1.266	1.432	−0.359	−1.656	0.083	−2.069	0.476
2451912.0300	0.055	−1.257	1.408	−0.361	−1.654	0.081	−2.066	0.478
2451921.0070	0.061	−1.252	1.292	−0.364	−1.662	0.086	−2.067	0.477
2451922.0052	0.059	−1.262	1.292	−0.366	−1.665	0.079	−2.074	0.469
2451923.9997	0.058	−1.262	1.292	−0.359	−1.662	0.077	−2.072	0.474
2451928.9836	0.040	−1.267	−1.191	−0.356	−1.670	0.076	−2.080	0.469
2451930.9921	0.048	−1.268	−1.190	−0.360	−1.682	0.087	−2.085	0.483
2451933.0470	0.060	−1.252	−1.184	−0.352	−1.673	0.090	−2.077	0.484
2451934.9752	0.044	−1.254	−1.181	−0.367	−1.678	0.091	−2.081	0.482

Table 6: *BVRI* Photometry of IT Vir – continued.

HJD	B(v−c)	B(v−ch)	V(v−c)	V(ch−c)	R(v−c)	R(v−ch)	I(v−c)	I(ch−c)
2451935.9740	0.045	−1.254	−1.184	−0.358	−1.676	0.082	−2.070	0.473
2451941.9604	0.044	−1.249	−1.184	−0.352	−1.670	0.087	−2.077	0.488
2451942.9552	0.056	−1.256	−1.174	−0.356	−1.662	0.087	−2.068	0.479
2451943.9480	0.052	−1.247	−1.181	−0.354	−1.677	0.093	−2.090	0.499
2451944.9523	0.062	−1.266	−1.177	−0.362	−1.676	0.085	−2.066	0.483
2451943.9425	0.031	−1.263	−1.188	−0.353	−1.668	0.079	−2.082	0.477
2451946.9364	0.022	−1.261	−1.185	−0.358	−1.677	0.084	−2.088	0.480
2451952.9294	0.069	−1.253	−1.179	−0.348	−1.667	0.093	−2.080	0.486
2451959.9141	0.064	−1.249	−1.166	−0.349	−1.663	0.092	−2.076	0.488
2451960.9090	0.069	−1.249	−1.169	−0.359	−1.658	0.086	−2.071	0.485
2451961.9006	0.060	−1.248	−1.176	−0.359	−1.675	0.090	−2.088	0.485
2451962.9063	0.060	−1.251	−1.181	−0.344	−1.662	0.090	−2.072	0.485
2451972.8872	0.081	−1.256	−1.158	−0.357	−1.648	0.084	−2.056	0.478
2451985.8500	0.079	−1.252	−1.163	−0.344	−1.653	0.098	−2.059	0.483
2451986.8477	0.090	−1.263	−1.133	−0.362	−1.624	0.081	−2.028	0.474
2451991.9430	0.078	−1.241	−1.160	−0.346	−1.657	0.090	−2.067	0.491
2451993.8450	0.056	−1.244	−1.174	−0.345	−1.664	0.098	−2.081	0.484
2452012.7896	0.061	−1.263	−1.180	−0.362	−1.669	0.083	−2.082	0.484
2452013.7906	0.056	−1.253	−1.181	−0.351	−1.671	0.083	−2.090	0.489
2452014.7882	0.046	−1.261	−1.187	−0.358	−1.679	0.086	−2.089	0.482
2452015.7800	0.056	−1.252	−1.189	−0.349	−1.678	0.089	−2.083	0.481
2452017.7807	0.037	−1.268	−1.200	−0.346	−1.689	0.088	−2.086	0.484
season 11								
average	0.060	−1.256	...	−0.355	−1.665	0.086	−2.077	0.481
std. dev.	0.018	0.008	...	0.007	0.013	0.006	0.020	0.007
2452348.8505	0.137	−1.246	−1.131	−0.338	−1.634	0.095	−2.048	0.487
2452349.8570	0.101	−1.268	−1.142	−0.351	−1.633	0.087	−2.059	0.482
