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E Y E P I E C E V I E W S #312

January, 2006

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1. INTRODUCTION - Best wishes for the year ahead and always!

As promised in the previous issue of Eyepiece Views, we continued to include talks in this one from the Visual Observing Workshop conducted at the annual fall meeting, held in Newton, MA on October 14-15 2005.

You will enjoy reading “Observing Variable Stars with Binoculars” from our president David Williams while “The Story of a Variable Star Observation” by Glen Chaple will take you through a single observation’s journey from submission on.

"Star Partying 101" is a lively piece which is an unedited version of Haldun Menali’s talk presented at one of his Toastmasters’ meetings towards science teachers, students who are also amateur astronomers and general public. Our finale is spectacular, as always, with a piece from our avid contributor Mike
Simonsen. Our pieces are both educational and fun to read which is what we think is making our publication worthwhile to read.

Now sit back, relax and enjoy the ride!

We wish you a wonderful 2006 ahead with the best dark, clear skies.

Thanks and good observing!

Gamze Menali, AAVSO Technical Assistant (MGQ)

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2. OBSERVING VARIABLE STARS WITH BINOCULARS - David B. Williams

The meaning of the word binocular says it all: two eyes. There are two types of binoculars, field glasses and prismatic binoculars. Field glasses (and the low-power version, opera glasses) are “straight-through” optical systems with only objectives and eyepieces. Prismatic binoculars include a set of prisms that fold the light path between the objectives and eyepieces, creating a more compact optical system.

My first optical instrument was a pair of 6x30 binoculars. These revealed many Messier objects and I also used them to make my first variable star estimates. Many amateurs begin with binoculars, because they are often available in the household when the initial interest in astronomy is born.

The Sky and Telescope web site has a feature titled “Binoculars, Halfway to a Telescope.” This is a calumny, because binoculars are actually twice a telescope! Binoculars aren’t second-choice substitutes for “real” telescopes, they are simply small telescopes.

What’s good about binoculars? They are small, eliminating considerations of storage and transportation. And they can be put to use quickly – no set-up time! When the temperature is far below freezing, I can step outdoors with my binoculars and make several estimates of familiar variables and jump back indoors in less than five minutes.

Binoculars are inexpensive. Reasonably good binoculars can be purchased for just a few dollars on eBay (I bought my secondhand 7x35s for $17). They are multi-use instruments that can be used for sports and nature viewing as well as astronomy. And binoculars are wide-field, erect-image instruments, making it easy to find your way around the night sky.

What’s bad about binoculars? Not much. They have small apertures and low magnifications, but these characteristics are also advantages when you are observing bright variables and need a wide field of view.

Best of all, binoculars let you use both eyes! Since the evolutionary development of the eye 600 million years ago, vision has been based on the combination of two visual signals. Your brain is wired to process two visual channels, enhancing resolution and contrast. When you think about it, looking at anything with just one eye is a very strange thing to do. Monocular telescope users are sometimes advised to keep both eyes open, covering one with a hand or eye patch, to relieve the deficiencies of viewing with just one eye.

Binoculars are designated by their magnifying power and their aperture in millimeters. Thus, my first pair of 6x30 binoculars provided a magnifying power of 6 with an aperture of 30 mm. Most binoculars come in power-aperture ratios of 1:5 (6x30, 7x35, 10x50) or 1:7 (7x50, 9x63, 11x70).

Dividing the aperture of binoculars in millimeters by the magnification gives you the diameter of the optical system’s exit pupil. Thus, 1:5 ratio binoculars produce an exit pupil of about 5 mm, while the 1:7 ratio produces an exit pupil of about 7 mm. The maximum aperture of the dark-adapted human eye is about 8 mm, which shrinks with advancing age (that’s why children can

usually see fainter stars with the unaided eye than adults, another example of how youth is wasted on the young). Their larger exit pupil is why 1:7 ratio binoculars are sometimes called “night glasses,” because they provide the largest exit pupil that the human eye can accommodate, and therefore the brightest images.

This means that 1:7 ratio binoculars give the brightest views of nebulae and star fields in a dark sky. (Binoculars with a ratio greater than 1:7 would produce an exit pupil larger than the human eye can accommodate and some of the collected light could not enter the eye.) But in a moonlit or light-polluted sky, 1:7 binoculars also provide the brightest sky background, drowning out faint stars and nebulosity. So for variable star observers, a power-aperture ratio of 1:5 or smaller is preferable. We want to darken the sky background and see fainter stars.

