British Astronomical Association

VARIABLE STAR SECTION CIRCULAR

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Contents

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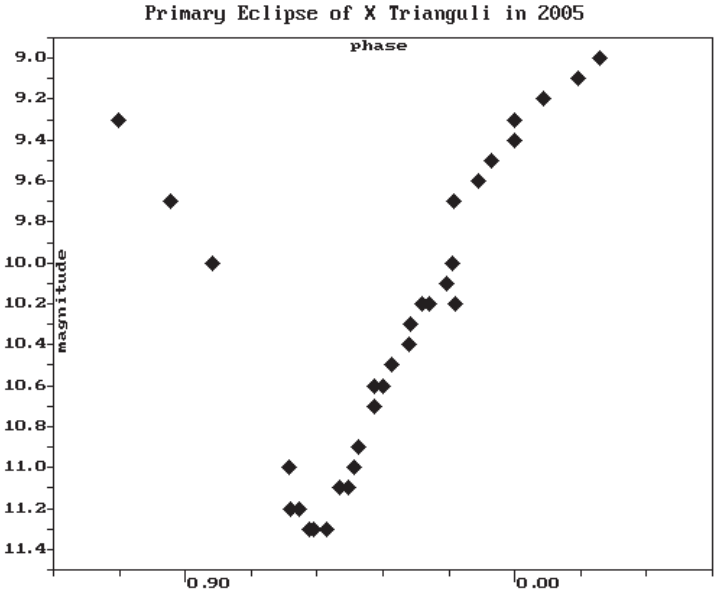
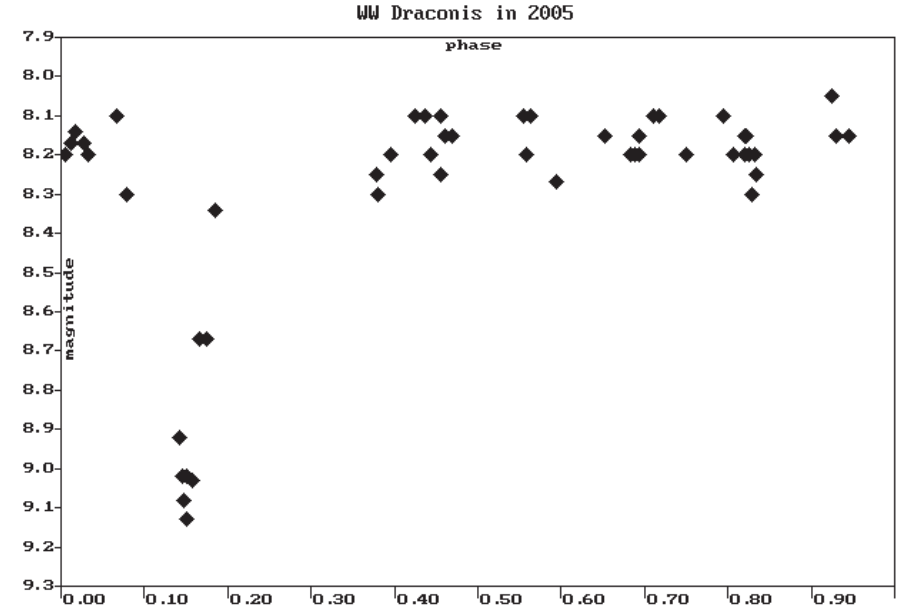
ECLIPSING BINARY LIGHT CURVES

Tony Markham and Michael Clarke



The variables were observed on a regular basis, rather than only at the times of predicted primary eclipses, and all observations were plotted, in order to see how much scatter/tidy a light curve might result.

X Trianguli light curve is based on observations by Michael Clarke.



WW Draconis lies near TX Draconis and is labelled on chart 106.01, although it is not identified as an EB. The light curve is based on observations by Tony Markham.

FROM THE DIRECTOR

Roger Pickard

After more than 10 years as our Editor, Karen Holland has asked to step down with immediate effect. I am extremely grateful to Janet Simpson for taking on this onerous task and trust she will serve for at least as long as Karen!

Karen, through much badgering of likely contributors has managed to issue four Circulars every year since she took over as well as instigate a number of innovations within the Section such as the CCD Programme and the Mentoring Scheme. She will be missed as the Director's 'ideas' person.

However, Karen will not be lost to astronomy as she intends to continue visual observing with her Daughter, Rosie, something she has been enjoying very much over the last year or two. She will also be supporting Janet in her new role for the foreseeable future. Karen also needs more time to concentrate on her business activities and we wish her well in this connection as well as thanking her for her invaluable contribution to the Section for so long.

Please send all future contributions as well as subscriptions to Janet whose details can be found on the back cover.

VSS Meeting Saturday 5th May 2007

I'm pleased to advise that the next Section Meeting will be on Saturday 5th May 2007, and will take place at the Royal Observatory, Blackford Hill, Edinburgh; this will be our first meeting in Scotland. The meeting will start at 10.00 am for 10.30 am, and finish at 5.30pm.

Speakers will include Dr Martin Hendry on "Gravitational Microlensing - Nature's Telescope"; Dr Michael Hawkins on "Dark Matter"; and Andrew Collier Cameron on "Sizing -Up Extrasolar Planets with Small Telescopes".

There will be an optional tour of the ROE following the lunch break.

The cost will be £10 per head to include all refreshments and a buffet-style lunch.

In addition the Astronomical Society of Edinburgh are holding their monthly meeting on Friday 4th May at 8 pm at the Calton Hill Observatory in the middle of Edinburgh. Members are welcome to attend this meeting who have arrived in Edinburgh on Friday evening.

Des Loughney is kindly organising the meeting for me, and so any queries on travel and accommodation etc. should be addressed to him. Some details can be obtained from the ROE's web site <http://www.roe.ac.uk/>.

I would be grateful if those attending can register with Des so that we can make the necessary catering arrangements, and organise the tour of the ROE (we may need to do it in two parties). Car parking is available just outside the ROE. Those people who have special needs should contact Des as car-parking can be arranged inside. The lecture room is accessible.

Further details will appear on the web site as they become available, or may be obtained from either Des or myself.

If you want to display a poster paper please let Des or myself know.

I'm sorry for the late announcement of this meeting but it only came about following the Director's visit to Edinburgh, in December last year.

Old Charts

John Toone, our Chart Secretary, has made an appeal for any observers who may still possess old VS Charts to contact him; the older the chart the better, but he is particularly interested in those that are at least 20 years old. Please let either John or myself know if you have any that you'd be happy to get rid of.

More Old Data Unearthed during BAA Office Move

During the recent move of the BAA Office to allow the refurbishment of the whole of Burlington House, a number of old VS records came to light. Some of these are in a slightly different format to those we've handled so far, but if any member fancies having a go at transcribing them to machine readable form please let me know. Otherwise they will have to wait for another member of the existing team to finish their present task.

Reversed Charts

Thanks are now also due to new member Kim Burton for reversing several charts that now appear on our Web Site.

On the Usefulness of Visual Observing

I've spoken to some observers over the last few months about the usefulness of visual observing in this modern day and age with so many professional CCD surveys of one type or another, and with more and more amateurs turning to CCD photometry. It usually runs along the lines that visual observing is pointless and has been replaced. How wrong can they be?!

Visual observations go back around 120 years, and in some cases a few hundred years. Electronic scans of the sky have lasted for only a small percentage of this time but will they continue? Sure, one may be replaced by another, but we will need to tie those two

databases together in some way, and what better way than to use visual observations?

In addition, current electronic scans are at the whim of local funding and should the Principal Investigator move on, it may be that the project fails. All this and I have not even mentioned equipment breakdowns! This is yet another reason to keep observing until it has been proved that there is no need; that time is still many years in the future.

But perhaps just as importantly, many of the stars that visual observers follow are too bright for many of these surveys, as the stars saturate the detectors.

Visual magnitude estimates provide a perfectly acceptable means for generating light curves for many types of variable star. Furthermore, visual observers provide a very efficient means of rapidly obtaining data - especially the notification of outbursts. This is not really the case for amateur CCD observers. They can only follow LPVs at minimum for example as otherwise their CCD is saturated. Therefore they tend not to follow them at all.

There has also been a lot of discussion on the AAVSO lists recently on this topic, and Arne Hendon is also of the opinion that, to quote, "observers are not paying attention to some important stars. Keep observing the LPVs, please!"

So, please, please keep on submitting those observations, otherwise many stars will end up being neglected which would be a tragedy for science.

ECLIPSING BINARY NEWS

DES LOUGHNEY

W Serpentis

While trawling through an astronomical publication, I was surprised to read that there may be a 'trinary' system. I had not thought that such a system could have a stable orbit, but it seems I was wrong. Apparently there is a stable 'figure of eight' orbit, which three stars can trace out. A binary system has two eclipses. A hallmark of a trinary system would be six eclipses.

If a trinary system is possible, then I would suppose, several examples should have been detected. However it seems that there is only one candidate at present. This is the system W Serpentis, which varies within the range 8.4 to 10.2.

W Serpentis has an accepted period of 14.15 days. Within that period it has three minima.

Those who speculate that it is a trinary system, consider that the real period is double the accepted period, therefore 28.3 days. On the basis of that period there are six minima. Apparently, according to a computer model, the light curve over 28.2 days is consistent with a trinary system.

W Serpentis is not on the Eclipsing Binary observing list, but perhaps such an interesting

object ought to be?

