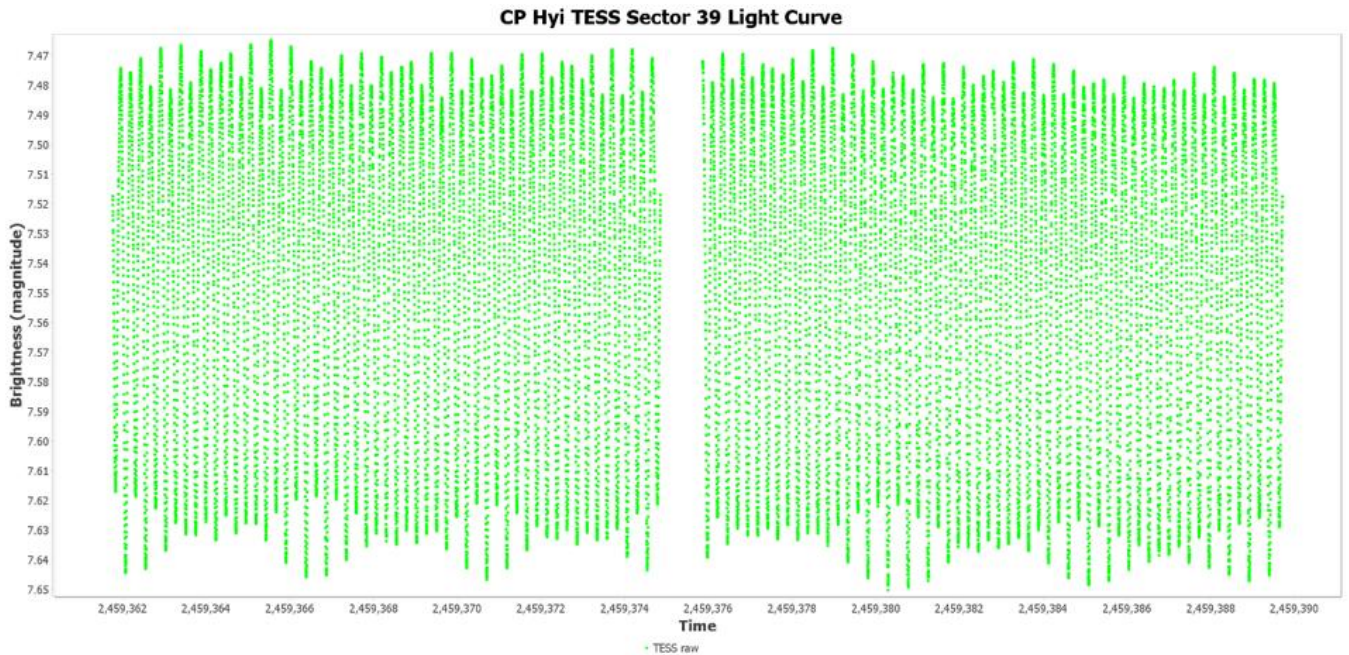




Transiting Exoplanet Survey Satellite (TESS) light curve of eclipsing binary CP Hyi from Sector 39 (27/05/2021 to 26/06/2021) showing variable brightness of maxima and minima. The magnitudes of minima vary in a semi-regular pattern with a period of about 4.3 days. Magnitudes of maxima appear to vary randomly. These may be caused by rapidly evolving star spots, or possibly pulsation of one of the component stars. See article starting page 6 of this newsletter.

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From the Director - *Mark Blackford*

Welcome to the third edition of the Newsletter for 2026. Thanks to Mati Morel for his articles on IZ Sgr and LMC novae and Ed Budding for his third instalment on analysing Cepheid light curves using the Baade-Wesselink (B-W) technique.

The unfortunate passing of long-time member Peter Williams was announced in the May 2026 VSS Newsletter. Peter was held in high esteem by variable star communities around the world for his decades of high-quality visual observations. The June 2026 edition of the British Astronomical Association Variable Star Section Circular includes a moving tribute by John Toone, BAA VSS Chart Secretary.



Looking ahead, the 2027 RASNZ conference will be held in Hamilton NZ hosted by the Hamilton Astronomical Society from 14th – 16th May. The venue and other details will be updated on the conference website (<https://www.rasnzconference.org.nz/>) as they become available. This may seem a long way off, but I encourage you to start thinking about attending and showcasing your work as an oral or poster presentation.

The AAVSO recently launched their new website. It may take a bit of getting used to the fresh new look, but it appears to still have all the features variable star observers regularly use. The Variable Stars South website is also getting a much-needed update. Simon Lowther is working with David O'Driscoll to construct a modern website, but that is still some way off. I look forward to seeing the results.

Back in mid-July John Drummond posed a question on the VSS Google Group “...is it still worth trying to capture nova, or have amateurs given up?”. Well, it turns out amateurs are still well and truly in the game. In another post on September 10th John announced he had imaged an ~11th mag transient in Sagittarius on 2026-09-09 09:36:13.764703 UTC from Gisborne, NZ. Andrew Pearse subsequently pointed out that Rob Kaufman also picked it up on the same night. Unfortunately for the amateurs though, the professional ASAS-SN survey identified the transient on an image recorded at 2026-09-08 18:57:36.000 UTC.

As always, I encourage you to submit articles or short notes to this Newsletter. We all have our favourite astronomy interests; mine being eclipsing binaries as should be obvious from the articles I've authored over the years. Some of you devote your time to exoplanets or cataclysmic variables for instance. Regular contributors do a marvellous job, but the newsletter would benefit from more varied topics. For those articles we need authors passionate about those topics.

Since the last Newsletter my wife and I enjoyed a tour of Sri Lanka followed by five weeks on a cruise from Amsterdam to Boston. On returning home we had several events that kept me away from the telescopes. Consequently, Congarinni Observatory has been dormant for the last 4 months. Now that spring has arrived, I am looking forward to getting back to observing again. The looming “super” el Ninho may result in drier conditions favourable to astronomy, albeit with associated risks of drought and bushfires. Let's hope we strike a good balance of conditions over spring and summer.

Wishing you all clear skies and good health,

Mark Blackford

Abstract

IZ Sgr has, since 2020, been classified as an RCB-type variable. However, an examination of published data, old and new, shows that it is rarely seen near maximum light. It spends most of its time near minimum, but with multiple rises reaching 12.5V max., with a cadence, of about 1229d, which was not previously known. This provides a new perspective on its classification as an RCB star.

Introduction

Announced by I. Woods (1928) as HV 4148, range 13.2 - <17.0. Type unknown. The name IZ Sgr was conferred prior to 1940.

At least 2 decades later the star was studied, by Hoffleit (1961) as var. no. 28. A finder chart was published. Range 13.6 - <16.5p. I reproduce her remarks regarding var 28 = IZ Sgr as follows:

Invisible on the vast majority of our plates. Only the following two groups of positive observations were found among several hundred plates showing stars fainter than 15 mag.

<i>mag pg</i>	<i>JD</i>	<i>mag pg</i>	<i>JD</i>
15.5	27600	14.9	29811
15.0	603	14.6	843
15.3	606	14.0	906
15.2	631	13.6	30087
15.0	634	13.6	116
[16.5	964	[15.0	168

Although the coordinates agree, it is doubtful that this is the star Miss Woods (1928) announced as HV 4148 = IZ Sgr. Both of these groups of observations are later than the dates of the plates then at her disposal, which we believe we have examined.

The above data points are too few to permit a precise determination of dates of maxima, but I adopt the approximate dates JD 2427634 (1934 July 15) and JD 2430102 (1941 April 17), interval 2468d

Houk (1967) classified the spectrum of IZ Sgr as type M6 (2 plates).

Observations

On account of its prolonged absence from brighter than mag.14.5, photometry is scarce. It is also known as **GSC 6279 870**, V = 12.21, as it was recorded on SERC V11963 (4min), 1987 June 19.

SIMBAD provides the following data:

Position: (J2000) 18 36 31.263, -20 59.15.53
Gaia EDR3 lists several faint companions (17 – 18 mag) within a radius of 10''
Proper motion, mas/y -5.049 2.071
Spectral type M6 (Houk, IBVS 228)
Mags: G = 19.288 (uncorr) 19.309 (corr) Gaia EDR3
J = 10.632 2MASS, near max. (1997-2001)
H = 9.131 2MASS, near max.
K = 7.636 2MASS, near max. J-K = 2.996

Evidently Gaia saw IZ Sgr only at minimum, not at max. EDR3 provides other data:

BP = 19.204
RP = 16.534
BP-RP = 2.670, a very red star.

ASAS3 Observations

ASAS3 provides a plot of observations of IZ Sgr between the years 2001 and 2009 (Figure 1).