Nonetheless, all types of binoculars are useful for variable star observing.
Use whatever binoculars you have! My own working set includes 4x30, 7x35, 10x50, and 20x60, and I occasionally use a pair of 25x100 at a club observatory. It should be noted that binoculars can magnify too little for optimum astronomical use. I can’t see stars much fainter than about magnitude 6.0 with my 4x30s, because they don’t magnify enough to fully exploit the available aperture, but these small binoculars are excellent for estimating variables in the 4th to 5th magnitude range. These variables are a little too faint to estimate easily with the naked eye in a bright sky and too bright for easy observation in more powerful binoculars. The 7x35s reach magnitude 8.0, the 10x50s magnitude 9.0, and the 20x60s magnitude 10.0 in a fairly dark sky.

Some observing tips can improve the observation of variable stars with binoculars. First and foremost, many modern binoculars are now produced with orange or green objectives to penetrate haze – do not use binoculars with colored lenses to estimate variable stars!

Also keep in mind that binoculars are altazimuth instruments (with hand-held binoculars, you are the mount). This means that field rotation effects cannot be avoided. To minimize errors caused by the changing angle between the variable and each comparison star, bring each star to the center of the field of view before deciding on your estimate.

Binoculars are intended for hand-held use, which is fine for stars well above your binoculars’ limiting magnitude (though one disadvantage of hand-held binoculars is that you have to reacquire the field every time you look away to check a chart). When observing dimmer stars, you can increase your faint limit by at least 0.5 magnitude by resting an elbow on a fence post or bracing the binoculars against the side of a utility pole or the corner of a building.

Mounting binoculars on a photo tripod produces an even steadier view, but it is difficult to use tripod-mounted binoculars when observing high in the sky. The best observing investment I ever made was the purchase of one of those “parallelogram” binocular mounts for my 20x60s. It allows me to effortlessly raise and lower the binoculars, lets me get underneath to observe near the zenith, and stays fixed on the field of view when I look away to consult a chart.

Unless you observe from a desert location, dew is the greatest enemy of binocular observers. Binoculars should be kept capped whenever they aren’t being used. Styrofoam cups make excellent insulating caps. I pop them over the objectives whenever I am not actually looking through my mounted 20x60

binoculars. I keep smaller binoculars in a covered storage tub when I'm not actually using them. Simple dew shields for each objective can be made from rolled cardboard and adhesive tape. During the warm, humid summer months, I have found that electric anti-dew heaters are essential during long observing sessions (and dew heaters keep frost from forming in cold weather). Alternatively, a hair dryer is noisy and has to be used again and again, but it will do the job.

The AAVSO program includes hundreds of variables that can be observed through all or part of their range with binoculars. Some of our top observers have never used any other instrument.

Can variable star estimates made with binoculars contribute to "real science"? Binocular observations are just as useful as estimates made with large telescopes. A variable of a particular type has exactly the same scientific potential whether it is 6th magnitude or 16th. If you observe stars that are appropriate for your aperture, quality of the estimates is the only consideration.

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3. THE STORY OF A VARIABLE STAR OBSERVATION - Glenn Chaple
THE MAGIC OF WEB OBS

On a cool evening in late October, I placed a reflecting telescope in an open area of my back yard. Peering into the finder, I aimed the scope towards the wide stellar pair zeta and theta Ursae Minoris in the Bowl of the Little Dipper. A star-hop from zeta and theta brought me to my quarry – the Mira-type variable S Ursae Minoris.

Alternating glances between the eyepiece and an S UMi "b" chart (illuminated by a red flashlight), I selected a comparison star brighter (mag 7.8) than S UMi and two that were fainter (mags 8.5 and 8.9). Several quick glances between S UMi and the comparison stars, plus an out-of-focus study of the field convinced me that S UMi was slightly brighter than the magnitude 8.5 comparison star. On a specially-made data sheet, I recorded the following information: TIME/JD: 30 October 2005 at 9:44 pm EDT (= J.D. 2453674.6), STAR: S UMi, MAGNITUDE: 8.4, COMP STARS: 7.8, 8.5, 8.9.

Early the next morning, I accessed the AAVSO website on my home computer. Clicking on "Web Obs," then logging in with my AAVSO observer code and a password, I was ready to report my observations for S UMi and the 56 other variable stars I viewed that evening. When finished, I carefully checked the accuracy of my entries, made the appropriate corrections, and then pressed "Logout & Submit Observations." A "Thank-you" message meant that my data had been received by AAVSO Headquarters.