The more conventional explanation, of the three minima within a 14.15 day period, does not make the system any less interesting. This explanation suggests that we are observing, a close binary system with an unusually high rate of mass transfer from the secondary to the primary. The transferred mass forms a thick accretion disc, more like an accretion sphere, around the primary which largely obscures it. Near a pole the accretion disc is thinner and allows the underlying star to shine through. This bright spot, jet, or conventional hot spot, is brighter than the rest of the apparent disc of the primary. The third minimum represents the regular eclipse of the 'hot spot'.

Observing W Serpentis is well within the means of amateur astronomers, though it is a bit low down for those of us who live in Scotland. Timings of the three minima may well be useful in illuminating the true nature of the system.

For further reading:

'Polarimetric Study of the Massive Interacting Binary W Serpentis: Discovery of High-Latitude Scattering Spot/Jet' : Piirola, V.; Berdyugin, A.; Mikkola, S.; Coyne, G. V. The Astrophysical Journal, 2005, Volume 632, Issue 1, pp. 576-589.

SW Cygni

This is a system that is on the Eclipsing Binary list. It will soon be in a favourable position for observing before midnight. It is quite easy to find as it is near the well known Omicron Cygni double. It is an Algol-type eclipsing binary (EA/SD), which varies between 9.3 and 11.8 during the primary eclipse. The period is 4.573 days.

The eclipse is total. On published light curves, the period of totality does not look very long in comparison with the phase diagram. However, bearing in mind the period of the system, totality actually lasts three hours. At the time of writing the next eclipse will be at 5.00 UT on 1/2/07; totality will start at 3.30. To get enough observations to make a reasonable estimate of the mid-eclipse, I reckon that you would have to start at around 2am, and then resume after totality finishes at 6.30 am.

This system is still of professional interest, because of continuing active mass-transfer from the secondary to the primary. The transfer is revealed through period changes, emission lines at totality, an accretion hotspot and a stable accretion disc, and a perturbed light curve. It would be interesting to see whether visual observations would pick up any of the features that may constitute a perturbed light curve.

Eclipsing Binary Secretary
desloughney@blueyonder.co.uk

RECURRENT OBJECTS PROGRAMME NEWS

Gary Poyner

AW Sagittae

A rare outburst of this ROP star was detected independently by Jeremy Shears and Gary Poyner on Nov 16.764 at 14.1C and Nov 16.846 at 14.4 visual respectively. This was the first outburst detected since May 2004. Unfortunately the location in the evening sky limited the period in which time-series photometry could be undertaken. Despite this however, Jeremy Shears reported 0.3 magnitude superhumps detected on November 16th (see his image in Figure 1 below), and Tom Krajci obtained a 3.2 hour time series run on November 18th revealing a superhump amplitude of 0.25 magnitude, and approximate period of 0.076d [baavss-alert 962]. Taichi Kato comments in vsnet-alert 9130, that the Supercycle for AW Sge could be quite long at ~2yrs.

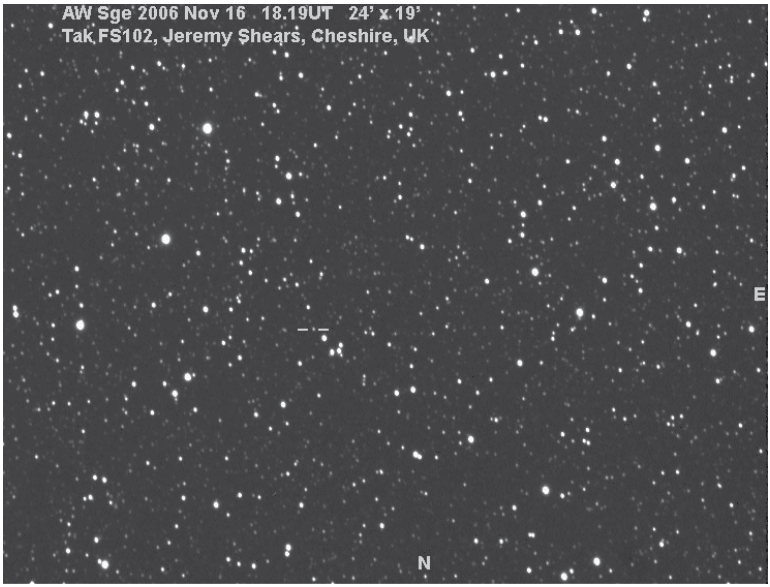


Figure 1: CCD image of AW Sge in outburst, by Jeremy Shears.

V452 Cassiopeiae

It has been decided to drop V452 Cas from the ROP. Thirteen outbursts have been detected since 1993, with nine of those observed since 2005. Recent intense CCD coverage has established that V452 Cas is a short period UGSU star, which in some aspects resembles the short brief outburst nature of V1316 Cyg. The UGSU classification was confirmed during the November 1999 outburst, when Tonny Vanmunster and Bob Fried determined a Psh of 0.0891d +/- 0.0004 [CBA News]. This value was however established from relatively short time-series runs, so it is important that V452 Cas is kept under observation so that any future superoutburst can be monitored more intensely. The Supercycle has also to be established.

http://www.garypoyner.pwp.blueyonder.co.uk/rop.html

MY FAVOURITE VARIABLE STAR

JEREMY SHEARS

When I first heard Janet's suggestion that VSS members should write about their favourite variable, I thought "what a great idea, let's get writing". However it has taken me some months to get around to putting pen to paper. This is not just because it has been a difficult decision, but also because I am not sure if I am actually *allowed* to have a favourite variable star. Let me explain with an example. When I moved to the Far East, I was immediately impressed by the variety and quality of the Asian cuisine, especially during my travels in China. There were simply so many dishes to try, so many different methods of preparation. In spite of that, pretty early on I announced that my two favourite dishes were crispy fried squid (the baby variety) and roast pigeon. Immediately, a wise Chinese friend commented that I was not *allowed* to have a favourite dish yet, as there were literally thousands of different foods to try and until I had spent a lifetime savouring them I should reserve judgement. This was wise advice indeed, and my journey thorough Chinese cuisine continues. Now, I began variable star observing a mere two years ago, so surely it would be too early, and too presumptuous of me, to have a favourite? One way around this is to simply claim a variable as my favourite so far encountered in my variable star journey.

With these caveats understood, let's move on to describe how I choose the favourite. I am almost exclusively a CCD observer; the sole exception being a series of naked eye observations of χ Cygni made during the summer of 2006 whilst on holiday in Spain without a telescope and without a CCD. I know that many people think that CCD observing is a purely mechanical process, devoid of any emotional contact with the stars such that a visual observer gets when admiring a beautiful star field. Well, just like a visual observer, I do get pleasure from imaging certain VS fields, especially ones that are very rich in stars near the milky way, like V1454 and V1363 Cygni, both of which have many attractive asterisms in their fields.

I also enjoy variables that are accompanied by other interesting deep-sky objects. Examples of the latter are CP Draconis and AL Comae Berenices, both of which are close to spiral galaxies (NGC 3147 and M88 respectively). Hence any favourite variable, so far as I am concerned, must be located in an interesting field to which I look forward to return time and again.

A second prerequisite of a favourite variable is that it should show some interesting behaviour. It has to be said that many of the targets on my programme, which are mainly Cataclysmic Variables, are invisible most of the time; in fact many of these I have never seen, since their outbursts occur on timescales of years, and several have never been see in outburst.

One of the excitements of CVs is being able to spot a rare outburst of one of these stars, and following up with time-series photometry in an attempt to uncover its underlying astrophysics: heady stuff indeed! But to keep my interest going, it's important to have some stars on my programme that do show regular activity. So based on these criteria - interesting field and intriguing activity - my favourite star at the moment is V452 Cassiopeiae.

V452 Cas is a dwarf nova belonging to the UGSU family. Recent monitoring has shown that the star shows rather frequent outbursts, typically every month or two, but these tend to be short-lived and rather faint, often below 16.0. In addition, there's the occasional superoutburst, during which superhumps have been detected. More details of these outbursts can be found in Gary Poyner's notes about the Recurrent Objects Programme, elsewhere in this Circular.

Most of the time when I image the field the star is not detectable, although I can usually detect the magnitude 17.2 star to the north on the AAVSO chart, which sets the limiting magnitude. Hence I record the result as <17.2. But occasionally when I turn the telescope to this field, to my amazement, V452 Cas appears as a neighbour to the magnitude 15.8 field star as shown in the accompanying CCD image. Because these stars are so close, when V52 Cas is in full outburst they look like a beautiful double star: a truly beautiful sight!

And there's science to be done here too: we still need to determine the actual frequency of outbursts and superoutbursts, as well as to refine the superhump period during a future superoutburst. What more could one want from a variable star?