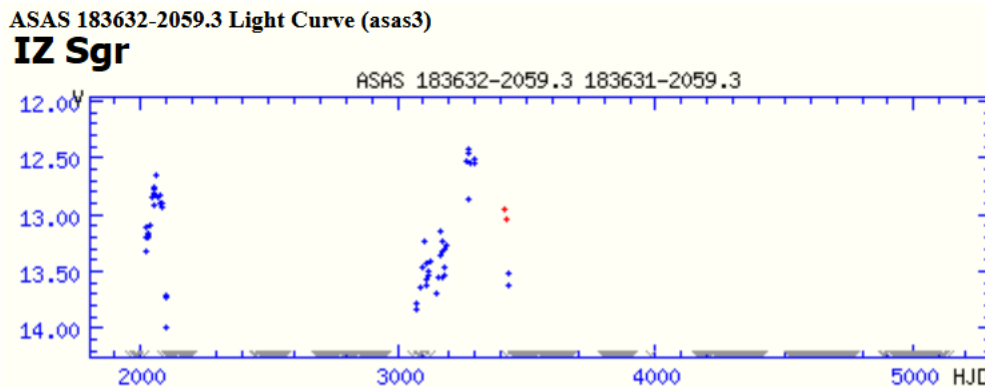


Figure 1. Light curve for IZ Sgr commencing JD 2452000 (2001 April 1). Courtesy ASAS.

Two maxima were captured, and I estimate that they occurred on the following dates:

JD 2452052	2001 May 22 UTC	Max. 12.65V
JD 2453299	2004 October 20 UTC	Max. 12.53V

Discussion

From the ASAS3 light curve the time interval between the two maxima is 1229d. The coverage is so good that there appears no possibility that another brightening, or rebrightening has been missed. On the other hand, if one refers back to Hoffleit's data the cadence is so large that there may have been a missed maximum midway between the two that she has listed. Cadence $2468 \div 2 = 1234$ d. Values derived from the Hoffleit and ASAS3 data are thus very similar. If there had been a missed maximum between the two Hoffleit maxima it would have occurred on about JD 2428868 = 1937 December 30, i.e. solar conjunction.

In 2020 Tisserand et al. published their comprehensive survey of RCB stars for both the Milky Way and the Magellanic Clouds and established WISE J183631.25 -205915.25 = IZ Sgr as a genuine RCB star. See ArXiv 1809.01743v3.PDF, or 2020A&A...635A..14T.

There are several things about IZ Sgr which do not add up:

- The published spectral type (M6) is not consistent with the extreme redness (B-V near +3.0). An expected value for an M6 giant is +1.6. Has a different star been classified by mistake? There are two stars just to the north of IZ which are both rather red. The brighter one in particular is at (J2000) 18 36 33.60 -20 58 29.2 (13.095V, B-V = +1.795 APASS).
- The ASAS light curve reminds one of an eruptive variable - a short period of rising to peak brightness, followed by a steady return to dim quiescence. During the long intervals between outbursts nothing much happens, as far as one can tell. The extreme redness is not consistent with a typical eruptive variable. This behaviour, and the very long period, is not that of a Mira variable.
- The ASAS light curve is not consistent with that of an RCB-type variable. Peak brightness occurs with a separation (1229 days), consistent with Hoffleit's observations, suggesting a regular pattern in its variability, which has persisted. Not the pattern of behaviour which would suggest RCB type.

Comparison Sequence

To facilitate observation of the next "outburst", I list the following provisional sequence of comparison stars. The field is crowded, with many red stars.

Table 1. Comparison sequence for IZ Sgr c/o AAVSO Seqplot.

Letter	V	V err	B-V	B-V err	Source	Remark
A	10.085	0.056	+0.778	0.086	Tycho-2	BD-21°5067 (off chart)
B	11.858	0.004	+0.528	0.006	APASS 29	
C	12.200	0.004	+0.673	0.006	“	
D	13.232	0.009	+1.135	0.016	“	
E	13.695	0.015	+1.343	0.030	“	
F	14.162	0.022	+0.912	0.035	“	
G	14.857	0.033	+1.081	0.062	“	

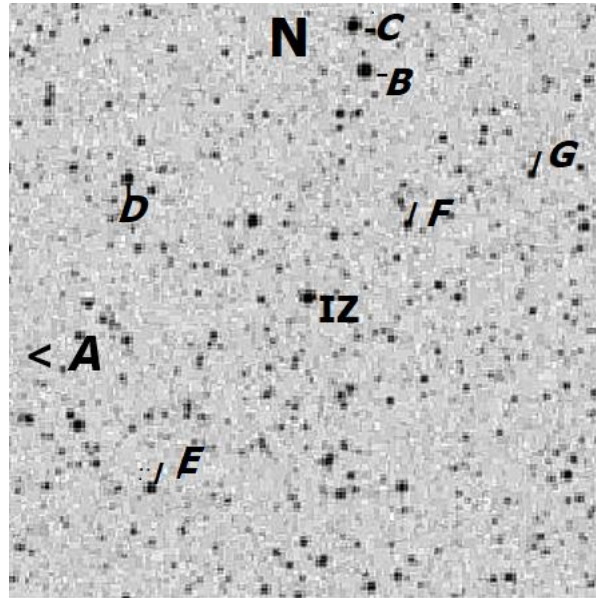


Figure 2. Field chart for IZ Sgr and selected comparison stars (see Table 1). The field size is approximately 6' x 6'. Adapted from DSS V plate from NASA's SkyView site. Star "A" is just off the eastern edge as indicated by the arrowhead. IZ Sgr is located dead centre, at max.

Next maximum

Assuming a periodicity of 1229d, the next maximum of IZ Sgr is expected on about JD 2461902 = 2028 May10. The rise can take as much as 50 - 100 days.

Conclusion

IZ Sgr has been classified an RCB star quite recently, but it shows many features which make it a rather unusual member of this class, as has been described above. From time-to-time reports appear of certain stars having isolated outbursts, which are considered abnormal or uncharacteristic. See for example Liller and Morel (2002) in the case of the LMC variable V2434. IZ Sgr has multiple episodes of brightening, but apparently on a regular long cycle length, and amplitude of more than 6 magnitudes. It is unknown whether this cyclic activity has persisted without interruption over the latter half of the 20th century. Knowing the cycle length should assist in collecting data in future.

References

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- Liller, W., Morel, M. 2002 AIP Conf. Proc.637, 472 "The Mysterious Eruption of V2434 LMC"
- Tisserand, P. et al 2020 Astron. Astrophys. 635,14 [ArXiv 1809.0174v3]
- Woods, I. 1928 Harv Bull. 854

Two Eclipsing Binaries Undergoing Period Change

Mark Blackford, Congarinni Observatory

In a previous VSS Newsletter (Blackford 2021) I extolled the virtues of photometric data from the Transiting Exoplanet Survey Satellite (TESS). Here I present a study of TESS light curves for two EW-type eclipsing binaries in Hydrus. These targets have also been observed as part of the VSS Southern Eclipsing Binaries Project, and both show evidence of period change in the years since they were first discovered.

There do not appear to be any measured Times of Minimum (ToM) of either system other than by Roy Axelsen or myself since discovery by the Hipparcos Satellite. Observed-Calculated diagrams (O-C diagrams) were constructed to investigate possible period changes. ToM's were measured from TESS observations using a custom macro-enabled Excel spreadsheet.

CN Hyi light curve and O-C diagram

AAVSO Variable Star Index (VSX) lists the magnitude range 6.68 - 6.93 Hp and period 0.4561070 days. Spectral Type F6V. CN Hyi was observed by TESS in 13 sectors between 2018 and 2025. TESS observations show very consistent brightness of light curve maxima and minima (Figure 1).

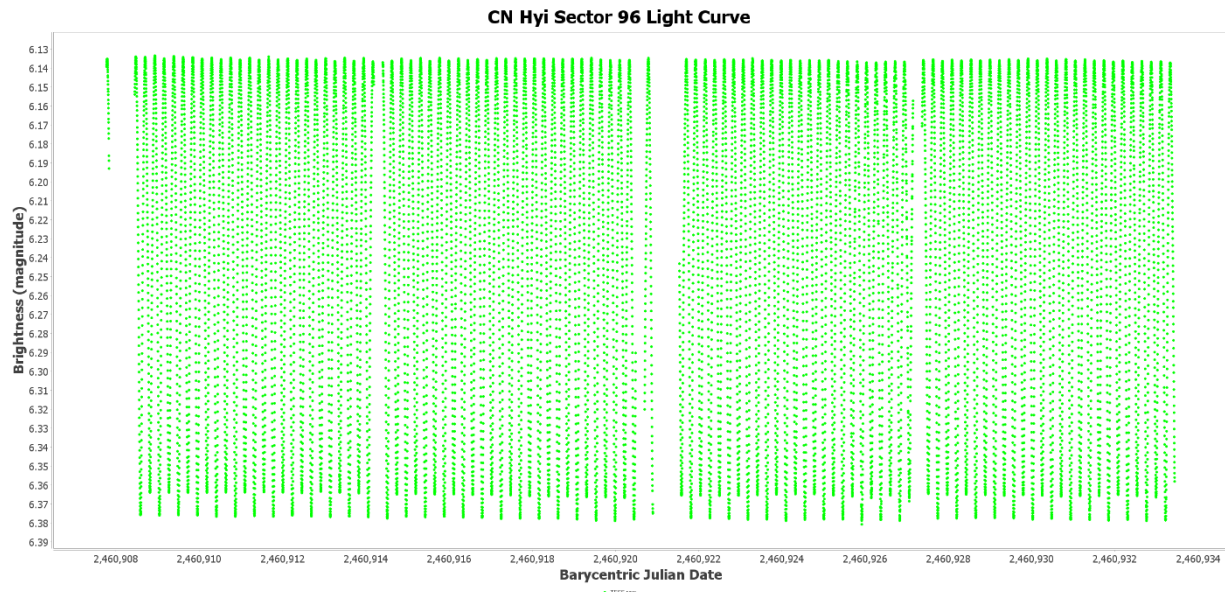


Figure 1: TESS Sector 96 light curve of CN Hyi showing consistent brightness of maxima and minima.