2452356.8441	0.157	−1.255	−1.141	−0.343	−1.654	0.088	−2.074	0.479
2452357.8505	0.169	−1.266	−1.140	−0.349	−1.652	0.083	−2.096	0.481
2452367.8150	0.065	−1.257	−1.172	−0.354	−1.679	0.094	−2.103	0.485
2452368.8075	0.095	1.226	−1.162	−0.347	−1.661	0.094	−2.088	0.485
2452370.7870	0.076	1.217	−1.170	−0.348	−1.665	0.087	−2.088	0.485
2452371.7932	0.062	1.236	−1.185	−0.332	−1.678	0.101	−2.091	0.486
2452372.7991	0.048	1.235	−1.182	−0.334	−1.674	0.099	−2.086	0.491
2452373.7985	0.089	1.225	−1.168	−0.341	−1.677	0.101	−2.098	0.493
2452374.7883	0.060	1.241	−1.181	−0.333	−1.674	0.100	−2.094	0.486
2452375.7966	0.095	1.219	−1.169	−0.344	−1.667	0.085	−2.087	0.483
2452376.7873	0.086	1.222	−1.163	−0.347	−1.647	0.089	−2.071	0.491
2452378.7627	0.069	1.239	−1.173	−0.345	−1.675	0.090	−2.088	0.478
2452379.7803	0.101	1.233	−1.165	−0.349	−1.667	0.088	−2.097	0.491
2452380.7543	0.078	1.220	−1.159	−0.354	−1.654	0.080	−2.077	0.485
2452395.7406	0.062	1.223	−1.184	−0.333	−1.679	0.092	−2.085	0.490
2452397.7405	0.044	1.238	−1.188	−0.333	−1.685	0.110	−2.103	0.499
2452398.7396	0.055	1.234	−1.185	−0.341	−1.679	0.091	−2.104	0.486
2452399.7297	0.082	1.234	−1.179	−0.325	−1.679	0.103	−2.102	0.491
2452400.7300	0.086	1.237	−1.177	−0.335	−1.675	0.097	−2.099	0.480
2452402.7225	0.088	1.234	−1.187	−0.322	−1.677	0.100	−2.099	0.497
2452403.7230	0.069	1.228	−1.189	−0.337	−1.682	0.094	−2.102	0.491
2452405.7241	0.072	1.225	−1.186	−0.337	−1.680	0.090	−2.096	0.483
season 12								
average	0.075	1.230	−1.176	−0.339	−1.672	0.094	−2.092	0.488
std. dev.	0.016	0.007	0.010	0.008	0.010	0.007	0.009	0.005

Table 7: *BVRI* Photometry of HR 7442.

HJD	B(v−c)	B(v−ch)	V(v−c)	V(ch−c)	R(v−c)	R(v−ch)	I(v−c)	I(ch−c)
2451636.0103	1.176	−0.982	0.028	−0.456	−0.839	−0.221	−2.099	−0.017
2451638.0074	1.178	−0.989	0.026	−0.452	−0.832	−0.227	−2.101	−0.016
2451638.9947	1.174	−0.975	0.029	−0.455	−0.833	−0.224	−2.102	−0.013
2451639.9880	1.181	−0.980	0.038	−0.453	−0.832	−0.224	−2.100	−0.015
2451640.9874	1.189	−0.985	0.040	−0.453	−0.824	−0.227	−2.099	−0.017
2451641.9744	1.200	−0.982	0.049	−0.451	−0.819	−0.220	−2.095	−0.015
2451645.9803	1.224	−0.978	0.076	−0.455	−0.801	−0.225	−2.082	−0.016
2451638.9603	1.230	−0.983	0.083	−0.455	−0.799	−0.228	−2.085	−0.017
2451647.9747	1.243	−0.981	0.093	−0.453	−0.791	−0.221	−2.083	−0.021
2451648.9542	1.249	−0.978	0.101	−0.452	−0.785	−0.221	−2.080	−0.017
2451650.9744	1.270	−0.981	0.122	−0.453	−0.767	−0.228	−2.075	−0.015