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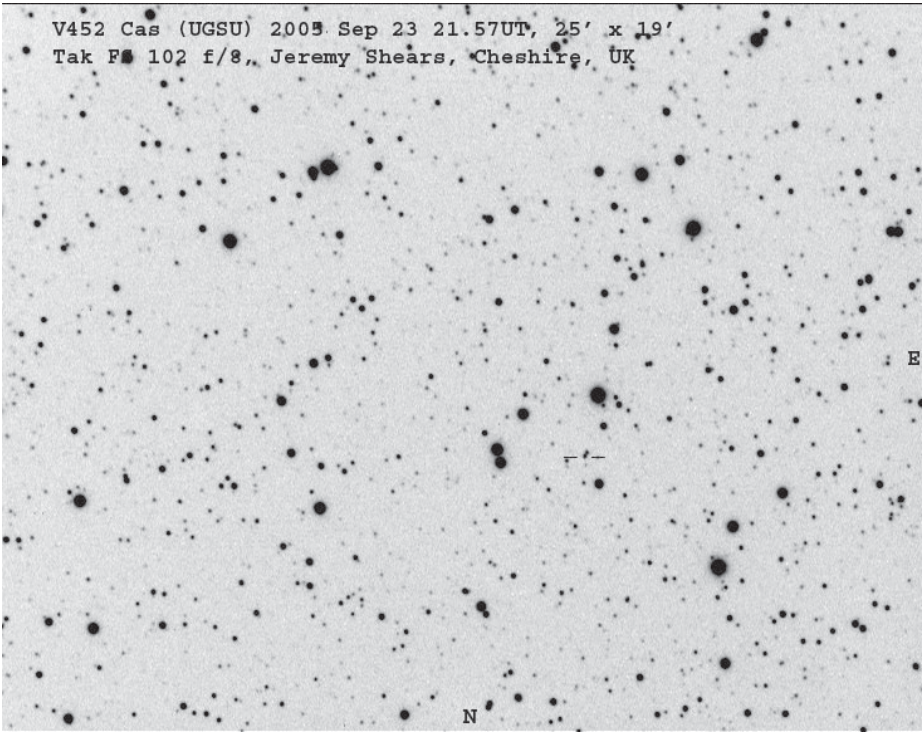

Figure 1: V452 Cas in outburst on 2005 Sep. 23, Takahashi FS102, 0.1 apochromatic refractor, Starlight Xpress SXV-M7 CCD (unfiltered). 25' x 19'; S is up.

SAO 64632 - A NEW VARIABLE STAR IN THE FIELD OF U CORONAE BOREALIS

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Abstract: A light curve of the dwarf K star SAO 64632 (BD +32 2572), in the same field as U CrB, is presented in this paper. Data was obtained using the 7.5-cm telescope at the Cáceres Astronomical Observatory (Cáceres, Spain) equipped with a Starlight Xpress MX516 CCD. The present light curve (in V band) and those obtained by HIPPARCOS (in B_T and V_T band) are all analysed: the results show that SAO 63632 is a variable star of low amplitude (almost 0.18 magnitude: 0.14 ± 0.04 mag.) with a period near to 9.24 days.

Name of the object: SAO 64632, BD +32 2572, HIP 75011
Equatorial co-ordinates: R.A.= 15h 19m 40.14s DEC.= 31° 50' 33" (Equinox: 2000.0)
Observatory and telescope: Cáceres Astronomical Observatory, Cáceres (Spain), 7.5cm achromatic refractor.
Detector: Starlight Xpress MX 516 camera, 512 x 290 pixels, 16 bits.
Filter: *V* Johnson
Comparison star: SAO 64632 (HIP 75011), for U Coronae Borealis.
Check stars: TYC 2563-605-1, TYC 2563-1152-1 (BD +32 2567), TYC 2563-1060-1

Availability of the data: Upon request to *fviolat@yahoo.es*

Type of variability: BY (BY Dra: stars with 'starspots' rotating with the star), L (unstudied variable stars with slow light changes) or IB (poorly studied irregular variables of intermediate [F-G] to late [K-M] spectral type).

The variability of SAO 64632 (BD +32 2572 and HIP 75011), a high proper-motion star (LTT 14557 or PPM 78506), has been discovered during a programme to study, discover and/or classify new variables, using CCD observations of stellar fields with a small telescope. In this case the star was the eclipsing variable U CrB (Alpha: 15h 18m 11.35s, Delta: +31º 38' 49.42", magnitude: 7.82 *V*, period: 3.4522053 days), using SAO 64632 (*V* = 8.8, Sp. K0 V) as comparison star and TYC 2563-605-1 (*V* = 9.55), TYC 2563-1152-1 (*V* = 10.52, Sp. G5) and TYC 2563-1060-1 (*V* = 10.30) as check stars (B, C and D in our CCD chart, Figure 1).

The observations were taken on 33 nights over a period of 47 days, between 2006 August 30 and October 15 (HJD 53978 to 54024), using a CCD camera (Starlight Xpress MX516, 512 x 290 pixels, 16 bits, field of view: 36' x 24') attached to the focus of the 7.5-cm refractor (focal length = 500 mm) at Cáceres Astronomical Observatory, Cáceres (Spain), with a *V* Johnson filter. The exposure time was 40-45 s, depending on the

transparency; the frames were corrected for standard dark and flat fielding, and were then processed with the microcomputer-based aperture photometry software "AIP$_4$WIN". Because the signal-to-noise ratio for SAO 64632, a presumably non variable star, was above 50, the photometric precision was below 0.03 magnitude.

From 402 CCD frames over 395 observations of U CrB, an EA eclipsing star, the following was taken: the CCD finder chart (with labelled stars) is shown in Figure 1 and the light curve is shown in Figure 2.

The magnitudes were determined relative to SAO 64632, whose constancy during the run was confirmed using TYC 2563-605-1, TYC 2563-1152-1 and TYC 2563-1060-1. In Figure 3 we can see a strange "oscillation" between eclipses because the comparison star is really variable; curiously the same periodical "oscillation" appears in the light-curves of the 3 check stars (Figure 4 and 5).

The measured amplitude was in the range 0.21 to 0.40 magnitude, including the random errors: the scatter increases and widens for the low bright stars TYC 2563-1152-1 and TYC 2563-1060-1 (V 10.52 and 10.30 magnitudes respectively).

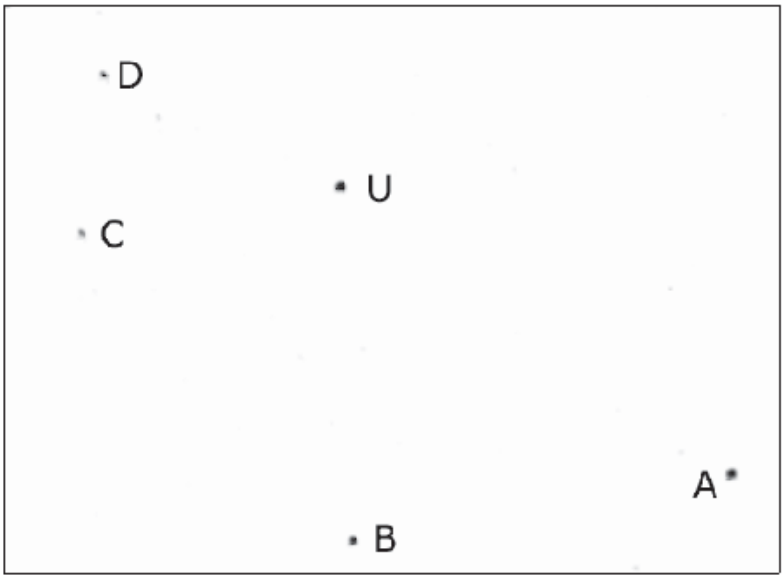

Figure 1: CCD finding chart made by the authors, of the variable U Coronae Borealis (U), the comparison star (A), and the check stars (B, C and D). Field of view: 36' x 24'; North down, East to the right. Limiting magnitude: ~13.

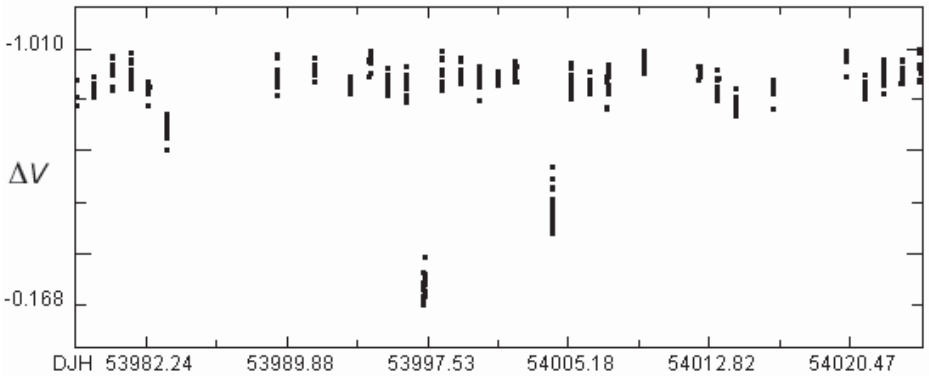

Figure 2.:Light curve, in V band, of U CrB from our 395 CCD: a strange "oscillation" (seen as abnormal scatter between eclipses), can be observed.

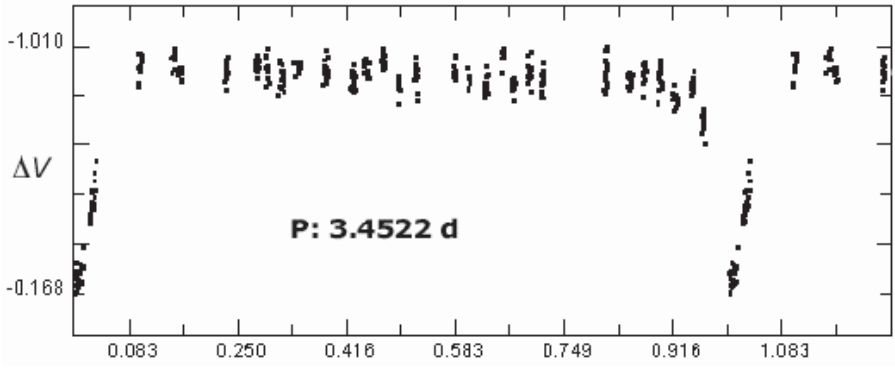

Figure 3: Light curve, in *V* band, of U CrB from our 395 CCD measurements, folded with the official period; amplitude measured: 0.842 magnitude. One can see the periodical, and sinusoidal, oscillations in the time.