A total of 1434 times of minimum (ToM) were measured by fitting a 6th order polynomial to each primary and secondary eclipse recorded by TESS. The Barycentric Julian Date of the first TESS primary minimum was taken as the zero epoch, $E0 = 2458325.34675$ BJD. ToM's from the first TESS sector were used to refine the period, $P = 0.4560837d$.

TESS data are shown in blue in the O-C diagram (Figure 2), with VSS data (starting in 2014) shown in red. Error bars are plotted for the TESS data but are smaller than the symbols. The dotted curve is a parabolic fit to all the TESS and VSS data points. The downward curve indicates a steadily decreasing orbital period, the rate of which can be determined from the coefficient of the quadratic term.

The O-C analysis software OCFit v0.2.2 was used to determine the rate of orbital period decrease from TESS ToM's only as the VSS ToM's are much less precise. Blackford (2020) described an earlier version of OCFit. The rate of change was measured to be $-1.218251(5) \times 10^{-6}$ d/yr. Equating to -0.00013 s/orbit which seems small but steadily accumulates over the seven years of TESS observations such that eclipses occur some 25 minutes earlier than the linear ephemeris predicts.

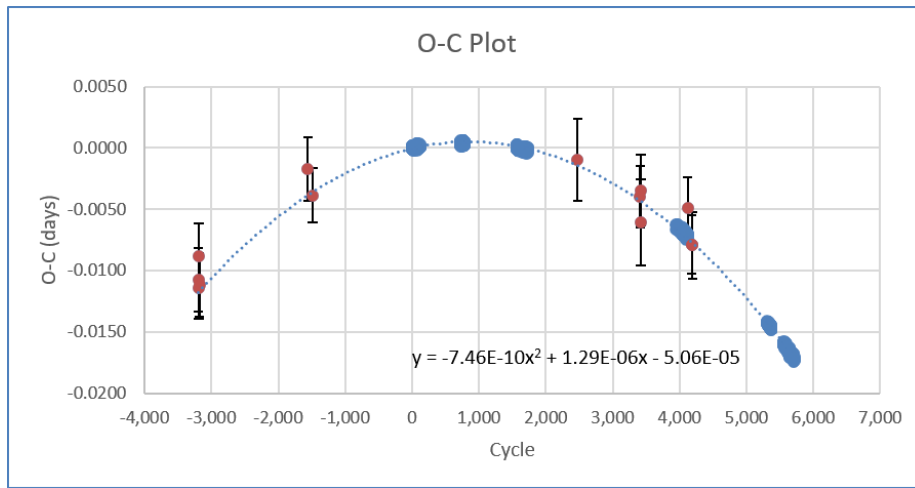


Figure 2: CN Hyi O-C diagram using TESS (blue) and VSS (red) times of minimum. Epoch of first TESS primary minimum 2458325.34675 BJD, revised period 0.4560837d.

CP Hyi light curve and O-C diagram

AAVSO Variable Star Index (VSX) lists the magnitude range 7.90 - 8.04 V and period 0.479406 days. Spectral Type F0V. CP Hyi was observed by TESS in 12 sectors between 2018 and 2025.

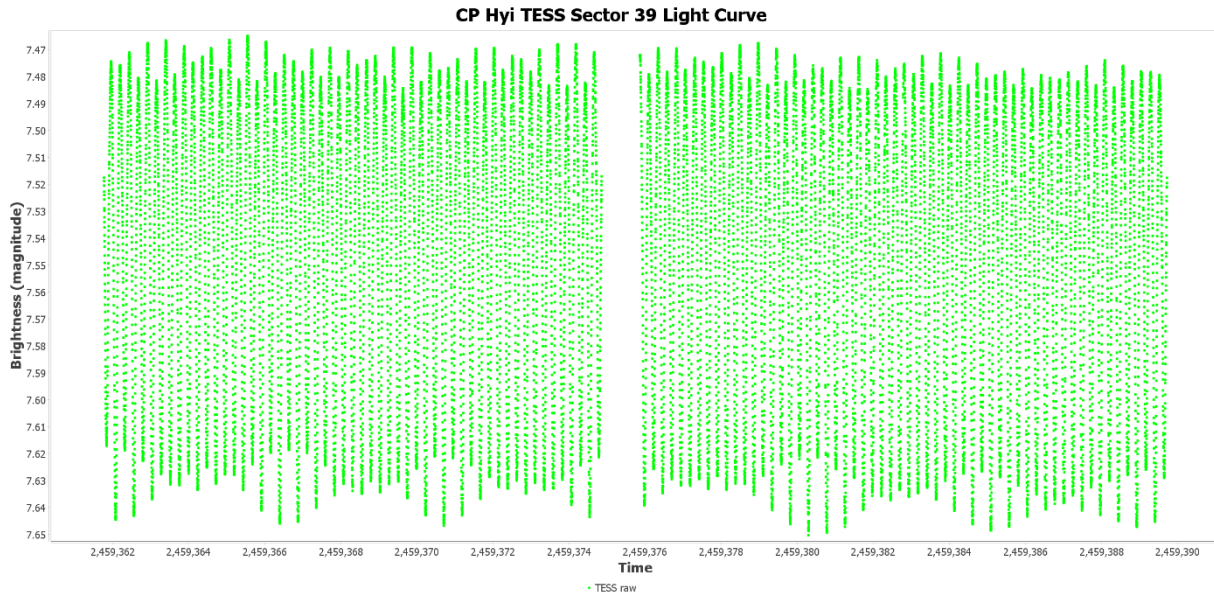


Figure 3: TESS Sector 39 light curve of CP Hyi showing variable brightness of maxima and minima.

Unlike CN Hyi, TESS light curves of CP Hyi (Figure 3) show considerable variation in the magnitudes of maxima and minima from cycle to cycle, a phenomenon known as the O'Connell Effect. The cause of this variation is not clear but may be due to bright (or dark) spots, or possibly pulsation of one of the stars in the system. I will leave further speculation on the O'Connell Effect to others; in this article I will restrict discussion to analysis of the O-C diagram.

A total of 1288 TESS eclipse times of minimum were measured in the same manner as for CN Hyi. The Barycentric Julian Date of the first primary minimum was taken as the zero epoch, $E_0 = 2458325.61432$ BJD. ToM's from the first TESS sector were used to refine the period, $P = 0.4794013d$.

TESS data are shown in blue in the O-C diagram (Figure 4), with VSS data (starting in 2017) shown in red. The dotted line is a parabolic fit to all the TESS and VSS data points. The upward curve indicates a steadily increasing orbital period.

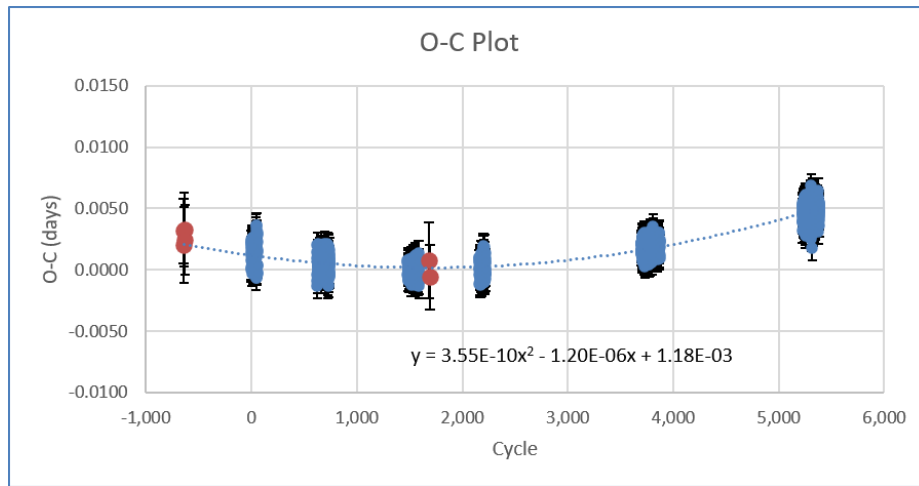


Figure 4: CP Hyi O-C diagram using TESS (blue) and VSS (red) times of minimum, plotted at the same scale as Figure 1. Epoch of first TESS primary minimum 2458325.61432 BJD, revised period 0.4794013d.

The rate of change was measured using OCFit to be $5.37172(9) \times 10^{-07}$ d/yr. This equates to 0.00006 s/orbit which accumulated over the seven years of TESS observations such that eclipses occur some 8 minutes later than the linear ephemeris predicts.