2451652.9679	1.264	−0.977	0.124	−0.455	−0.768	−0.225	−2.075	−0.020
2451653.9489	1.270	−0.990	0.120	−0.458	−0.764	−0.231	−2.071	−0.024
2451657.9434	1.250	−0.987	0.093	−0.452	−0.784	−0.233	−2.079	−0.021
2451658.9407	1.231	−0.984	0.078	−0.452	−0.800	−0.222	−2.096	−0.011
2451659.9363	1.229	−0.992	0.068	−0.446	−0.808	−0.219	−2.100	−0.012
2451660.9356	1.222	−0.984	0.059	−0.448	−0.821	−0.221	−2.103	−0.014
2451661.9436	1.215	−0.983	0.061	−0.455	−0.821	−0.221	−2.103	−0.020
2451663.9357	1.195	−0.985	0.040	−0.459	−0.836	−0.223	−2.107	−0.015
2451664.9204	1.187	−1.005	0.027	−0.470	−0.847	−0.235	−2.115	−0.026
2451665.9233	1.183	−0.988	0.019	−0.454	−0.852	−0.220	−2.117	−0.018
2451666.9304	1.170	−0.988	0.007	−0.450	−0.863	−0.222	−2.123	−0.012
2451667.9259	1.159	−0.980	0.000	−0.452	−0.865	−0.222	−2.124	−0.019
2451668.9202	1.151	−0.979	−0.002	−0.454	−0.871	−0.224	−2.135	−0.015
2451669.9075	1.140	−0.980	−0.013	−0.452	−0.877	−0.229	−2.131	−0.019
2451670.9139	1.137	−0.979	−0.016	−0.457	−0.881	−0.223	−2.129	−0.020
2451671.8993	1.133	−0.983	−0.022	−0.451	−0.880	−0.223	−2.133	−0.016
2451673.8933	1.133	−0.985	−0.020	−0.449	−0.875	−0.224	−2.133	−0.016
2451674.8846	1.136	−0.986	−0.011	−0.454	−0.874	−0.221	−2.131	−0.020
2451675.8737	1.135	−0.976	−0.009	−0.447	−0.872	−0.223	−2.123	−0.009
2451681.9775	1.165	−0.986	0.016	−0.451	−0.852	−0.226	−2.106	−0.014
2451682.9603	1.156	−0.987	0.017	−0.453	−0.846	−0.228	−2.108	−0.019
2451683.9764	1.165	−0.989	0.018	−0.458	−0.846	−0.224	−2.107	−0.018
2451684.8564	1.151	−0.981	0.008	−0.449	−0.851	−0.225	−2.112	−0.015
2451685.9083	1.145	−0.988	0.002	−0.457	−0.854	−0.233	−2.113	−0.022
2451686.8802	1.133	−0.985	−0.002	−0.451	−0.861	−0.225	−2.114	−0.015
2451687.8482	1.114	−0.987	−0.018	−0.466	−0.877	−0.230	−2.128	−0.022
2451688.8505	1.113	−0.990	−0.029	−0.457	−0.882	−0.232	−2.124	−0.016
2451689.8423	1.108	−0.986	−0.037	−0.446	−0.886	−0.225	−2.123	−0.021
2451690.8469	1.096	−0.978	−0.040	−0.452	−0.897	−0.220	−2.129	−0.017
2451691.8349	1.099	−0.987	−0.050	−0.456	−0.900	−0.224	−2.135	−0.014
2451692.8304	1.096	−0.982	−0.057	−0.448	−0.911	−0.225	−2.140	−0.017
2451693.8202	1.093	−0.980	−0.058	−0.457	−0.916	−0.218	−2.142	−0.015
2451694.9197	1.091	−0.981	−0.061	−0.450	−0.920	−0.215	−2.148	−0.012
2451698.9372	1.090	−0.982	−0.071	−0.453	−0.921	−0.219	−2.153	−0.017
2451699.8103	1.087	−0.985	−0.072	−0.448	−0.926	−0.222	−2.155	−0.010