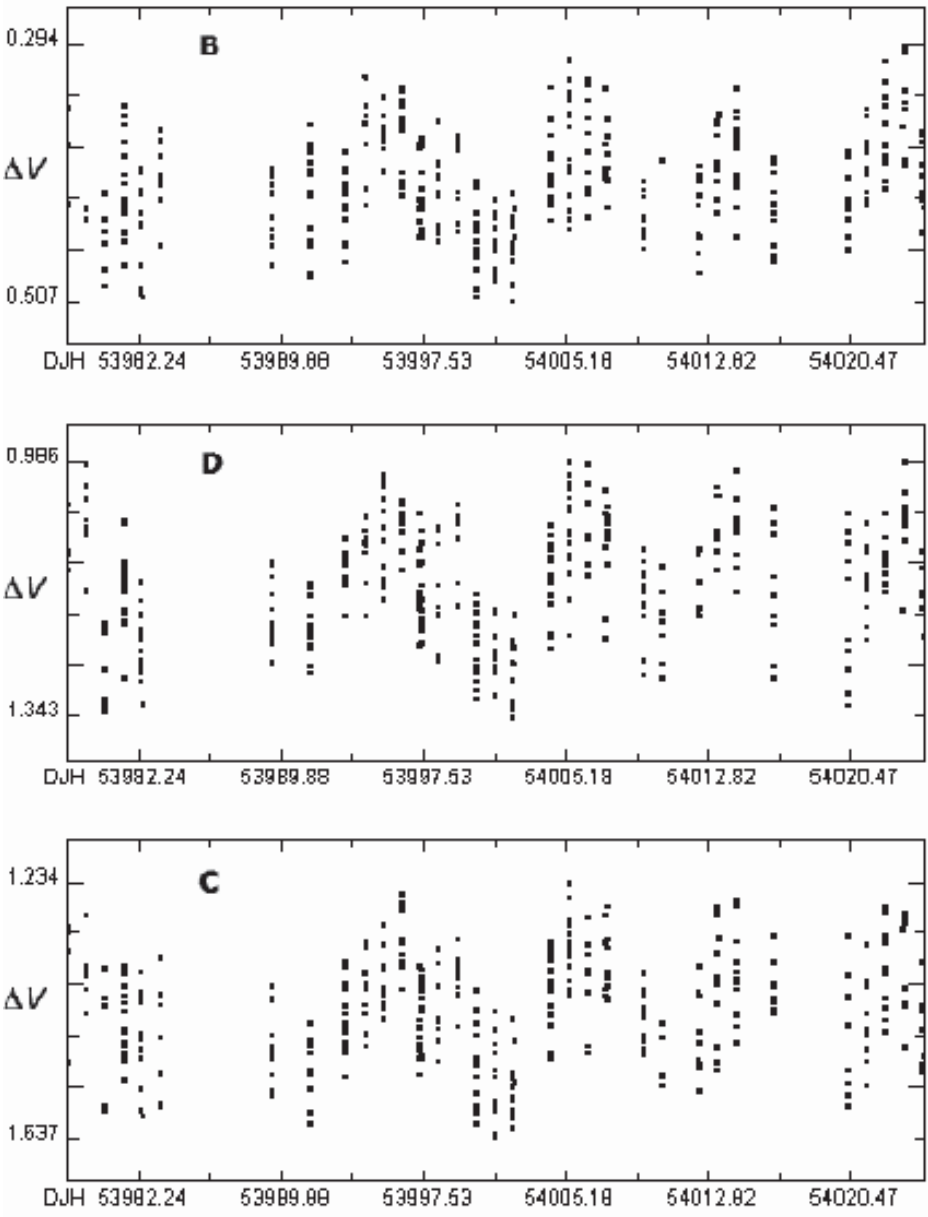

Figure 4: Light curves of check stars TYC 2563-605-1 (B), TYC 2563-1152-1 (C), and TYC 2563-1060-1 (D), with the same and identical, periodical, quasi-sinusoidal "oscillations".

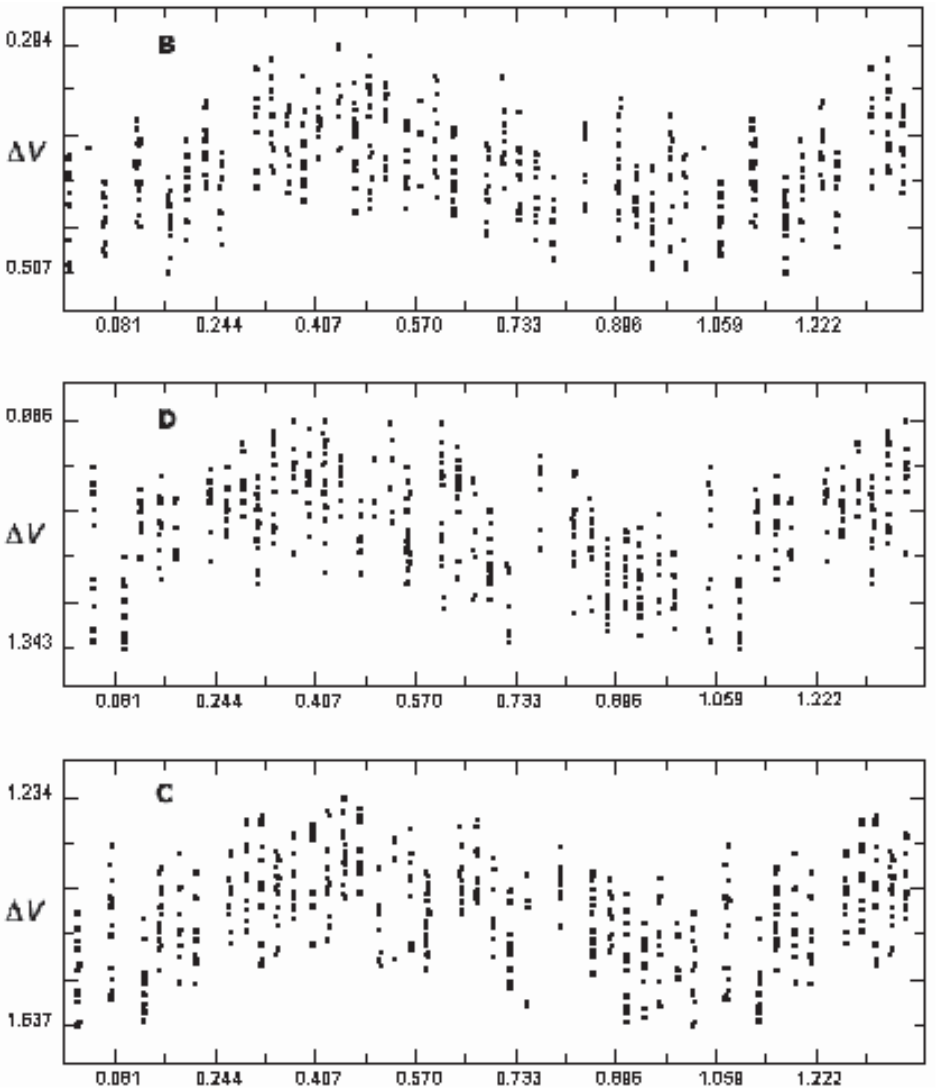

Figure 5: Light curves of check stars folded with the period found (9.218 days).

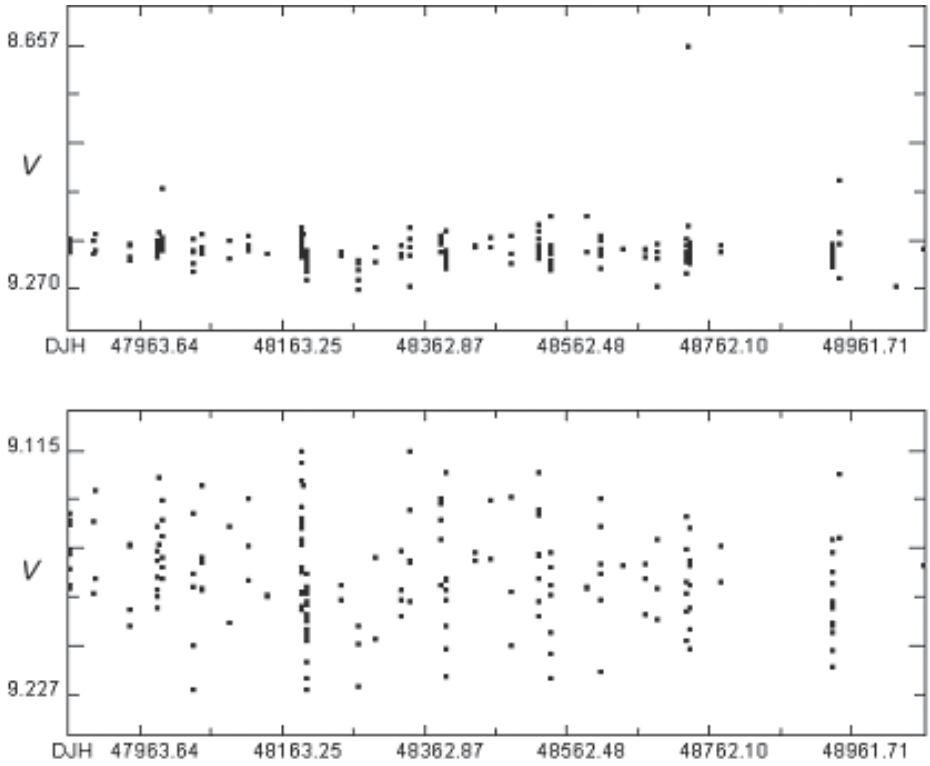

Figure 6. The *Hipparcos* data collected between HJD 2 447 863 and 2 449 061. All the data (panel *a*), and only accurate data (panel *b*) cleared by the authors.