Scatter of O-C values

TESS observations of CN Hyi show very consistent brightness and shape of light curve maxima and minima (Figure 1). This results in very low scatter in the O-C values from cycle to cycle (Figure 5 top panel).

In contrast, CP Hyi exhibits significant brightness and shape variation of maxima and minima from cycle to cycle (Figure 3) which, as mentioned earlier, is possibly due to star spots or pulsation of one of the stars in the system. The shapes of minima are not consistent which leads to significant scatter in O-C values from cycle to cycle (Figure 5 bottom panel).

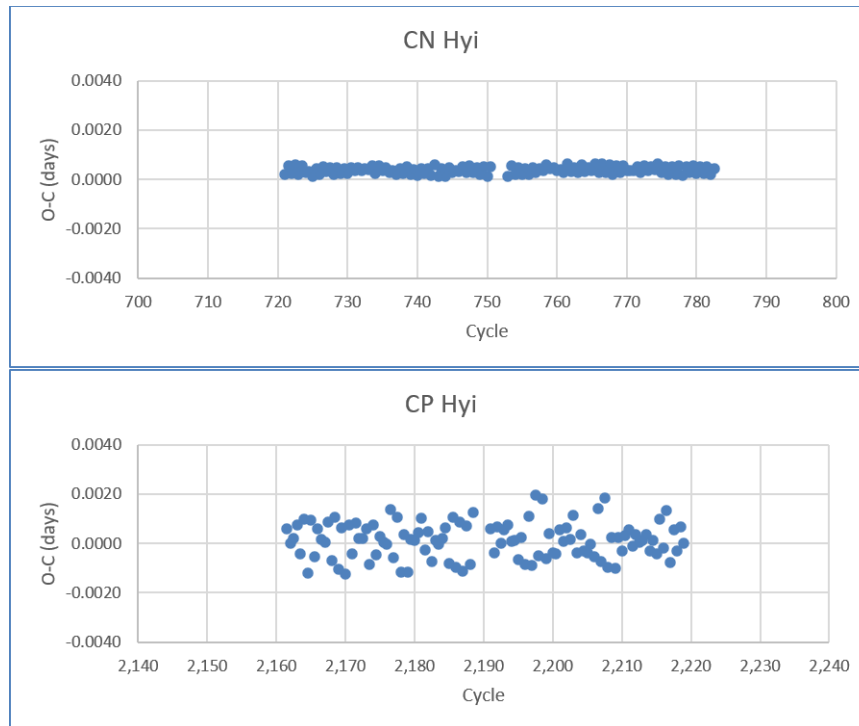


Figure 5: Comparison of scatter in measured Times of Minimum from the light curves of CN Hyi (top) and CP Hyi (bottom).

Conclusions

The orbital period of eclipsing binary CN Hyi has been steadily decreasing since VSS observations commenced in 2014. The orbital period of CP Hyi on the other hand has been steadily increasing since VSS observations commenced in 2017. In both cases transfer of mass between the stars in each system is a possible cause of the period changes.

TESS light curves of CP Hyi (Figure 3) show significant variation in eclipse depths from cycle to cycle. These appear to have a semi-regular pattern with a period of about 4.3 days which may be due to pulsation of one star in the system or star spot activity. The apparently random variation of maxima magnitudes may favour the star spot scenario.

Whilst no published times of minimum could be found for either CN Hyi or CP Hyi, other than by VSS observers, it should be possible to use surveys such as ASAS to extend the time base for the O-C diagrams.

Acknowledgements

This research made use of the AAVSO VSX database and the SIMBAD and VIZIER databases, operated at CDS, Strasbourg, France and of NASA Astrophysics Data System Bibliographic Services. This paper includes data collected by the TESS mission, which are publicly available from the Mikulski Archive for Space Telescopes (MAST).

References

Blackford, Mark, A new software tool for O-C diagram analysis, 2020, VSS Newsletter 2020-1

Blackford, Mark, TESS light curves – a treasure trove of variable star data, 2021, VSS Newsletter 2021-4

Abstract

I present a list of LMC novae discovered between 1926 to end of 2025, comprising 50 unique objects which includes four recurrent novae, as Table 1A. A second list, Table 1B, is comprised of objects which were initially reported as novae, but later reclassified, and or unverified.

Introduction.

The first LMC nova to be recorded was RY Doradus in 1926. Up till about 1970 the discovery of novae in the LMC was infrequent. Lack of close monitoring meant that, most likely, many novae escaped detection. Between 1990 and 2010 William Liller conducted his own nova patrol and began making discoveries on a regular basis. The advent of surveys such as ASAS, then ASAS-SN, OGLE and others increased the frequency of new discoveries quite significantly. An updated list of LMC novae is therefore desirable.

Base List by Shafter (2026)

Allen Shafter has published a very thorough survey of all known LMC novae, and their eruptions, totaling 66 entries. The coordinates for different outbursts belonging to the same nova are sometimes slightly discordant. He was concerned with the overall statistics of LMC novae, but re-solving discrepancies in coordinates was not part of his brief. He includes, in his Table I, many separate eruptions from recurrent novae (4), which inflates the number of entries. These are the two main issues which I have worked to resolve in creating a new table. I have separated multiple eruptions from recurrent novae and placed them in a “comments” section at the foot of Table IA.

Other sources have been consulted to include the most accurate coordinates for each nova, where possible.

Defining spectral characteristics of nova in eruption

These indicators can be used to confirm a nova in outburst.

- **He/N (Helium/Nitrogen) class.** Their spectra show broad emission lines of helium and nitrogen, typically associated with faster speed classes.
- **Fe II class.** These spectra show prominent ionized iron and other low-ionization metals, typically associated with slower speed classes and denser ejected envelopes. The strongest non-Balmer lines during the early phases in this class are due to Fe II.
- **Hybrid novae.** This class of nova is a system that changes spectral class from “Fe II” to “He/N” during the early permitted line phase, before the forbidden lines appear.
- **SSS = Super Soft X-ray Source.** A source of low-energy (soft) X-rays, typically between 0.09 and 2.5 keV, with few above 1 keV.

Tables 1A and 1B

Both tables follow the same format.

- Col. 1. Customary name, according to year and month of eruption.
Col. 2. LMC no. in Gen. Cat. of Var Stars, vol. 5 (1995)
Col. 3. Right ascension (h, m, s) for J2000.
Col. 4. Declination (deg., min, sec) for J2000.
Col. 5. “S”, primary source of data (max. of 2 sources)
Col. 6. Class of nova, where known
Col. 7. Maximum mag. and type of band/filter
Col. 8. Minimum magnitude
Col. 9. Provisional names and remarks relating to the eruption.

Conclusion

By my count, over the last century 50 individual novae have been detected in outburst. Four of them are recurrent novae, and this group is responsible for 13 eruptions. This group does not include LMC V1512 (=N Men 1951) now reclassified as a U Gem variable. Shafter's list of 66 entries includes 50 unique stars + multiple eruptions + unverified stars. His recent paper is worth consulting for an overview of nova eruptions in the LMC. My work here aims to give the reader a basic introduction, as the published literature on this topic is extensive. Mróz et al (2018) provide light curves for many of the OGLE discoveries.

Acknowledgements

I acknowledge Allen Shafter, whose 2026 paper inspired me to write this paper. While much of the information in his Table 1 has been incorporated in my work a considerable amount of editing and rearrangement has been carried out to make it more useful to VSS members. I also referred frequently to the VSX database of the AAVSO, for current data.

References

- Morel, M. 2021 VSS Newsletter 2021-1, 3
Mróz, P. et al 2018 arXiv 1511.06355 "OGLE Atlas of Classical Novae in Magellanic Clouds"
Shafter, A.W. 2026 arXiv 2607.23849 "A Century of Novae in the Large Magellanic Cloud"
Subramaniam, A., Anupama, G.C. 2002 Astron. & Astrophys. 390,449