2451700.8104	1.082	−0.977	−0.079	−0.447	−0.923	−0.227	−2.147	−0.010
2451704.7923	1.085	−0.973	−0.064	−0.449	−0.917	−0.217	−2.143	−0.016
2451706.7964	1.109	−0.980	−0.045	−0.455	−0.898	−0.223	−2.137	−0.008
2451708.7857	1.126	−0.973	−0.020	−0.451	−0.879	−0.221	−2.123	−0.021
2451709.8953	1.147	−0.979	−0.008	−0.447	−0.870	−0.214	−2.126	−0.006
2451710.7816	1.152	−0.971	0.010	−0.445	−0.856	−0.213	−2.113	−0.017
2451711.7904	1.159	−0.977	0.020	−0.443	−0.849	−0.222	−2.106	−0.017
2451712.7772	1.196	−0.994	0.047	−0.463	−0.814	−0.242	−2.088	−0.037
2451729.7844	1.221	−0.979	0.085	−0.454	−0.795	−0.218	−2.087	−0.011

Table 7: *BVRI* Photometry of HR 7442 – continued.

HJD	B(v−c)	B(v−ch)	V(v−c)	V(ch−c)	R(v−c)	R(v−ch)	I(v−c)	I(ch−c)
2451707.8037	1.111	−0.981	−0.034	−0.451	−0.890	−0.222	−2.131	−0.011
2451730.7254	1.212	−0.979	0.074	−0.451	−0.801	−0.218	−2.088	−0.013
2451731.8803	1.211	−0.984	0.074	−0.449	−0.803	−0.227	−2.089	−0.024
season 10								
average	1.165	−0.983	0.016	−0.453	−0.850.	−0.224	−2.113	−0.017
std. dev.	0.053	0.006	0.054	0.005	0.043	0.005	0.022	0.005
2452355.0101	1.107	−0.989	−0.053	−0.449	−0.903	−0.221	−2.157	−0.013
2452364.0044	1.193	−0.995	0.036	−0.462	−0.825	−0.230	−2.110	−0.029
2452365.0083	1.206	−1.000	0.036	−0.464	−0.839	−0.228	−2.121	−0.024
2452366.0070	1.216	−0.987	0.048	−0.447	−0.827	−0.213	−2.119	−0.006
2452367.9925	1.213	−0.996	0.044	−0.449	−0.834	−0.219	−2.131	−0.011
2452371.9866	1.232	−1.002	0.076	−0.469	−0.810	−0.228	−2.107	−0.025
2452372.9787	1.225	−0.995	0.061	−0.450	−0.818	−0.228	−2.118	−0.017
2452373.9763	1.222	−0.985	0.056	−0.450	−0.827	−0.213	−2.125	−0.008
2452374.9738	1.216	−0.997	0.057	−0.461	−0.829	−0.226	−2.130	−0.013
2452375.9764	1.223	−1.007	0.065	−0.468	−0.821	−0.237	−2.124	−0.026
2452376.9676	1.224	−1.001	0.053	−0.455	−0.831	−0.220	−2.131	−0.016
2452379.9632	1.231	−1.002	0.064	−0.451	−0.826	−0.222	−2.123	−0.014
2452380.9604	1.226	−0.994	0.071	−0.451	−0.809	−0.228	−2.115	−0.009
2452382.9674	1.222	−1.011	0.062	−0.465	−0.814	−0.233	−2.113	−0.018
2452383.9628	1.217	−1.008	0.056	−0.466	−0.816	−0.232	−2.117	−0.018
2452433.9704	1.230	−1.000	0.048	−0.456	−0.830	−0.220	−2.128	−0.016
2452436.9644	1.235	−0.993	0.064	−0.457	−0.819	−0.227	−2.118	−0.022
2452437.9559	1.221	−1.013	0.056	−0.468	−0.826	−0.238	−2.116	−0.029
2452439.9564	1.226	−0.995	0.058	−0.460	−0.825	−0.219	−2.118	−0.016
2452440.9525	1.221	−1.013	0.057	−0.474	−0.826	−0.232	−2.117	−0.026