The analysis of the photometric data was performed by means of the program "Análisis de Variabilidad Estelar" AVE (written by Rafael Barberá, Grupo de Estudios Astronómicos, G.E.A.,) using the Scargle algorithm (Scargle, 1982); the analysis yields a period of 9.200 days for TYC 2563-605-1, 9.211 days for TYC 2563-1152-1 and 9.243 for TYC 2563-1060-1.

Photometric variability of SAO 64632 was detected by the *Tycho* instrument during the *Hipparcos* project (Fig. 6), but no studies on variability have been published to date.

Finally, Figure 7 shows graphs of the *Hipparcos* data (191 measurements) folded to the period derived for SAO 64632 from this data (9.323 days). The paucity of *Hipparcos* data (the four-year lifetime of the satellite ended in August 1993), the bad temporal coverage (the *Tycho* observations of any particular star are very unevenly distributed in time) and the high noise of the V_T and B_T data account for the unsolved variable status of SAO 64632 in the *Hipparcos* catalogue.

Some physical data about SAO 64632 taken from SIMBAD or Strassmeier et al. (2000) are: spectrum = K0 V; parallax: 0.02227" ± 0.00123"; distance: 145 y.l.; radial velocity: -26.6 ± 0.4 km s^{-1}; colour index *B-V*: 0.83; T_{eff}: 5210 K and M_v: 5.9. This dwarf K star with a large

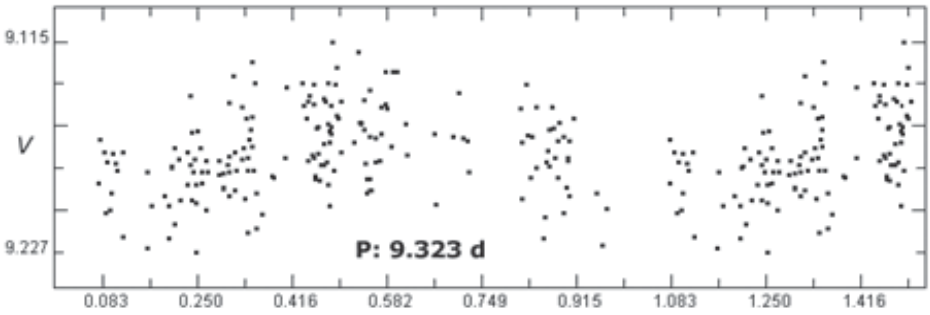

Figure 7. The *Hipparcos* data (191 points) folded with a period equal to 9.323 days.

annual proper motion (LTT 14557 or PPM 78506), is a member of the "Hyades supercluster". The projected rotational velocity, $V \sin i$, measured by Strassmeier et al. on the same night was 6.2 km s^{-1} and 10.1 km s^{-1}.

DISCUSSION

Fekel (1997) measured 133 bright stars with spectral types of F, G or K from *The Bright Star Catalogue*: the projected rotational velocities of 24 stars of spectral types K0 V to K7 V are in the range 0.6 km s^{-1} to 3.9 km s^{-1}, showing moderately slowly rotating stars (periods > 14 days). The work of Radick et al. (1987), high-precision differential *b, y* photometric observations, shows that the rotation periods of lower main-sequence Hyades stars (like SAO 64632, sp. K0 V) increase from about 5 days at $B\text{-}V = 0.55$ (~F8 V) to about 13 days at $B\text{-}V = 1.25$ (~K5 V), and the rotational velocities decline smoothly from about 11 km s^{-1} to 4 km s^{-1} over this colour range.

From the Strassmeier et al. velocities the rotation period for SAO 64632 are in the range of 6 to 10 days. If the photometric periods (*Hipparcos* and ours) agrees with this range, then the low-level variability measured (~0.11 mag. *Hipparcos*, but 0.21 mag. from our best measurements) can be attributable to starspots in a moderately fast rotating star. A periodic (rotational) signal has been detected in the intra-seasonal H+K variability of HD 1835 and HD 25998 (Baliunas et al., 1983), both members of the Hyades "moving group": HD 1835, a normal solar-type dwarf star (G2 V), shows low-level photometric variability (3%-4%).

It is particularly important to remember that low-level photometric variability is a ubiquitous characteristic of Hyades stars later than spectral type F8 V: twenty-four of these stars were observed at Lowell Observatory between 1982-1984 and, without exception, all were found to be variable (Radick et. al, 1987).

The sinusoidal shape of the four folded light curves (one from *Hipparcos* and three from ours data) suggests that SAO 64632 is a BY Dra variable star, and the surface activity is extended covering a significant fraction of the stellar surface. Stellar rotation

may be periodic (9, 10 or 11 days), but the modulation signal produced by dark spots marking a stellar surface is not: the appearance and disappearance of spots at different longitudes will affect the amplitude, period and waveform of the light curves (as in SAO 64632). The Sun is regarded as a BY Dra variable, a type characterised by showing low (0.01 to 0.5 magnitude) visual amplitudes over intervals varying from a fraction of a day up to about 120 days.

In 2006 intensive photometric observations were obtained over 33 nights and 47 days (Violat & Violat, 2006); there is no doubt that we have been lucky: one (possibly three) of the field stars were found to be variable. We need more accurate photometric observations, in a future campaign (2007), to adequately classify this new variable star.

Acknowledgements:

This research made use of the SIMBAD data base, operated by the CDS at Strasbourg, France; the NASA ADS Abstract Service was used to access data and references. The translation of this paper from Spanish to English was made by Miss Ruth Kent (Agrupación Astronómica de Cádiz *Hércules*).

The observational data used in this work are available upon request to Francisco Violat-Bordonau: *fviolat@yahoo.es*

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Fekel, F. C., 1997, PASP, 109, 514.
Radick, R. R., Thomson, D. T., Lockwood, G. W., Duncan, D. K., Baggett, W. E., 1987, ApJ, 321, 459.
Scargle J. D., 1982, ApJ, 263, 835.
Strassmeier, K., Washuettl, A., Granzer, Th., Scheck, M., Weber, M., 2000, A&AS, 142,275.
Violat-Bordonau, F., Violat-Martín, D., 2006 November, Casanchi: http://personales.ya.com/casanchi/ast/u01.htm

HP LYRAE IS A PULSATING STAR

Tristram Brelstaff

In his article "Minima of Long Period Eclipsing Variables", Tony Markham includes HP Lyrae. This star is now thought to be a pulsating star. See "HP Lyr - Possibly the Hottest RV Tau Type Object", Graczyk et al., Acta Astronomica, Vol 52 (2002), pp 293-304. The abstract of this paper reads as follows:

"We report Johnson's UBVRI photometric and optical spectroscopic observations of a long period variable HP Lyr which up to now has been considered to be an eclipsing binary with a period of 140 days. Its spectral type changes continuously from A2-3 at maxima to A7-F2 at minima. We propose that the brightness changes are caused by pulsation of the star with two periods: P_1=69.35 days, and P_2=2 x P_1=138.7 days. These periods decreased by more than 1% between 1960 and 1980. The spectral luminosity class corresponds to an A type supergiant Iab. HP Lyr is also the optical counterpart of the infrared source IRAS 19199+3950. Relatively high galactic latitude (b=+11.7 arcd) and high radial velocity (-113 km/s) indicate that HP Lyr is an evolved, most likely post-AGB star. All these features suggest that this star is an RV Tau type object."

A full copy of the paper is available online via the Smithsonian/NASA ADS Astronomy Abstract Service.

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OJ+287 UPDATE:

Gary Poyner

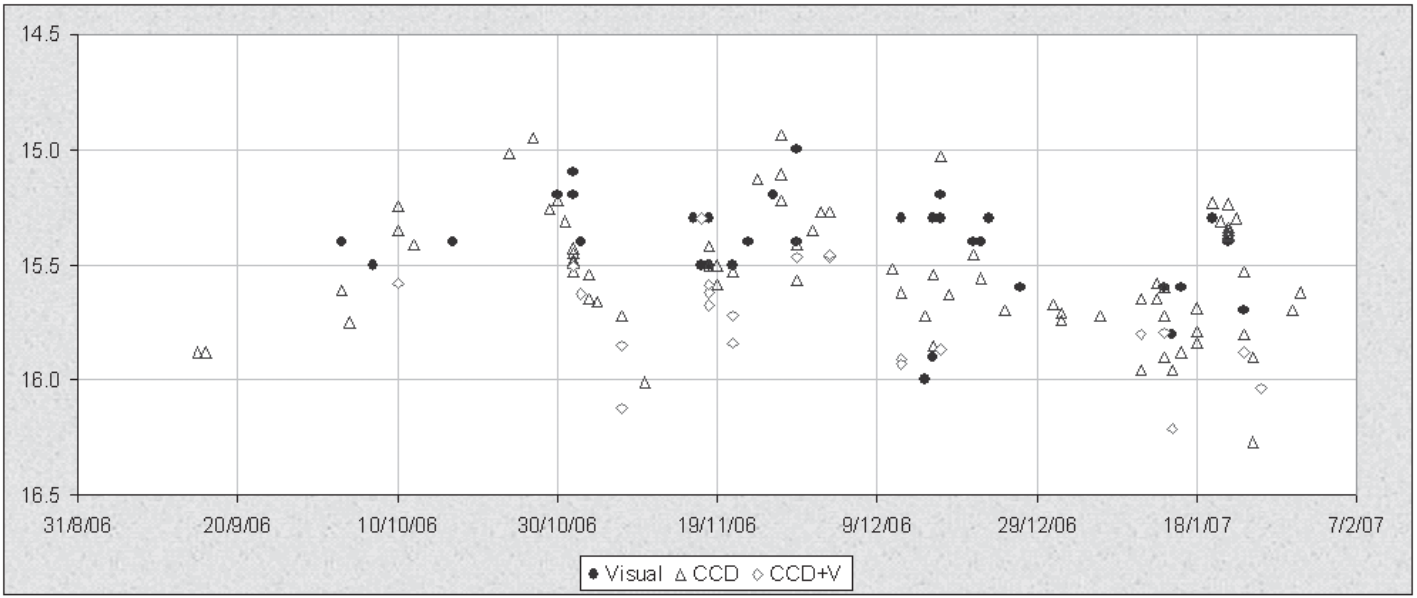
Following on from the news update published in the December 2006 Journal of the British Astronomical Association [1], it is now clear that Dr. Esko Valtaoja's prediction for a January 2007 outburst has not materialised. In fact OJ287 has been undergoing deep minima of below magnitude 16, followed by short duration flares of around one magnitude amplitude. These are occurring roughly at intervals of 25-30days. Four post conjunction flares have now been observed during October, November, December and January, and as I write these words (Feb 02), OJ287 is in the mid 15's.