Table 1A: LMC Novae with reliable classifications

Year id.	GCVS v5	RA (J2000)	Dec.	S	Type	Max.	Min	VSX, Other ID. / Remarks
1926-09a	V1674	05 14 57.09	-66 50 05.8	1	NB	12.4p	<18.0p	RY Dor
1936-02a	V1102	05 07 27.07	-66 39 24.9	1	NA	10.8p	<18p	
1937-11a	V4622	05 56 42.42	-68 54 34.5	1	NR	10.8p	19.5V	YY Dor; See below for 2 nd eruption
1948-12a	V3773	05 38 11.6	-70 21 07.0	1	NB	13.3p	<18.5p	Scanty data. Hybrid
1968-12a	V1341	05 09 58.39	-71 39 52.7	1	NR+E	10.7V	21.1V	6 other eruptions. See list below.
1970-03a	V3297	05 33 16.30	-70 35 02.0	2	N	12.	<17p	Scanty data. Hybrid
1970-11a	V3498	05 35 33.59	-70 46 21.4	2	NA	10.8:B	<18.8B	Scanty data. Fe II
1971-03a	V0430	04 58 18.46	-68 05 49.6	2	NA	12.08V	<21.5V	Scanty data.
1971-08a	V3958	05 40 44.16	-66 40 11.5	2	NR	13.0p	<14p	1 st eruption. See comments.
1972-08a	V2814	05 28 27.40	-68 48 51.0	2	NA	11.0p	<15.0p	Scanty data.
1973-09a	V1744	05 15 18.30	-69 39 23.0	2	NA	10.9B	<17B	Scanty data.
1977-02a	V4674	06 05 55.40	-68 38 13.0	2	N	12.6V		Scanty data.
1977-03a	V0971	05 05 13.30	-70 09 03.5	2	NA	10.67V	<18.3V	Posn uncert. Well studied. Fe II
1978-03a	V0990	05 05 55.35	-65 51 53.8	2	NA	9.8V	<15.0V	Maximum light missed. Hybrid?
1978-11a	V0616	05 00 59.63	-67 12 44.6	2	N:	16.0V	<16.0V	Observed far past maximum.
1981-09a	V3204	05 32 09.28	-70 22 11.5	2	NA	8.:V	<14V	Scanty data. Hybrid
1987-09a	V2406	05 23 50.25	-70 00 44.5	2	NA	9.5p	<19p	Good coverage.
1988-03a	V3479	05 35 29.33	-70 21 29.4	1	NA	11.4V	<15.0V	Extensive data. Fe II
1988-10a	V1161	05 08 01.04	-68 37 37.4	1	NA	10.3V	21.2V	Good coverage. He/N
1990-01a	V2361	05 23 21.83	-69 29 48.0	1	NA	11.5C	21.2V	Extensive coverage. He/N
1991-04a	V0850	05 03 44.92	-70 18 13.4	1	NA	9.0V	<20V	Very luminous. Hybrid,
1992-11a		05 19 19.96	-68 54 35.1	1	N	10.2V	18.1V	N LMC 92. Good coverage, Fe II
1995-02a		05 26 50.30	-70 01 24.1	1	N	10.7V	19.5V	N LMC 95. SSS. Fe II
1996-11a		05 13 32.71	-68 38 00.4	3	NR	<12.4V		MACHO detection. See comments
2000-07a		05 25 01.60	-70 14 17.3	1	NA	11.45V	?	N LMC 00. Good coverage, Fe II
2001-08a		04 48 57.50	-69 55 35.7	3,4		13.3 I		OGLE-2001-NOVA-01 (archival)
2002-02a		05 36 46.64	-71 35 34.4	1,4	NA	10.5V	<14.8V	N LMC 02. Covered in decline, Fe II
2003-06a		05 08 25.59	-68 26 22.3	1,4	NA	11.0V	<14.2V	N LMC 03. Fast nova, He/N
2005-09a		06 06 36.44	-69 49 34.3	3,4		11.4 I		SSS. Fe II?
2005-11a		05 10 32.69	-69 12 35.0	1,4	NA	11.5V	21.0V	N LMC 05 Slow nova, Fe II
2009-05a		05 31 26.42	-67 05 39.4	1,4	N	12.1p	?	N LMC 2009 #2
2010-11a		05 09 58.40	-71 39 52.7	4		12.6: I		OGLE, disc. in archival data
2011-08a		05 43 48.46	-69 19 31.0	2,4		<13.1 I		OGLE. Fast.. Maximum missed.
2012-03a		04 54 56.85	-70 26 56.4	1,4	NA	10.7w	18.1V	N LMC 12. Very fast. He/N
2012-10a		05 20 21.09	-73 05 43.3	3,4		13.9 I		OGLE-2012-NOVA-03, He/N
2013-10a		05 57 58.38	-74 54 09.4	3,4		11.2 I		OGLE-2013-NOVA-02 He/N
2015-03a		05 56 40.96	-75 09 36.9	1	N	11.5V	16.9V	Nova LMC 2015. Good cover. Fe II
2016-04a		05 10 32.58	-69 21 30.6	3	N+E	>11.0	20.6 Ic	Nova LMC 2016. He/N?
2017-11a		05 30 16.77	-73 16 11.3	1	N	11.8V	<22V	Nova LMC 2017 No.2 Fe II
2018-05a		06 26 20.78	-69 45 46.3	1	NA	12.1g	<21G	LMCN 2018-05a
2018-07a		05 41 46.46	-71 48 37.6	1	N	10.9	<22G	LMCN 2018-07a
2019-07a		05 29 36.64	-70 09 57.0	1	NA	10.95	<19V	LMCN 2019-07a
2019-11a		05 14 53.65	-70 09 48.6	1	NA	10.5g	20.2G	LMCN 2019-11a. He/N
2020-11a		04 49 30.26	-68 53 51.0	1	NA	11.0g	21.8B	LMCN 2020-11a. Hybrid?
2022-05a		05 22 27.88	-69 36 33.3	1	NA	10.0g	20.4V	PNV J05222788-6836333
2022-09a		06 29 08.43	-71 29 39.0	1	NB	11.5g	22.7B	ATLAS22beux, Nova Men 2022
2023-10a		04 46 52.43	-65 53 51.2	1	NA	10.4g	22.1B	DR3 4662989888116855808. He/N
2024-03a		04 55 03.93	-65 55 56.9	1	NA	10.2g	20.5G	ASASSN-24by. He/N
2024-04a		05 09 20.73	-67 08 21.8	1	NA	11.7g	20.5g	Nova LMC 2024b
2025-03a		05 03 37.06	-69 24 08.8	1	NA	11.2g	<21g	ASASSN-25ax
2025-09a		05 42 06.46	-67 01 06.7	1	NA	11.6g	23g	GOTO25hfy. Fe II

COMMENTS. for Table 1A

1937-11a Other eruption 2004-10a (2nd, 10.9:V, He/N. OGLE detection).

1968-12a. Other eruptions. 1990-02a (2nd, 11.2V, He/N), 2002-10a (3rd, 11.2V)), 2010-11a (4th, 12.0 I), 2016-01a (5th, 11.5 I, He/N), 2020-05a (6th, 13.7g) 2024-08a (7th, 10.0w1, He/N).

2nd eruption 2009-02a (10.6V,

1971-08a He/N)

1996-11a. 2nd eruption 2018-02a (11,0V, He/N). OGLE detection, their position adopted.

Table 1B: Nova suspects; unverified or later rejected

Year id.	GCVS v5	RA (J2000)	Dec.	S	Type	Magnitudes		VSX ID. / Remarks
						Max.	Min	
1935-09a	SN1935C	03 59 49.0	-67 38 16.5	2	SN	12.5p		In NGC 1511, galaxy
1951-01a	V1512	05 12 44.94	-69 57 19.3	1	UG	13.9V	19.4V	ASASSN-17lo
1952 :	V2724	05 27 54.61	-66 05 02.4	2	NL:	11.5p	<14p	Very limited data
1966 :	V3080	05 30 30	-71 46 00	2	N?	11.1p		BV 908; Very limited data
1996-11a		05 13 30.0	-68 38 00	3		<12.4V		MACHO detection
1997-06a		05 04 26.70	-67 38 38.0	3		13.5V		Limited data
1998-12a		05 35 32.27	-69 29 52.1	3		16.9R		Likely not a nova
1999-09a		05 19 55.79	-70 27 53.4	3,4		12.6 I		Max possibly missed
2001-06a	V2434	05 24 01.60	-71 09 34.5	1		9.7 R	12.90V	M2eIII; not a nova

Source Code "S": (1) VSX (2) GCVS v5
(3) Shafter 2026 (4) Mróz et al 2018

The Light Curves of Cepheid type Variables: III

Ed Budding VSS, RASNZ

Abstract

The Baade-Wesselink technique, discussed in previous reports, is examined again, this time referring to the more problematic case of S Muscae.

Introduction

The last issue of the VSSN contained ‘Paper II’, that discussed observations of the southern Cepheid beta Dor, and its analysis using the Baade-Wesselink (B-W) technique. It was shown how this comes down to constructing a theoretical light curve (LC) to compare with real observations. The theoretical LC is made by combining simultaneous size determinations obtained from radial velocity (RV) measures of the star’s photosphere, and its changing colour, from which a corresponding temperature can be derived. This, in turn, allows the full surface light emission from the star to be calculated with dependence on certain parameters, such as the mean size and temperature, and the distance from the Earth. The parameters that give the best fit to the observed LC form a reference set.

The technique was applied using standard B and V observations in Auckland by H Williams and S Walker to a few bright Cepheids. Near contemporaneous RV data were available from Taylor & Booth (1998). There was a fair level of agreement in the results for beta Dor, where the mean radius was found to be $69 R_{\text{sun}}$, and 312 pc was obtained for the distance.

Although S Mus has a similar period and range of spectral type variation to beta Dor, S Mus turns out to have quite different properties to beta Dor and indeed is a much more complicated object.