2452441.9604	1.225	−1.005	0.055	−0.461	−0.826	−0.226	−2.120	−0.022
2452442.9503	1.227	−0.997	0.060	−0.460	−0.822	−0.223	−2.118	−0.018
2452443.9507	1.240	−1.004	0.064	−0.464	−0.822	−0.223	−2.114	−0.022
2452444.9416	1.245	−1.011	0.077	−0.471	−0.809	−0.231	−2.108	−0.027
2452459.8994	1.194	−1.004	0.026	−0.459	−0.857	−0.220	−2.145	−0.011
2452460.9064	1.193	−1.007	0.032	−0.465	−0.845	−0.222	−2.132	−0.023
2452461.8954	1.201	−1.013	0.030	−0.472	−0.842	−0.237	−2.130	−0.032
2452462.9073	1.194	−0.987	0.039	−0.453	−0.840	−0.217	−2.123	−0.022
season 12								
average	1.215	−1.000	0.050	−0.460	−0.929.	−0.225	−2.122	−0.019
std. dev.	0.025	0.006	0.024	0.005	0.018	0.007	0.011	0.007
2452750.9533	1.207	−0.979	0.056	−0.448	−0.803	−0.223	−2.076	−0.016
2452768.9184	1.133	−0.980	−0.038	−0.448	−0.890	−0.220	−2.113	−0.013
2452769.9434	1.122	−0.971	−0.051	−0.443	−0.896	−0.212	−2.123	−0.017
2452770.9428	1.144	−0.993	−0.030	−0.458	−0.877	−0.223	−2.105	−0.018
2452772.8923	1.128	−0.975	−0.035	−0.450	−0.884	−0.222	−2.118	−0.014
2452775.9364	1.143	−0.969	−0.030	−0.442	−0.882	−0.211	−2.117	−0.013
2452785.9705	1.185	−0.982	0.023	−0.449	−0.841	−0.221	−0.810	−0.013
2452797.9679	1.166	−0.980	0.008	−0.443	−0.846	−0.216	−0.827	−0.007
2452798.9673	1.175	−0.974	0.016	−0.448	−0.839	−0.218	−0.822	−0.009
2452799.9498	1.171	−0.969	0.022	−0.448	−0.838	−0.217	−0.817	−0.012
2452802.9527	1.209	−0.979	0.052	−0.446	−0.807	−0.219	−0.804	−0.018
2452803.9602	1.211	−0.977	0.057	−0.449	−0.807	−0.216	−0.801	−0.017
2452803.9503	1.212	−0.974	0.064	−0.449	−0.804	−0.212	−0.799	−0.013
2452807.9424	1.225	−0.982	0.060	−0.452	−0.798	−0.226	−0.791	−0.022
2452808.9384	1.219	−0.983	0.065	−0.458	−0.794	−0.223	−0.796	−0.014
2452809.9484	1.213	−0.973	0.059	−0.445	−0.807	−0.213	−0.801	−0.013
2452811.9704	1.229	−0.979	0.065	−0.453	−0.800	−0.213	−0.797	−0.009
2452814.9555	1.251	−0.983	0.082	−0.447	−0.789	−0.219	−0.792	−0.017
2452815.9322	1.242	−0.983	0.082	−0.452	−0.781	−0.214	−0.790	−0.017
2452819.9299	1.233	−0.988	0.081	−0.452	−0.789	−0.223	−0.789	−0.014
2452822.9202	1.245	−0.969	0.090	−0.447	−0.778	−0.219	−0.782	−0.020
2452823.9334	1.223	−0.973	0.081	−0.437	−0.793	−0.214	−0.791	−0.014
2452828.9226	1.225	−0.977	0.072	−0.444	−0.795	−0.218	−0.794	−0.014
season 13								
average	1.196	−0.978	0.037	−0.448	−0.823	−0.218	...	−0.014
std. dev.	0.040	0.006	0.045	0.005	0.038	0.004	....	0.004

Table 8: *BVRI* Photometry of HR 1556 and HR 363.