Every ten minutes, all newly received data are downloaded into the AAVSO's main database. While I waited, I explored other parts of the AAVSO website. I looked for updates under the "News and Announcements" section. A request to "Help us create a map of AAVSOrs" piqued my curiosity. That heading brought me to an outline map of the world, covered with little balloons – each representing an AAVSO member. By clicking on a balloon, I got the name and address of that member, plus a "shoutout" message, and, in many cases, a photo. Filling in the info in the "Add Yourself" box, I added my own little balloon to the map. If you haven't yet joined this "Map of AAVSOrs," do it today!

Once ten minutes had passed, it was time to see the fruit of my labors. From the menu on the AAVSO main page, I selected "Quick Look." In the appropriate box, I typed in "S UMi," then clicked on the "SEARCH" prompt. Within

seconds, I was looking at a chronological listing - most recent, mine! - of all S UMi observations forwarded within the previous few weeks. It was gratifying to see that my magnitude estimate was comparable to those of other AAVSO members who viewed S UMi around the time I did. But the best was yet to come! I clicked on the “Lightcurve” prompt, located to the right of my S UMi data. In less than a minute, a light curve of S UMi dramatically showing the star’s behavior for the previous 18 months appeared on the screen. Each observation was denoted by a red dot, except for mine, which appeared blue. Every observation of S UMi I had made since the spring of 2004 showed on the light curve (thankfully, they fit nicely with all the others!). And there, at the recent end of the light curve was my observation from the previous night. Like a solitary note from a musician, my one single observation, combined with those from dozens of AAVSO members, had produced this beautiful symphony of a light curve!

Think of it. Thanks to Web Obs, you can make a brightness estimate of a variable star, go indoors to your computer and immediately forward the data to the AAVSO. Then, within minutes you can see that observation plotted on a light curve for that star. That, my Friend, is immediate feedback!

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4. STAR PARTYING 101 - Haldun Menali

Did you know that scientists estimate the planet Earth is home to approximately 1.8 million species? The most dominant species is of course, Homo Sapiens, meaning all of us! Today I will talk about a little less known species, namely Homo Nocturnalis or night dwellers, analyze their kind of ritualistic behavior called ‘star partying’, and provide with some helpful hints to any other people considering to attend one. Homo Nocturnalis may not be a scientific classification, but they are there for real. In some circles these species are called ‘amateur astronomers or stargazers’ and they are believed to be somehow mutated from Homo Sapiens by the call of nature.

Let me begin by mentioning the main characteristics of a star party:

1) First, it is a gathering of night sky lovers in groups ranging between a dozen to several hundreds, generally held annually.

2) Second, star parties can be at local, regional or national level, in the order of increasing attendance.

3) Lastly, these gatherings usually take place many miles away from urban centers where the sky is washed out with bright lights. Further you go away from cities, darker gets the sky, and in a minute we’ll see why this is important in star partying.

I can almost hear you saying ‘why star partying in the first place’?

1) Mainly, star parties allow stargazers observe celestial objects under quite dark skies. Most of the night-time objects are faint, and darker the sky, the better the contrast and the details one can see. Some places are so dark that Milky Way (our own galaxy) looks like a colorful chandelier hanging in the sky! Recently, I read a story about a young stargazer and his first star party. This novice fellow, after observing a while, started to pack up his scope suddenly. When a veteran observer asked to why, he answered that clouds started to move in from the east. The old hand chuckled and told him that this is the Milky Way rising over the horizon!

2) Also, say, you are willing to buy a telescope, but not sure which one to

pick. As many stargazers bring their armada of telescopes to star parties, these gatherings offer a chance to check out a great variety of telescopes before you buy one. Members of Homo Nocturnalis are eager to let you 'test drive' their scopes which will give you hands-on experience in using one.

3) The saying goes: 'happiness grows by sharing'. Enjoying the night sky also grows when it is shared at star parties by fellow stargazers. During these gatherings, you will have a chance to make new friends, find mentors who will guide you into the hobby, or just plainly share the joyful moments.

Finally, you may ask 'what do I need to bring to a star party'?

1) Well, most and foremost, a flashlight covered with a red filter. Homo Nocturnalis are very easygoing and friendly creatures, except when disturbed by intense white floodlights! Since they hunt, err… observe in the dark, their dark-adapted eyes become very sensitive to any kind of light except a red one.