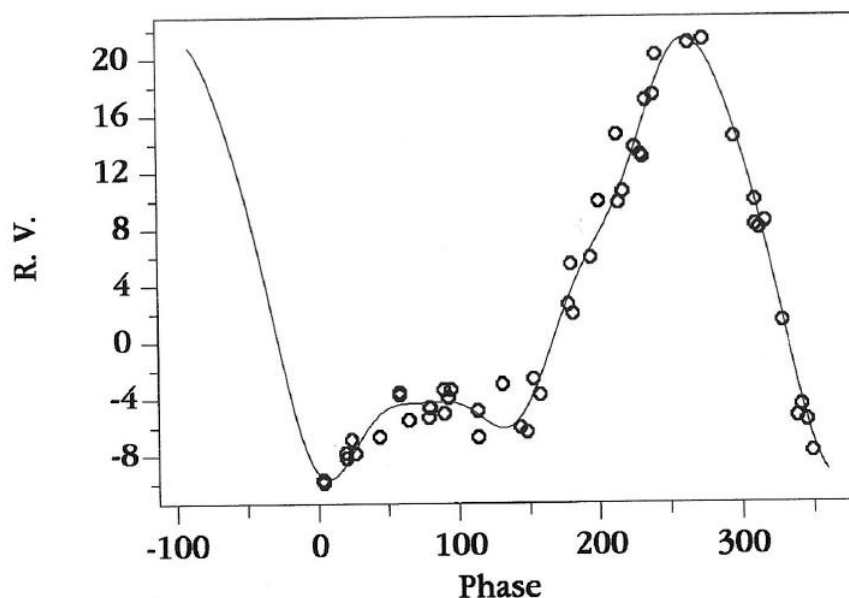


Figure 1: The radial velocity curve of S Mus as obtained by Wallenstein et al (1992) and fitted here by a fifth-order Fourier series.

For a start, S Mus is not a single star. Its relatively bright and massive B5 type companion orbits around with a period of ~ 505 days (Evans, 1990). This is one of the shortest known periods for a binary Cepheid, and it implies care to be required in separating the two sources of RV variation. The projected spatial

separation, $a \sin I$, derived from the wide orbit RV curve is 0.68 AU. Reasonable inferences can show that the inclination angle I must be relatively small (~ 15 degrees) so that the orbit presents itself almost 'pole on'. This suggests that S Mus might be an interesting target for polarization observations. Evans (1990) also found the interstellar extinction to S Mus is ~ 0.71 magnitudes suggesting the distance of several hundred pc.

Baade Wesselink analysis

As in Paper II, we first allow the radial velocity curve of S Mus to be represented by a Fourier series in phase. This can be integrated to yield the change of size with phase, as shown in Fig 1. The relevant Fourier coefficients are determined from the curve fitting procedure. The results of this can be judged from the fittings shown in Figs 1 and 2.

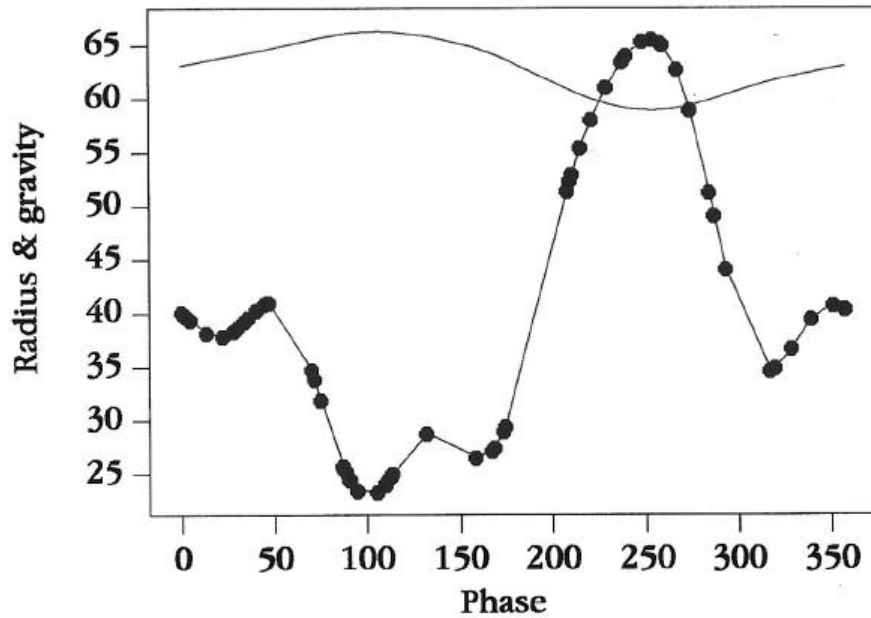


Figure 2: Radius (smooth curve near top --in solar radii) and gravity ($m \text{ sec}^{-2}$) variation for S Mus.

If we compare Fig 1 with the Paper II RV curve for beta Dor, we will notice the general similarity of form, i.e. the RV variation tends to mirror the brightness variation being most positive near the time of least brightness.

There are significant differences of detail, however. The amplitude of the S Mus velocity variation is quite less than that of beta Dor and the data more scattered. This dataset, from Wallenstein et al. (1992) is somewhat older and less homogeneous than that of Taylor and Booth (1998). This may reflect some extra complications associated with the binarity.

Another difference that can be seen in the S Mus RV data is that the peak recession velocity occurs significantly later (phase ~ 270 deg) than that of beta Dor (phase ~ 200 deg), with consequent implications for the time of maximum compression from this ephemeris. Indeed, such are the uncertainties of the phasing of Wallenstein et al. with the reference ephemeris:

$$\text{Max} = 2440299.420 + 9.66007 \text{ d}$$

From the observations of Williams and Walker, we find that the epoch of zero phase should occur some 15 degrees of phase later than what is given by Wallenstein et al. But even this does not accord with the epoch of maximum light, found by Williams and Walker to occur some 64 deg behind the predicted phase, at:

$$\text{Max} = 2449169.0059$$

This raises the issue of the phase difference parameter ε , introduced in Paper I. It should be generally negligible for contemporaneous light and RV variations of classical Cepheids. However, in cases of clear slippage of the reference point, as in the present case, it is necessary to allow ε to become adjustable, permitting a reasonable quality of curve fit. This is not possible for the present data sets with $\varepsilon = 0$. From the time of maximum light given by Wallenstein et al. ε could be as much as ~ 75 degrees.

The scaling factor p was again set at 1.36 in this analysis. The other parameters: R_0 , k_1 , T_0 , ρ , h_1 , were allowed to vary freely.

At this point, another complication comes to light associated with the relatively low colour variation. It is clear that a normal colour temperature relationship is compromised in the case of S Mus by the contribution of the B5 component. When the Cepheid is at its coolest its colour is not as red as it should be, due to the contribution of the hot component. Fortunately, very good data on the colour and magnitude effects of this star were given by Evans (1990).

The colour perturbation will detract from the expected flux drop at lower temperatures. We have approached this issue by including higher order terms in the empirical colour to brightness temperature relationship (including cubic and fifth order terms). This can reproduce the sought form of brightness variation that should be that of the variable star plus a constant additional amount from the hot companion. The reference temperature is correspondingly scaled up from that of the Cepheid alone.

Interim results

The same form of fitting function used in Paper II was used again as the basis for the optimization analysis. Evans (1990) derived a value of 0.23 for the interstellar reddening to S Mus, which implies a correction of -0.71 V magnitudes as mentioned before. This correction would place the peak brightness of the present V curve at 5.16. That's rather too bright to make the rest of the picture fit together well.

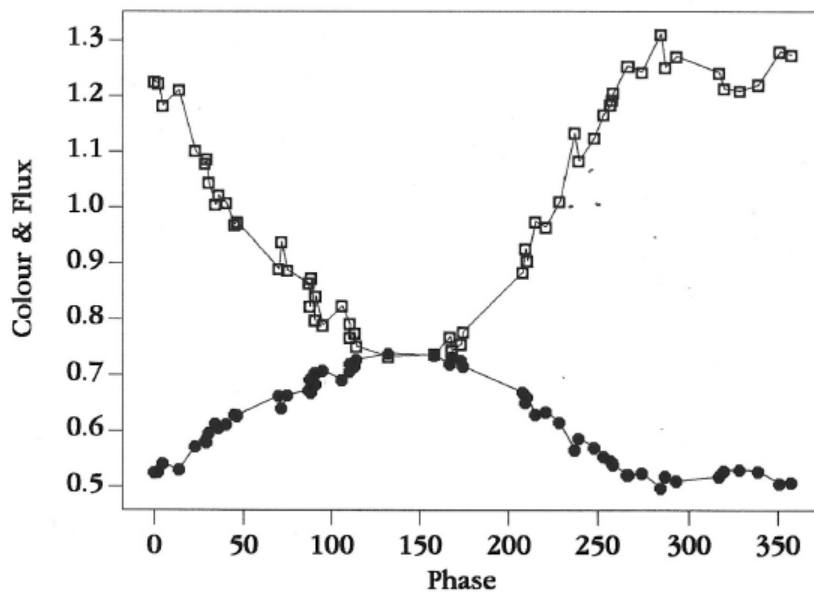


Figure 3: $B - V$ (full) and derived relative flux values (open) for S Mus. Note the relatively low amplitude of colour variation compared with that of beta Dor (see Paper II).