We must now look forward to a September 2007outburst, as predicted by Dr. Mauri Valtonen last year. Indeed Dr. Valtonen has gone one step further, and has produced a future light curve calculation up to and including 2014. Here he charts his predicted behaviour for OJ287 for the next seven years. Quite a feat! The graph can be seen at...

http://www.garypoyner.pwp.blueyonder.co.uk/oj-future.gif

Observers should now observe OJ287 at every possible opportunity (and if possible several times per night), and as near to Solar Conjunction as possible. Hopefully we should be seeing a slow brightening trend within the next month or two. Observations should be reported to me on a daily or weekly basis (but no longer please). The campaign light curve is updated as data is received, and can be seen at...

http://www.garypoyner.pwp.blueyonder.co.uk/oj_camp.html



POST 2006 SOLAR CONJUNCTION LIGHT CURVE OF OJ287. September 2006 - January 2007. 154observations.
Observers:
Visual: S. Karge, R. Paterson, G. Poyner, J. Toone.
CCD: D. Boyd (V), S. Brady (V), T. Crawford (V), J. Gonzalez (BRT), A. Jones, J. McCormick, F. Melillo, R. Miles, I. Miller, R. Pickard (V), G. Poyner (BRT), R. Rodriguez, J. Shears, D. Storey

1: JBAA, 116, 6 2006

IBVS 5701-

GARY POYNER

5701 Times of maxima for selected Delta Scuti stars. (Klingenberg et al, 2006)
5702 Active motion of matter in the envelope of DI Cephei. (Ismailov & Aliyeva,2006)
5703 Elements for RR Lyrae variables in Ophiuchus. (Haussler et al, 2006)
5704 The first complete photometry of the short period Algol type binary BF Velorum. (Manimanis & Niarchos, 2006)
5705 UZ UMa: An ARab star with double periodic modulation. (Sodor et al, 2006)
5706 Newly discovered variable stars in the globular cluster NGC 6864 (M75) (Scott et al, 2006)
5707 New times of minima of some eclipsing stars. (Dogru et al, 2006)
5708 Variability of V838 Mon before it's outburst. (Kimeswenger & Eyres, 2006)
5709 BVRcIc photometry of three RRAB stars. (Jurcsik et al, 2006)
5710 CCD photometry of DF Lyr, BY Peg, CW Peg and RW Tri. (Polsgrove et al,2006)
5711 Calibration of a UBVRI sequence around Nova Cyg 2006. (Frigo et al, 2006)
5712 Spectroscopy of the faint Dwarf Nova DV UMa and AR Cnc. (Haefner, 2006)
5713 165. List of timings of minima eclipsing binaries by BBSAG observers. (Diethelm, 2006)
5714 Accurate light curve of the eclipsing binary V1898 Cyg. (Dallaporta & Munari, 2006)
5715 The classical Algol XZ UMa – observations and analysis. (Nelson et al, 2006)
5716 BVRI photometry of DX And: The Autumn 2005 outburst. (Spogli et al, 2006)
5717 The GEOS RR Lyr survey. (Le Borgne et al, 2006)
5718 The high amplitude delta Scuti star GP Andromedae. (Szeidl et al, 2006)
5719 GSC 2038.0293 is a new short period Eclipsing RS CVn variable. (Bernhard & Frank, 2006)
5720 Found a Nova in M31: The true optical counterpart of the M31supersoft X-ray source 191. (Smirnova & Alksnis, 2006
5721 THE 78th NAME LIST OF VARIABLE STARS. (Kazarovets et al, 2006)
5722 RV Aps: A unique eclipsing binary for gravity darkening studies. (Khaliullin et al, 2006)
5723 Detection of a large flare in the RS CVn star WY Cnc. (Kozhevnikova et al,2006)
5724 GSC 3576-0170: A new contact solar type binary, period analysis andclassification. (Nelson et al, 2006)
5725 BVRcIc observations of the dwarf nova AH Her during 2005. (Spogli et al, 2006)
5728 Times of minima of the eclipsing binary system EG Cephei.(Diamond et al, 2006)
5729 New times of minima of some eclipsing binary stars. (Cakirli et al, 2006)
5730 GSC 02799-00902: A new delta Scuti variable. (Zhang & Zhang, 2006)
5731 Photoelectric minima of selected eclipsing binaries and maxima of pulsating stars. (Hubscher et al, 2006)
5732 Elements for 8 RR Lyrae variables. (Haussler et al, 2006)
5733 Photometry of RS Oph after the 2006 outburst. (Zamanov et al, 2006)
5734 First complete BVRI light curves of the short period Algolpe binary DFPup. (Manimanis & Niarchos, 2006)
5735 IV Cassiopeiae: A probable photometric triple star. (Wolf et al, 2006)

The Information Bulletin on Variable Stars (IBVS) can be accessed through the WWW in HTML format at the following URL…. *http://www.konkoly.hu/IBVS/IBVS.html*

THE 2006 ECLIPSE OF V1413 AQUILAE:

GARY POYNER

V1413 Aquila is an eclipsing symbiotic star, with a period of 434.1 days, and eclipse amplitude of ~2 magnitudes. For further details see VSSC 108, June 2001.

Looking at the past seven eclipses which I had observed (I also missed two because of unfavourable position in the winter sky), the mid-eclipse time for 2006 was predicted to be October 31st. The eclipse ingress started near to October 2nd, with Ingress taking 19 days, five days shorter than 2005. V1413 Aql remained eclipsed for 23days, with mid-eclipse very close to the predicted October 31st. Egress lasted 23days, five days longer than 2005.

Fortunately the eclipse ended just as the field became too difficult to observe in the December sky. The whole event lasted 68days. The amplitude of the eclipse was two magnitudes (13.3v-15.3v). This is consistent with previous eclipses, and with the star being about 0.5 magnitude intrinsically brighter, was slightly easier to observe visually.

The next two eclipses will be difficult to cover, with mid-eclipse times being January 8th 2008 and March 17th, 2009.

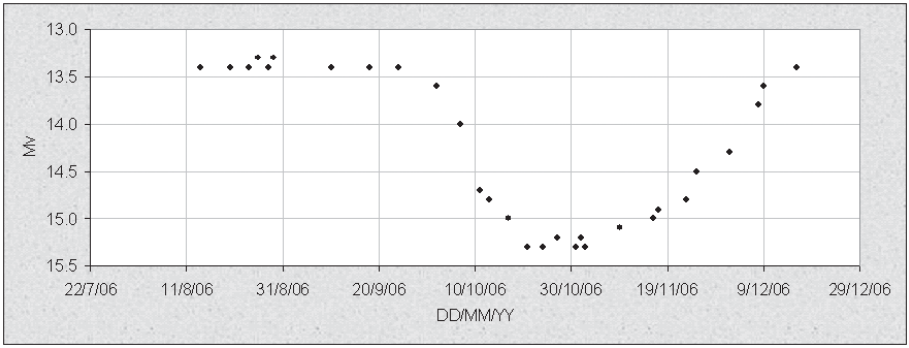


Figure 1: The 2006 Eclipse of V1413 Aquilae. 35cm SCT Visual G. Poyner

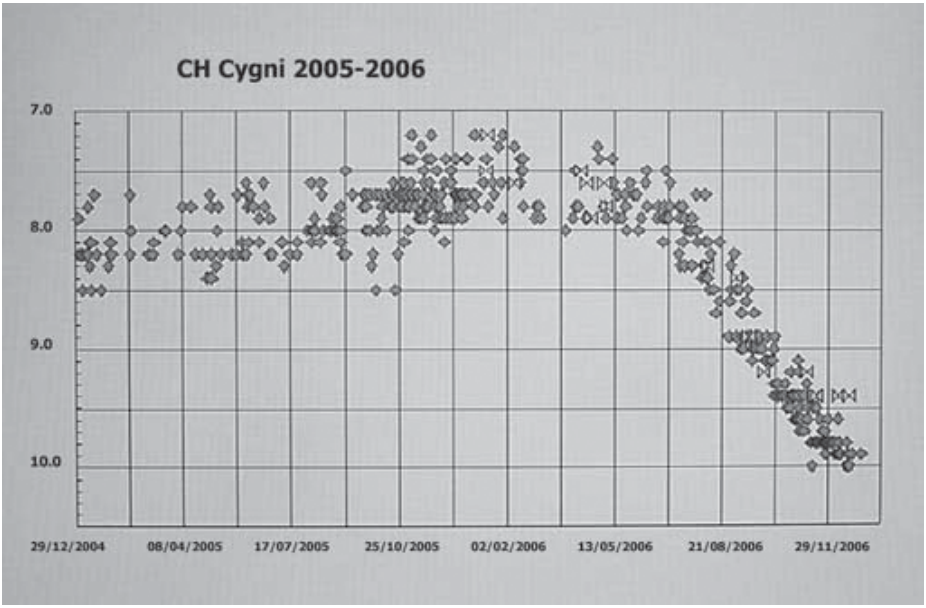
For details of previous eclipses, see...

http://www.garypoyner.pwp.blueyonder.co.uk/V1413aql.html

CH CYGNI

Melvyn Taylor

The recent activity and fade of this popular binocular Symbiotic star.