HJD	B(v−c)	B(v−ch)	V(v−c)	V(ch−c)	R(v−c)	R(v−ch)	I(v−c)	I(ch−c)
HR 1556								
2451607.6851	1.456	0.713	−0.061	1.025	−1.012	1.173	−2.239	1.285
2451612.6675	1.446	0.705	−0.080	1.022	−1.035	1.175	−2.247	1.290
2451613.6597	1.445	0.704	−0.086	1.027	−1.040	1.176	−2.247	1.278
2451614.6575	1.437	0.701	−0.091	1.020	−1.039	1.170	−2.252	1.275
2451620.6483	1.434	0.706	−0.105	1.026	−1.063	1.176	−2.270	1.284
2451621.6467	1.405	0.704	−0.105	1.016	−1.055	1.167	−2.259	1.276
2451622.6405	1.430	0.711	−0.109	1.027	−1.059	1.175	−2.265	1.284
season 10								
average	1.436	0.706	−0.091	1.023	−1.043	1.173	−2.254	1.282
std. dev.	0.016	0.004	0.017	0.004	0.018	0.003	0.011	0.005
2451820.9054	1.587	0.707	0.078	1.025	−0.902	1.174	−2.176	1.279
2451822.9744	1.598	0.713	0.079	1.029	−0.899	1.178	−2.180	1.290
2451834.0251	1.526	0.705	0.012	1.026	−0.949	1.173	−2.211	1.292
2451868.9632	1.462	0.716	−0.066	1.043	−1.022	1.188	−2.238	1.302
2451871.9633	1.402	0.710	−0.124	1.036	−1.061	1.179	−2.259	1.290
2451873.9524	1.382	0.710	−0.143	1.027	−1.078	1.176	−2.271	1.286
2451874.9601	1.368	0.712	−0.159	1.029	−1.087	1.170	−2.270	1.291
2451875.9442	1.366	0.712	−0.162	1.033	−1.094	1.174	−2.276	1.287
2451877.9440	1.364	0.713	−0.165	1.027	−1.098	1.182	−2.277	1.292
2451882.9393	1.378	0.709	−0.147	1.028	−1.082	1.179	−2.275	1.290
2451884.9221	1.406	0.712	−0.120	1.032	−1.057	1.180	−2.265	1.293
2451894.8980	1.658	0.715	0.147	1.030	−0.842	1.177	−2.162	1.293
2451895.8946	1.672	0.712	0.162	1.028	−0.833	1.175	−2.158	1.288
2451897.8857	1.693	0.713	0.186	1.028	−0.813	1.180	−2.148	1.289
season 11								
average	1.490	0.711	−0.030	1.030	−0.987	1.178	−2.226	1.290
std. dev.	0.127	0.003	0.135	0.005	0.109	0.004	0.051	0.005
HR 363								
2451807.8590	1.507	−0.118	3.443	−0.772	0.419	−1.044	−0.352	−1.295
2451809.8684	1.490	−0.116	3.393	−0.765	0.406	−1.047	−0.355	−1.299
2451810.9306	1.489	−0.121	3.389	−0.769	0.408	−1.051	−0.355	−1.302
2451813.8320	1.495	−0.124	3.395	−0.770	0.418	−1.055	−0.350	−1.298
2451815.9180	1.532	−0.122	3.423	−0.768	0.443	−1.048	−0.340	−1.299
2451821.9273	1.556	−0.123	3.459	−0.771	0.466	−1.053	−0.332	−1.302
2451822.7100	1.460	−0.018	3.470	−0.753	0.455	−1.040	−0.344	−1.287
2451824.8862	1.571	−0.127	3.476	−0.781	0.477	−1.053	−0.329	−1.299