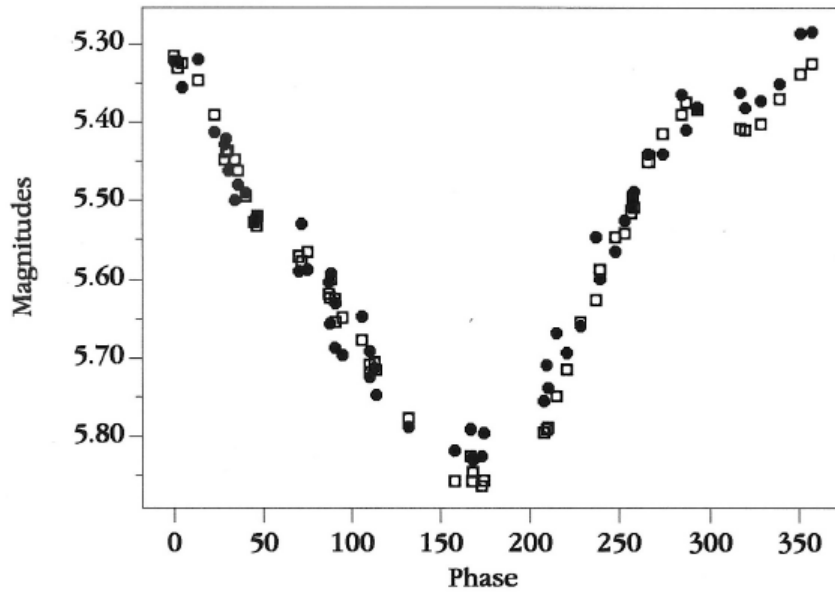


Figure 4: Observed (open) and calculated (full) *V* magnitude variations for *S Mus*.

In fact, there is an indication of a zero correction of 0.158 mag to allow the present *V* data to match what is generally reported for the peak brightness ($V = 6.025$). The extinction-corrected observational points are shown in Fig 4.

Using a 5th order Fourier fit to the RV curve of Wallentein et al (1992) optimal values of the radius and gravity variation were found as shown in Fig 2. These were used in the B-W procedure to compare with our *V* observations.

Fig 3 shows results of the complementary colour analysis. The $B - V$ index reaches its blue peak by phase ~ 280 deg, which implies that later brightening must be due to a radial increase over phases 0.8 to 1.0.

After numerous experiments, the parameters for optimal fitting of the *V* light curve were as follows:

($p = 1.36$, $\varepsilon = 72$ deg fixed); $R_0 = 63.0 R_{\text{sun}}$; $T_0 = 8114$ K; $\rho = 982$ pc,
 $k_1 = 8.45 \times 10^{-5}$, $k_3 = -4.8 \times 10^{-6}$, $k_5 = 1.04 \times 10^{-5}$ (colour-temperature coeffs)
 $h_1 = 0.013$ (gravity coeff.)
 $\chi^2/\nu = 1.25$, $\Delta m = 0.03$

These parameters correspond to the full points given in Fig 4.

Discussion

The results of this B-W analysis have to be regarded as interim until the issues of phasing and the colour effects of the B5 type component, particularly when the Cepheid is at its coolest, can be fully accounted for. Thus, the total variation of surface flux in *V* is about 50% of its maximum, as with beta Dor. The colour variation of *S Mus* is only 62% of that of beta Dor although about a significantly bluer average value.

The gravity term, with coefficient h_1 , is encouragingly about the same value as found for beta Dor, which, because of the independent quality and limited range of the gravity peak, tends to confirm that this term relates to a real ‘luminosity effect’ in the $B - V$ colour (see Paper I).

The shape of the gravity curve resembles the shorter period classical Cepheids δ Cep, or η Aql, with a single peak at maximum compression. The gravity curve for β Dor has a second, smaller peak just after maximum brightness. This is not so marked for S Mus and absent from the other Cepheids just mentioned, having a single peak. These effects may have some connection to the occurrence of ‘overtones’ in pulsating variables.

It is worth repeating that B-W analysis, regarded as an optimization problem, is characterised by highly correlated parameter values. That is to say, corresponding adjustments to certain combinations of parameters can result in comparable fit quality, even though the final sets of numbers may look appreciably different.

In other words, B-W fitting is not a well-defined problem. This should be kept in mind when considering that the derived distance ~ 982 pc is noticeably greater than would correspond to the adopted amount of interstellar reddening. On the other hand, with β Dor it was found that the solution became distinctly more definite in the immediate vicinity of the finally adopted optimum, where the difference between the observed and calculated magnitudes show no systematic effects.

A provisional quality to the results was reported for β Dor, where it was noted that other forms of evidence e.g. colours from longer wavelengths, or interferometric data may help to resolve possible residual ambiguities. This appears to be the case for S Mus.

In this article, we mentioned also a possible application for polarization studies. There are as well outstanding theoretical issues associated with the underlying simple, quasi-static assumptions about the properties of these dynamic photospheres. Even so, the point remains that Cepheid light curves offer useful information for other areas of astrophysics.

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The close binary V486 Carinae

Erdem, Ahmet; Bakış, Volkan; Özkardeş, Burcu; Budding, Edwin; Blackford, Mark G.; Love, Tom; Rhodes, Michael D.; Banks, Timothy S.

Abstract

The hitherto neglected close binary V486 Car is studied with the aid of newly applied satellite photometry (HIPPARCOS and TESS), high-dispersion spectrometry (High Efficiency and Resolution Canterbury University Large Échelle Spectrograph) and ground-based B and V photometry. While the sinusoidal light variations are suggestive of a near-contact system, the stars have only shallow eclipse, so highly confident parametrization becomes challenging. We find: $M_1=2.1\pm0.1$, $M_2=0.4\pm0.1$; $R_1=3.20\pm0.02$, $R_2=1.48\pm0.01$; ($\odot$); $T_{e1}=10000\pm500$, $T_{e2}=6200\pm200$ (K); distance = 162 ± 12 (pc). New times of minima for V486 Car have been examined, including recent observations from TESS. The role of the relatively significant O'Connell effect is examined. As well as the conspicuous asymmetry from the main effect of about 0.036 mag (V), a jitter, with amplitude of about 0.005 V mag and quasi-period of order ~ 10 d is noticed. There is a tendency for such photometric excursions at one maximum to precede those at the other. As well, the O—C data indicate the presence of a low-mass star $\sim 0.3 M_{\odot}$ in an orbit separated by a few au from the close binary. More accurate and plentiful spectroscopic data would be requisite for further investigations. A brief discussion reviews possible approaches to understanding the system in the context of near-contact binary scenarios.

Publication: Monthly Notices of the Royal Astronomical Society, Volume 548, Issue 4, id.stag831, 18 pp.

Pub Date: June 2026

DOI: 10.1093/mnras/stag831 10.48550/arXiv.2605.14208

arXiv: arXiv:2605.14208

The Eclipsing Binary V4374 Sgr Revisited

Michael D. Rhodes, Edwin Budding, Tom Love, Mark Blackford, Timothy S Banks, Aditya Shukla

Abstract

V4374 Sgr's variability was discovered by well-known RASNZ members. The system is a short period (1.177 days) eclipsing binary composed of similar G stars. This similarity and the system's strong chromospheric (star-spot) activity cause its light curves to be challenging to analyse, as noted in "Southern Stars" a quarter-century ago. Since then, higher quality data sets have been made publicly available, leading to this investigation which applies light curve modeling software jointly developed by New Zealand and US astronomers. Once the standard photometric variations caused by the close proximity of two stars orbiting each other were accounted for, two star spot regions were found to model well the remaining variations. This was a poster presentation at the 2026 RASNZ conference.

Publication: Southern Stars, Journal of the RASNZ, Vol 65, Number 2, 2026 June

Pub Date: June 2026

Metallicity Dependence of Internal Structure Coefficients in 1–2 $M_{\odot}$ Stars and Application to the Eclipsing Binary BW Aquarii

Inlek, G.; Budding, E.

Abstract

We investigate how metallicity ($Z = 0.0001-0.03$) shapes the internal structure of $1.0-2.0 M_{\odot}$ stars by quantifying the apsidal-motion constant k_2 and the related structural coefficients η_2 and Δ_2 , together with the radial derivative $d\eta_2/dr$ (hereafter $d\eta_2$). Using evolutionary models computed with MESA, we derive these coefficients by solving Radau's differential equation based on the stellar density profiles. We find that increasing metallicity generally produces more centrally concentrated interiors, with the metallicity

dependence approaching saturation at near-solar and metal-rich values ($Z \geq 0.02$). While zero-age main-sequence models show smooth, monotonic behavior in η_2 and $d\eta_2$, evolved models at 3 Gyr develop complex local extrema and core-region undulations, signaling deep structural reorganization with age. To test these trends, we compare our predictions with the eclipsing binary BW Aquarii ($M_1 = 1.365 M_\odot$, $M_2 = 1.483 M_\odot$; age = 3 Gyr). Our near-solar models successfully reproduce the observed apsidal-motion constant ($\log k_2$, obs = -2.02 ± 0.08). Critically, the $d\eta_2$ profiles reveal that even a modest mass difference of $\sim 0.12 M_\odot$ leads to radically different internal structures, as evidenced by the emergence of sharp structural peaks and undulations in the secondary component. These results demonstrate that η_2 and $d\eta_2$ provide sensitive diagnostics of stellar stratification that are masked by the integrated k_2 constant, emphasizing the necessity of precise mass and metallicity modeling in binary star studies.