2) In addition, simple star maps will be helpful to find your way in the sky. Especially after leaving suburban skies where less stars are visible, in a darker location where literally thousands of sparkling jewels twinkle up there, you'll be lost without sky maps.

3) Next, bring a scope or binoculars if you can: any size is good for a first-timer. If you don't have one, don't worry. Your eyes alone are what you will need to engulf the vastness of space. Alternatively, feel free to peek through fellow stargazers' scopes.

Considering what we have just heard, star parties are fun places to be. Some of their benefits are similar to camping out: to mingle with Mother Nature, flee away from our busy day-to-day lives, and enjoy the beautiful night sky. Since it can be very dark around, don't forget to have a flashlight handy. But beware to cover it with a red filter, not to scare Homo Nocturnalis, who are out there in the jungle with several telescopes hunting for … faint objects.

Remember: night sky belongs to everyone. And veteran stargazers always have open arms to newcomers to share the wonders of the night sky.

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5. CV COMMENTS - Mike Simonsen

The old adage "you can't believe everything you read" was never truer than for cataclysmic variables of the type UGZ. Named after the prototype Z Camelopardalis, the most distinguishing property of UGZ type CVs are the "standstills" they occasionally undergo in their cycles. This is described in the definition from the General Catalog of Variable Stars (GCVS): "Z Camelopardalis-type stars. These also show cyclic outbursts, differing from UGSS variables by the fact that sometimes after an outburst they do not return to the original brightness, but during several cycles retain a magnitude between maximum and minimum. The values of cycles are from 10 to 40 days, while light amplitudes are from 2 to 5 mag in V." Do all UGZs exhibit standstills? Are objects that don't exhibit standstills therefore, not UGZs? It would seem fairly straightforward from the GCVS definition, but things are seldom as simple as they seem in the world of variable stars.

Since this article is intended for visual observers, we will discuss only objects that have outburst magnitudes of 13.5V or brighter. Our primary sources for information on type, position, magnitude range, period, etc.,

are the GCVS http://www.sai.msu.su/groups/cluster/gcvs/gcvs/ and the Catalog and Atlas of Cataclysmic Variables http://icarus.stsci.edu/~downes/cvcat/index.html. As you will see, even these two well-respected sources don't always agree on the facts, and in some cases both are wrong!

RX And- (0058+40) With a normal range of 10.3-14.0V, this star is easy to follow at all times during its cycle in modest sized telescopes. A quick look at the AAVSO light curve for this star for the last 700 days will show two obvious standstills after outbursts. (http://www.aavso.org/data/lcg/) The cycles are fairly short and the amplitude of the curve is 3-4 magnitudes. This is a typical UGZ, showing all the normal characteristics defined in the GCVS.

TW Tri- (0130+31) Outbursting to 13th magnitude a little less often than the 40 days defined in GCVS, the case for TW Tri's UGZ-ness is less clear. There are no obvious standstills in the AAVSO light curves, possibly because the magnitude at which it might rest before returning to quiescence (15th mag?) is too faint for most visual observers to record. Another very similar star is VW Vul (2053+25). Outbursting as bright as 13.1 at times and having a minimum in the 16th magnitude range, short standstills occur in the mid-14's and can be difficult to follow visually.

KT Per- (0130+50) Listed as UGZ+ZZ in the GCVS, this suffix to the classification is explained in GCVS as "ZZ Ceti variables. These are nonradially pulsating white dwarfs that change their brightnesses with periods from 30 s to 25 min and amplitudes from 0.001 to 0.2 mag in V. They usually show several close period values. Flares of 1 mag are sometimes observed; however, these may be explained by the presence of close UV Ceti companions." Another explanation for dwarf nova oscillations (DNOs) and quasi-periodic oscillations (QPOs) observed in cataclysmic variable stars is proposed by Brian Warner in 2004PASP..116..115W - Publ. Astron. Soc. Pac., 116, 115-132 (2004) - February 2004, Rapid oscillations in cataclysmic variables. http://simbad.u-strasbg.fr/cgi-bin/cdsbib?2004PASP..116..115W The interpretation of these modulations is that they are "magnetically channeled accretion from the inner accretion disk for DNOs" and "magnetically excited traveling waves in the disk for QPOs".

TT Ari- (0201+14) GCVS lists this star as UGZ. Downes online CV catalog lists the type as vy/dq: In other words, they are not sure if it is a VY Scl type, which exhibit sudden fades, or a magnetic variable, specifically an intermediate polar, whose accretion disk is interrupted by the presence of a strong magnetic field. Most other references describe it as nova-like (NL).