Observers are: Brundle, Fraser, Gavine, Livesey, McCalman, Markham, Meacham, Taylor and Toone.

BINOCULAR PRIORITY LIST

MELVYN TAYLOR

Variable	Range	Type	Period	Chart	Variable	Range	Type	Period	Chart
AQ And	8.0-8.9	SRC	346d	82/08/16	***AH Dra***	7.1-7.9	SRB	158d?	106.01
EG And	7.1-7.8	ZA		072.01	***NQ Gem***	7.4-8.0	SR+ZA	70d?	077.01
V Aql	6.6-8.4	SRB	353d	026.03	***X Her***	6.3-7.4	SRB	95d?	223.01
UU Aur	5.1-6.8	SRB	234d	230.01.	***SX Her***	8.0-9.2	SRD	103d	113.01
AB Aur	7.2-8.4	INA		83/10/01	***UW Her***	7.8-8.7	SRB	104d	107.01
V Boo	7-12	SRA	258d	037.01	***AC Her***	6.8-9.0	RVA	75d	048.03
RW Boo	6.4-7.9	SRB	209d	104.01	***IQ Her***	7.0-7.5	SRB	75d	048.03
RX Boo	6.9-9.1	SRB	160d	219.01	***OP Her***	5.9-6.7	SRB	120d	84/04/12
ST Cam	6.0-8.0	SRB	300d?	111.01	***R Hya***	3.5-10.9	M	389d	049.01
XX Cam	7.3-9.7?	RCB?		068.01	***RX Lep***	5.0-7.4	SRB	60d?	110.01
X Cnc	5.6-7.5	SRB	195d	231.01	***SS Lep***	4.8-5.1	ZA		075.01
RS Cnc	5.1-7.0	SRC	120d?	84/04/12	***Y Lyn***	6.9-8.0	SRC	110d	229.01
V CVn	6.5-8.6	SRA	192d	214.01	***SV Lyn***	6.6-7.5	SRB	70d?	108.01
WZ Cas	6.9-8.5	SRB	186d	82/08/16	***U Mon***	5.9-7.8	RVB	91d	029.03
V465 Cas	6.2-7.2	SRB	60d	233.01	***X Oph***	5.9-9.2	M	328d	099.01
γ Cas	1.6-3.0	GC		064.01	***BQ Ori***	6.9-8.9	SR	110d	84/04/12
rho Cas	4.1-6.2	SRD	320d	064.01	***AG Peg***	6.0-9.4	NC		094.01.
W Cep	7.0-9.2	SRC		83/10/01	***X Per***	6.0-7.0	GC+XP		84/04/08
AR Cep	7.0-7.9	SRB		85/05/06	***R Sct***	4.2-8.6	RVA	146d	026.03
mu Cep	3.4-5.1	SRC	730d	112.01	***Y Tau***	6.5-9.2	SRB	242d	84/04/12
O Cet	2.0-10.1	M	332d	039.02	***W Tri***	7.5-8.8	SRC	108d	114.01
R CrB	5.7-14.8	RCB		041.02	***Z UMa***	6.2-9.4	SRB	196d	217.01
W Cyg	5.0-7.6	SRB	131d	062.1	***ST UMa***	6.0-7.6	SRB	110d?	102.01
AF Cyg	6.4-8.4	SRB	92d	232.01	***VY UMa***	5.9-7.0	LB		226.01
CH Cyg	5.6-10.0	ZA+SR		089.02	***V UMi***	7.2-9.1	SRB	72d	101.01
U Del	5.6-7.5	SRB	110d?	228.01	***SS Vir***	6.9-9.6	SRA	364d	097.01
EU Del	5.8-6.9	SRB	60d?	228.01	***SW Vir***	6.4-7.9	SRB	150d?	098.01
TX Dra	6.8-8.3	SRB	78d?	106.01					

ECLIPSING BINARY PREDICTIONS

DES LOUGHNEY

The following predictions, based on the latest Krakow elements, should be usable for observers throughout the British Isles. The times of mid-eclipse appear in parentheses, with the start and end times of visibility on either side. The times are hours UT, with a value greater than 24 indicating a time after midnight. D indicates that the eclipse starts/ends in daylight, L indicates low altitude at the start/end of the visibility and << indicates that mid eclipse occurred on an earlier date.

Please contact the EB secretary if you require any further explanation of the format.

The variables covered by these predictions are :

RS CVn 7.9-9.1V	Z Dra 10.8-14.1p	RW Tau 7.98-11.59V
TV Cas 7.2-8.2V	TW Dra 8.0-10.5v	HU Tau 5.92-6.70V
U CrB 7.7-8.8V	S Equ 8.0-10.08V	X Tri 8.88-11.27V
SW Cyg 9.24-11.83V	Z Per 9.7-12.4p	TX UMa 7.06-8.80V
V367 Cyg 6.7-7.6V	U Sge 6.45-9.28V	Z Vul 7.25-8.90V

Note that predictions for RZ Cas, U Cep, Beta Per and Lambda Tau can be found in the BAA Handbook.

For information on other eclipsing binaries see the website < http://www.as.ap.krakow.pl/o-c/index.php3>. Again please contact the EB secretary if you have any queries about the information on this site and how it should be interpreted.

2007 Apr 1 Sun
Z Dra D20(18)20
Z Per D20(19)23
SW Cyg L20(16)22
RW Tau 22(27)23L
del Lib L22(25)28D

2007 Apr 2 Mon
TW Dra D20(18)23
Z Vul L23(24)28D
Z Dra 24(26)28D

2007 Apr 3 Tue
S Equ L03(04)04D
RS CVn D20(14)20
U CrB D20(14)20
TX UMa D20(16)21

2007 Apr 4 Wed
TV Cas 01(05)04D
del Lib 03(09)04D
Z Per D20(20)23L
RW Tau D20(21)23L
U Sge L24(24)28D

2007 Apr 5 Thu
Z Dra D20(19)22
TV Cas 20(24)28D
SW Cyg 24(30)28D

2007 Apr 6 Fri
TX UMa D20(18)22
U CrB D20(25)28D
del Lib L22(17)24

2007 Apr 7 Sat
Z Dra 02(04)04D
RW Tau D20(16)20
TV Cas D20(20)24
Z Per D20(21)23L
Z Vul L23(22)28

2007 Apr 8 Sun
RS CVn 03(09)04D
U Sge 04(09)04D
TW Dra 04(09)04D
HU Tau D20(16)20
del Lib L22(25)28D

2007 Apr 9 Mon
TX UMa D20(19)24
Z Dra D20(21)24

2007 Apr 10 Tue
S Equ L02(01)04D
Z Vul 04(09)04D
HU Tau D20(18)21
SW Cyg D20(19)25
Z Per D20(23)23L
V367Cyg L22(56)28D
TW Dra 23(28)28D

2007 Apr 11 Wed
del Lib 03(09)04D
Z Dra 03(06)04D
V367Cyg L22(32)28D
U Sge L23(18)24

2007 Apr 12 Thu
HU Tau D20(19)22L
TX UMa D20(21)25
RS CVn 22(28)28D
V367 Cyg L22(08)28D
Z Vul L23(20)25

2007 Apr 13 Fri
TV Cas 02(06)04D
U CrB D20(23)28D
TW Dra D20(24)28D
Z Per D20(24)23L
Z Dra 20(23)25
del Lib L21(17)23
V367 Cyg L22(<<)28D