2451831.8080	1.546	−0.117	3.993	−0.774	0.454	−1.050	−0.335	−1.300
2451832.9125	1.543	−0.113	3.894	−0.769	0.457	−1.046	−0.334	−1.298
2451834.8480	1.567	−0.116	3.571	−0.770	0.471	−1.047	−0.330	−1.297
2451842.8363	1.599	−0.114	3.506	−0.763	0.504	−1.047	−0.311	−1.293
2451866.7883	1.517	−0.118	3.419	−0.764	0.430	−1.044	−0.346	−1.292
2451873.7975	1.545	−0.113	3.447	−0.767	0.456	−1.045	−0.332	−1.292
2451877.7832	1.556	−0.114	3.464	−0.765	0.464	−1.046	−0.326	−1.295
season 11								
average	1.532	−0.112	3.516	−0.768	0.449	−1.048	−0.338	−1.297
std. dev.	0.038	0.026	0.181	0.006	0.028	0.004	0.012	0.004

Table 9: *BVRI* Photometry of HD 58521 and HD 49368.

HJD	B(v−c)	B(v−ch)	V(v−c)	V(ch−c)	R(v−c)	R(v−ch)	I(v−c)	I(ch−c)
HD 58521								
2452693.7201	2.643	0.459	1.258	0.031	0.996	−0.193	−1.071	−0.438
2452722.6990	2.713	0.461	1.333	0.044	1.063	−0.196	−1.008	−0.440
2452724.6921	2.726	0.459	1.340	0.040	1.078	−0.197	−1.004	−0.437
2452725.6980	2.738	0.466	1.366	0.047	1.099	−0.196	−0.980	−0.446
2452727.6943	2.795	0.466	1.423	0.056	1.151	−0.188	−0.917	−0.443
2452729.6800	2.795	0.466	1.414	0.049	1.136	−0.184	−0.942	−0.436
2452730.6905	2.813	0.467	1.458	0.039	1.153	−0.201	−0.931	−0.449
2452734.6840	2.915	0.449	1.552	0.029	1.242	−0.208	−0.858	−0.440
2452737.6804	2.933	0.467	1.572	0.038	1.251	−0.202	−0.854	−0.452
2452737.6757	2.904	0.476	1.546	0.054	1.237	−0.189	−0.856	−0.431
2452738.6566	2.908	0.470	1.533	0.048	1.230	−0.186	−0.883	−0.440
2452739.6494	2.934	0.454	1.559	0.035	1.250	−0.198	−0.869	−0.441
2452740.6490	2.923	0.464	1.550	0.049	1.247	−0.189	−0.880	−0.434
2452748.6505	2.996	0.468	1.644	0.040	1.312	−0.194	−0.815	−0.441
season 13								
average	2.838	0.464	1.468	0.043	1.175	−0.194	−0.919	−0.441
std. dev.	0.106	0.007	0.114	0.008	0.092	0.007	0.074	0.006
HD 49368								
2451867.0276	1.936	0.692	1.556	0.322	1.146	0.133	0.434	−1.231
2451868.0295	1.935	0.700	1.547	0.325	1.144	0.133	0.429	−1.231
2451897.9474	1.954	0.699	1.565	0.328	1.161	0.134	0.438	−1.231
2451942.8240	1.905	0.699	1.509	0.324	1.115	0.136	0.426	−1.214
2451976.7307	1.887	0.694	1.518	0.327	1.127	0.131	0.433	−1.238
2451987.6986	1.887	0.698	1.515	0.324	1.132	0.142	0.446	−1.223
season 11								
average	1.917	0.697	1.535	0.325	1.138	0.135	0.434	−1.228
std. dev.	0.028	0.003	0.024	0.002	0.016	0.004	0.007	0.008