Publication: The Astrophysical Journal, Volume 1006, Issue 2, id.168, 10 pp.
Pub Date: August 2026
DOI: 10.3847/1538-4357/ae8443

Phil Evans was co-author on the following 4 papers:

TOI-2494 c and TOI-5143 c: A Hot Saturn and a Hot Jupiter with Interior Planetary Companions
 Quinn, Samuel N., et al.

Abstract

We present the TESS-based discoveries of planetary systems orbiting the late G dwarfs TOI-2494 and TOI-5143, each of which harbors a hot giant planet and a smaller interior planet. TOI-2494 hosts a transiting mini-Neptune ($P = 2.41$ days, $RP = 2.35 - 0.15 + 0.16 R_\oplus$) and a hot Saturn ($P = 8.38$ days) with grazing transits, while TOI-5143 hosts a transiting mini-Neptune ($P = 2.38$ days, $RP = 2.73 - 0.17 + 0.19 R_\oplus$) and a hot Jupiter ($P = 5.21$ days) with grazing transits. We measure the masses of TOI-2494 c ($80 \pm 19 M_\oplus$) and TOI-5143 c ($208 \pm 14 M_\oplus$), place upper limits on the masses of the smaller planets, and explore the architectures of the planetary systems. TOI-2494 c and TOI-5143 c join a small but growing number of short-period giant planets known to be flanked by smaller companions. While the absence of close neighbors to most hot Jupiters would be consistent with disruptive dynamical evolution, the presence of nearby small planets in some hot Jupiter systems points to a separate, dynamically quiet formation pathway. In support of this conclusion, we present preliminary evidence that hot giant planets with small nearby companions tend to have low mutual orbital inclinations, consistent with the mutual inclination distribution of the dynamically quiet population of compact systems of multiple super-Earths and mini-Neptunes.

Publication: The Astronomical Journal, Volume 171, Issue 6, id.359, 17 pp.
Pub Date: June 2026
DOI: 10.3847/1538-3881/ae5b6a

TOI-159 b: An eccentric hot-Jupiter planet around a young, pulsating γ Doradus star

Mantovan, G., et al.

Abstract

Fast-rotating hot stars are challenging targets for exoplanet searches due to rotational broadening and stellar variability. Moreover, hot stars often exhibit pulsations, an additional source of scatter in both photometric and spectroscopic series. Because of these challenges, such stars remain a relatively unexplored environment for planetary architecture and evolution studies. In this study, we present the confirmation and preliminary atmospheric characterisation of a giant planet orbiting a young (≈ 150 Myr), pulsating γ Doradus star. TOI-159 b ($P_{\text{orb}} \approx 3.7$ d, $R_p \approx 1.6 R_J$, $M_p \approx 3.5 M_J$) is an S-type planet in a close binary system and is the hottest ($T_{\text{eq}} \approx 1900$ K) hot Jupiter with a significant eccentricity ($e = 0.24 \pm 0.04$) ever detected. Our joint modelling of radial velocities (HARPS and CORALIE), transits (TESS), and spectro-photometry (IMACS) allows us to detect its Keplerian signal at high significance (13σ), place strong constraints on its eccentricity (6σ), disentangle the stellar rotational modulation and

pulsation periods, and generate a low-resolution transmission spectrum, on which we conduct an exploratory analysis to constrain the presence of a planetary atmosphere using combined star-planet retrievals. Whilst our spectrum appears to display some modulation, the data are too coarse to allow for any conclusive detections at this stage. Higher-resolution observations are needed to confirm or refute these features and, if genuine, determine whether they originate from contamination from the star or a planetary atmosphere.

Publication: Astronomy & Astrophysics, Volume 711, id.A107, 18 pp.
Pub Date: July 2026
DOI: 10.1051/0004-6361/202659354
arXiv: arXiv:2605.04149

ASTEP confirmation of a pair of long-period Jupiter-sized planets with extremely low densities transiting TOI-791

Dransfield, Georgina, et al.

Abstract

Gas giant planets with periods $20 < P < 300$ d orbiting Sun-like stars are a relatively uncommon outcome of planetary formation, and key questions about the nature and formation of this subpopulation remain unanswered. Theoretical models for the location of their formation (in situ or ex situ) and for their subsequent migration predict different outcomes in terms of planet masses and eccentricities, indicating that observations have a key role to play in disentangling their histories. In this work, we present the discovery and confirmation of a pair of long-period Jupiter-sized planets transiting an F7 star: TOI-791 b is a $0.993 \pm 0.033 R_{\text{Jup}}$ planet on a $139.29931 + 0.00011 - 0.00012$ d orbit, and TOI-791 c, a $1.155 \pm 0.040 R_{\text{Jup}}$ planet on a $232.01570 + 0.00067 - 0.00071$ d orbit. The two planets are within 0.07 per cent of a second-order 5:3 period commensurability leading to transit timing variations (TTVs) of up to 50 min. We confirm their planetary nature using ground-based photometry, including multiple full detections of the >11 h transits of both TOI-791 b and c from Antarctica with ASTEP, making these the longest-duration transits ever observed in their entirety from the ground. Our detailed analysis of the TTV signal allows us to measure dynamical masses for both planets, which yield densities of $\rho_b = 0.038 \pm 0.008 \text{ g cm}^{-3}$ and $\rho_c = 0.047 \pm 0.006 \text{ g cm}^{-3}$, indicating that TOI-791 b and c are two of the lowest density giant planets ever detected. While these measurements are robust, further follow-up is needed to fully characterize the TTV signal and the architecture of the system.

Publication: Monthly Notices of the Royal Astronomical Society, Volume 549, Issue 4, id.stag864, 22 pp.
Pub Date: July 2026
DOI: 10.1093/mnras/stag864
arXiv: arXiv:2606.30016

TIC-65910228 b / NGTS-38 b, a 180 d transiting warm super-Jupiter

Rodel, Toby, et al.

Abstract

We present the discovery of TIC-65910228 b / NGTS-38 b, a giant exoplanet with a radius of $1.081 \pm 0.047 R_{\text{J}}$ and a mass of $4.77 + 0.39 - 0.37 M_{\text{J}}$ on a long-period (180.52797 ± 0.00036 d), moderately eccentric ($e = 0.3086 \pm 0.010$) orbit transiting a bright ($V = 10.230 \pm 0.020$ mag) metal rich ($[\text{Fe}/\text{H}] = 0.33 \pm 0.09$ 'dex') F6V–F7V type host star. The planet was initially detected from a single transit in TESS Sector 33. A photometric monitoring campaign of 228 nights with NGTS detected a transit egress of the planet, which together with spectroscopic radial velocity monitoring with CORALIE and HARPS identified an orbital period of 180.5 d. These radial velocity measurements also showed the mass of the companion to be planetary. Additional transit observations coordinated by the TESS follow-up observing program allowed further confirmation and refinement of this period. With its relatively cool equilibrium temperature of 457 ± 11 K, NGTS-38 b joins a small but growing population of well characterized transiting warm-Jupiters and has one of the longest periods of any discovered to date. The target is

situated in the LOPS2 field of the upcoming PLATO mission which will allow for greater refinement of the system parameters and potential for the discovery of additional companions too small and/or too long-period to be seen by TESS or NGTS. NGTS-38 b's bright host star and wide orbital separation make it an attractive target for further study, including potential measurement of its spin-orbit alignment or targeted exomoon/ring searches.

Publication: Monthly Notices of the Royal Astronomical Society, Volume 549, Issue 4, id.stag1061, 26 pp.

Pub Date: July 2026

DOI: 10.1093/mnras/stag1061

arXiv: arXiv:2602.12977

About

Variable Stars South is an international association of astronomers, mainly amateur, interested in researching the rich and under-explored myriad of southern variable stars.

Renamed from the Variable Star Section of the Royal Astronomical Society of New Zealand, it was founded in 1927 by the late Dr Frank Bateson, OBE, and became the recognised centre for Southern Hemisphere variable star research.

VSS covers many areas and techniques of variable star research, organised into projects such as Beginners' Visual Observations and Dual-Maxima Miras. The goal of each project is to obtain scientifically useful data and results. These may be published in recognised journals or supplied to international specialist data collection organisations.

VSS is entirely an internet based organisation, working through our website <http://www.VariableStarsSouth.org> and its e-group <http://groups.google.com/group/vss-members>. It also encourages members to work with major international organisations such as the British Astronomical Association, the Center for Backyard Astrophysics, and the American Association for Variable Star Observers.

To find out more, please visit our website, where, incidentally, you will find PDF copies of all our newsletters. Our website has a great deal of information for VSS members, and for anyone interested in southern hemisphere variable star research. All VSS project information and data is kept here too.

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