2007 Apr 14 Sat
Z Per L03(00)04D
HU Tau D20(20)22L
TV Cas 22(26)28D
U Sge L23(28)28D

2007 Apr 15 Sun
Z Vul 02(07)04D
SW Cyg 03(09)04D
TX UMa D20(22)27
RW Tau D20(23)22L
del Lib L21(25)28D

2007 Apr 16 Mon
TW Dra D20(19)24
TV Cas D20(21)25
HU Tau D20(22)22L
Z Per 21(25)23L
2007 Apr 17 Tue
S Equ L02(<<)03
Z Per L03(01)04D
U CrB 04(09)04D
RS CVn D20(23)28D
Z Dra 22(25)27
Z Vul L22(18)23
2007 Apr 18 Wed
del Lib 02(08)04D
TV Cas D20(17)21
RW Tau D20(17)22L
HU Tau D20(23)22L
TX UMa D20(24)28D
2007 Apr 19 Thu
SW Cyg D20(23)28D
Z Per 22(27)22L
Z Vul 24(29)28D
2007 Apr 20 Fri
S Equ 03(08)04D
Z Per L03(03)04D
Z Dra D20(18)20
U CrB D20(20)26
HU Tau 21(24)21L
del Lib L21(16)23
2007 Apr 21 Sat
TX UMa 21(25)28D
U Sge L23(22)28D
Z Dra 24(26)28D
2007 Apr 22 Sun
RS CVn D20(19)25
del Lib L21(24)28D
2007 Apr 23 Mon
Z Per L03(04)04D
TV Cas 23(27)27D
2007 Apr 24 Tue
U CrB 01(07)03D
Z Dra D20(20)22
Z Vul L22(27)27D
TX UMa 22(27)27D
2007 Apr 25 Wed
TW Dra 00(05)03D
U Sge 01(07)03D
del Lib 02(08)03D
TV Cas D20(23)27
2007 Apr 26 Thu
Z Dra 02(04)03D
Z Per L03(05)03D
RW Tau D20(25)21L
2007 Apr 27 Fri
S Equ L01(05)03D
U CrB D20(18)24
TV Cas D20(18)22
TW Dra D20(25)27D
del Lib L21(16)22
TX UMa 24(28)27D
2007 Apr 28 Sat
Z Dra D20(21)24
SW Cyg D20(26)27D
2007 Apr 29 Sun
V367Cyg 02(46)03D
Z Per L02(07)03D
RW Tau D20(19)21L
del Lib D20(24)27D
V367Cyg L21(46)27D
Z Vul L22(25)27D
2007 Apr 30 Mon
TW Dra D21(20)25
V367Cyg L21(22)27D
U CrB 23(29)27D
2007 May 1 Tue
TX UMa 01(06)03D
V367Cyg L21(<<)27D
U Sge L22(25)27D
2007 May 2 Wed
del Lib 01(08)03D
RS CVn 03(09)03D
Z Dra D21(23)25
2007 May 3 Thu
TV Cas 01(05)03D
SW Cyg D21(16)22
2007 May 4 Fri
S Equ L01(02)03D
TX UMa 03(07)03D
del Lib D21(15)22
U CrB D21(16)22
TV Cas D21(24)27D
Z Vul L21(22)27D
2007 May 6 Sun
TV Cas D21(20)24
del Lib D21(23)27D
RS CVn 22(28)27D
Z Dra 22(25)27D
2007 May 7 Mon
U CrB 21(27)27D
SW Cyg 24(30)27D
2007 May 8 Tue
Y Psc L03(05)03D
U Sge L21(20)25
2007 May 9 Wed
del Lib 01(07)03D
TW Dra 01(06)03D
Z Vul D21(20)26
2007 May 11 Fri
Z Dra 00(02)03D
S Equ L00(<<)03D
del Lib D21(15)21
RS CVn D21(23)27D
TW Dra D21(25)27D
U Sge 23(29)27D
2007 May 12 Sat
Z Vul 02(07)03D
TV Cas 02(06)03D
Y Psc L03(00)03D
SW Cyg D21(20)26
2007 May 13 Sun
Z Dra D21(20)22
del Lib D21(23)27D
TV Cas 22(26)27D
2007 May 14 Mon
Z Vul D21(18)23
TW Dra D21(21)26
U CrB D21(24)27D
2007 May 15 Tue
Z Dra 02(04)03D
TV Cas D21(21)26
2007 May 16 Wed
del Lib 00(07)03D
RS CVn D21(18)25
Z Vul 24(29)27D
2007 May 17 Thu
Z Dra D21(21)24
V367Cyg D21(61)26D
S Equ L24(20)25
2007 May 18 Fri
U Sge D21(23)26D
V367Cyg D21(37)26D
2007 May 19 Sat
V367Cyg D21(13)26D
2007 May 20 Sun
V367Cyg D21(<<)26D
del Lib D21(22)26D
2007 May 21 Mon
S Equ 01(06)02D
U CrB D21(22)26D
Z Dra D21(23)25
SW Cyg D21(23)26D
Z Vul 22(27)26D
2007 May 22 Tue
TV Cas 23(27)26D
del Lib 24(30)26D
2007 May 23 Wed
TW Dra 02(07)02D
Y Psc 02(07)02D
2007 May 24 Thu
TV Cas D21(23)26D
2007 May 25 Fri
U Sge D22(17)23
TX UMa D22(18)23
TW Dra D22(26)26D
Z Dra 22(25)26D
2007 May 26 Sat
TV Cas D22(18)23
Z Vul D22(25)26D
2007 May 27 Sun
Y Psc L02(01)02D
X Tri L02(01)02D
del Lib D22(22)26D
S Equ L23(27)26D
2007 May 28 Mon
X Tri L02(01)02D
TX UMa D22(20)24
U CrB D22(20)26
TW Dra D22(22)26D
U Sge D22(26)26D
2007 May 29 Tue
X Tri L02(00)02D
del Lib 24(30)26D
2007 May 30 Wed
Z Dra 00(03)02D
Z Per L00(<<)01
SW Cyg D22(27)26D
RS CVn D22(28)26D
2007 May 31 Thu
TW Dra D22(17)22
TX UMa D22(21)26
Z Vul D22(23)26D

2007 Jun 1 Fri
U CrB 01(07)02D
TV Cas 01(05)02D
Z Dra D22(20)22

2007 Jun 2 Sat
Z Per L00(<<)02D
TV Cas D22(24)26D

2007 Jun 3 Sun
Z Dra 02(04)02D
del Lib D22(22)26D
TX UMa D22(23)26D
S Equ L23(24)26D

2007 Jun 4 Mon
SW Cyg D22(16)22
U CrB D22(17)23
TV Cas D22(20)24
U Sge D22(21)26D
RS CVn D22(23)26D

2007 Jun 5 Tue
Z Per L00(<<)02D
Z Vul D22(20)26
Z Dra D22(21)24
V367Cyg D22(51)26D
del Lib 23(29)26D

2007 Jun 6 Wed
TX UMa D22(24)26D
V367Cyg D22(27)26D

2007 Jun 7 Thu
V367Cyg D22(03)26D
U CrB 22(28)26D
Z Per L24(24)26D

2007 Jun 8 Fri
U Sge 00(06)02D
V367 Cyg D22(<<)24
TW Dra 22(27)26D

2007 Jun 9 Sat
SW Cyg 00(06)02D
RS CVn D22(18)24
Z Dra D22(23)26
TX UMa D22(26)26D

2007 Jun 10 Sun
Z Vul D22(18)23
del Lib D22(21)26L
S Equ L22(21)26D
Z Per L24(26)26D

2007 Jun 11 Mon
Y Psc L01(03)02D
TW Dra D22(22)26D
TV Cas D22(26)26D

2007 Jun 12 Tue
TX UMa 22(27)26D
del Lib 23(29)26L
Z Vul 24(29)26D

2007 Jun 13 Wed
SW Cyg D22(20)26D
TV Cas D22(21)26
Z Dra 23(25)26D
Z Per L23(27)26D

2007 Jun 14 Thu
TW Dra D22(18)23
U Sge D22(24)26D
U CrB D22(26)26D

2007 Jun 15 Fri
Y Psc L00(<<)01
TX UMa 24(29)26D

2007 Jun 16 Sat
Z Per 24(28)26D

2007 Jun 17 Sun
S Equ D22(18)23
del Lib D22(21)25L
Z Vul D22(27)26D

2007 Jun 18 Mon
Z Dra 00(03)02D

2007 Jun 19 Tue
TX UMa 02(06)02D
del Lib 22(29)25L

2007 Jun 20 Wed
Z Per 01(06)02D
Z Dra D22(20)22
S Equ 23(29)26D
TV Cas 23(27)26D

2007 Jun 21 Thu
U Sge D22(18)24
U CrB D22(24)26D

2007 Jun 22 Fri
TV Cas D22(23)26D
SW Cyg D22(23)26D
Z Vul D22(25)26D
TW Dra 23(28)26D

2007 Jun 23 Sat
RS CVn D22(27)26D
V367Cyg D22(65)26D

2007 Jun 24 Sun
TV Cas D22(18)23
del Lib D22(20)25L
Z Dra D22(22)24
U Sge D22(27)26D
V367 Cyg D22(41)26D

2007 Jun 25 Mon
V367 Cyg D22(17)26D
TW Dra D22(23)26D
Y Psc L24(28)26D

2007 Jun 26 Tue
X Tri 02(04)02D
V367 Cyg D22(<<)26D
del Lib D22(28)25L

2007 Jun 27 Wed
X Tri 01(03)02D
Z Vul D22(23)26D
S Equ D22(26)26D

2007 Jun 28 Thu
X Tri 00(03)02D
TW Dra D22(19)24
U CrB D22(21)26D
RS CVn D22(23)26D
Z Dra D22(23)26

2007 Jun 29 Fri
X Tri L00(02)02D
Y Psc L23(22)26D
X Tri L24(25)26D

2007 Jun 30 Sat
TV Cas 01(05)02D

IRAS 21443+4349: Visual G. Poyner

This star has only been under observation since July 2004. It appears to be a Mira star with an amplitude of 12.0 - <16.3 visual. Very difficult to observe when faint due to the presence of a very close 12th magnitude star.

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CONTRIBUTING TO THE CIRCULAR

If you would like to prepare an article for consideration for publication in a Variable Star Section Circular, please read the *Notes for Authors*, published on the web pages at **http://www.britastro.org/vss/circs.htm**; reproduced in full in VSSC127 p 24, or contact the editor (details on back cover) for a pdf copy of the guidelines.

If you are unsure if the material is of a suitable level or content, then please contact the editor for advice.

The **deadline for contributions** to the next issue of VSSC (number 132) will be 7th May, 2007. All articles should be sent to the editor (details are given on the back of this issue)

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Nova and Supernova discoveries
First telephone the Nova/Supernova Secretary. If only answering machine response, leave a message and then try the following: Denis Buczynski 01524 68530, Glyn Marsh 01772 690502, or Martin Mobberley 01284 828431.

Variable Star Alerts Telephone Gary Poyner (see above for number)