As far back as 1979 this star is referred to as a NL object. An early IBVS, from 1979, IBVS 1622, TT Ari; describes fast photoelectric photometry on this NL. http://www.konkoly.hu/cgi-bin/IBVS?1622

More recently, IBVS 5664, December 2005, describes the recent fading of this star. Again TT Ari is described as a NL variable, in spite of the VY Scl-like fading. TT Ari: Out from the Positive Superhump State http://www.konkoly.hu/cgi-bin/IBVS?5664

This fading episode is apparent in the ASAS light curve for this star. http://www.astrouw.edu.pl/cgi-asas/asas_variable/020653+1517.7,asas3,%20%20%204.292588,0,1000,0

It is also visible in any recent light curve from AAVSO data. No obvious outbursts are shown in the long-term light curve of TT Ari, certainly not every 40 days or less, so why is this one listed as UGZ in GCVS?

TZ Per- (0206+57A) Plot a light curve for this star going back 500 days and you'll see a standstill episode centered on magnitude 13.5, beginning around JD 2453375. It appears to last at least 100 days, but the end of the standstill is ambiguous due to the seasonal gap in the curve. This is pretty typical for TZ Per, making it a great star for visual observers to monitor. Varying between 12.0 and 15.6, it is visible more often than not.

AQ Eri- (0501-04) This variable is listed as a suspected UGZ in GCVS, however IBVS 5107 describes AQ Eri as a UGSU based on superhump observations. 'Superoutburst Observation of AQ Eri: Evidence for an Anomalous Superhump Excess?' http://www.konkoly.hu/cgi-bin/IBVS?5107. The Downes catalog does not include AQ Eri in its listings of UGZs. Is this merely outdated information in GCVS? Does the presence of superhumps preclude classification as a UGZ? Maybe not; read on.

CN Ori- (0547-05) This is a very active star, with a range of 11.0-16.2, outbursting about every other week. But the light curve looks very much like a UGSS to me. Try as I may, I don't see evidence of standstills in the data. Perhaps, as with TW Tri, the standstills occur below the threshold of most visual observers. But I would expect to see gaps in the outburst frequency if this were happening, and I just don't see it. What magnitude does it park at when in standstill? Are the standstills short-lived, or do they exist at all? This star also seems to be at or beyond the amplitude limit described in GCVS. Is this a UGZ?

Two more variables fit this mold SV CMi (0725+06) and AB Dra (1953+77). They are both active stars and interesting to follow visually, but they appear to be more UGSS-like than UGZ. AB Dra in particular, is so active I can't believe it has time to go into standstill between its frequent outbursts.

Z Cam- (0814+73) This is the prototype of this class, and a great star for visual monitoring. It ranges from 10.0-14.5V and will sometimes get stuck on the way down to minimum at or around 11.5. The last standstill was relatively short, and not very stable. However, the one before that lasted almost a year!

AT Cnc- (0822+25) AT Cnc is included as UGZ in Downes et al, but not GCVS. This unusual variable has been spending more time in standstill than in outburst or quiescence in recent times. It is therefore not surprising to find a great number of papers on AT Cnc in standstill, including this recent paper co-authored by AAVSO's Elizabeth Waagen. 2005PASP..117..931S - Publ. Astron. Soc. Pac., 117, 931-937 (2005) - September 2005 A recurrence time versus orbital period relation for the Z Camelopardalis stars. http://simbad.u-strasbg.fr/cgi-bin/cdsbib?2005PASP..117..931S

It was surprising to find this paper describing superhumps in AT Cnc in standstill. Apparently, superhumps do not preclude inclusion in the UGZ classification! 2004A&A...419.1035K - Astron. Astrophys., 419, 1035-1044 (2004) - June(I) 2004 Detection of superhumps in the Z Camelopardalis-type dwarf nova AT Cnc at standstill. http://simbad.u-strasbg.fr/cgi-bin/cdsbib?2004A%26A...419.1035K

More papers on AT Cnc in standstill seem to make it clear that this variable is a UGZ. Unusual Slow Fading of Standstill in AT Cnc http://www.konkoly.hu/IBVS/5001.html#5099

1999PASJ...51..115N - Publ. Astron. Soc. Jap., 51, 115-125 (1999) Spectroscopic and photometric observations of a Z Cam-type dwarf nova, AT Cancri, in standstill.

http://simbad.u-strasbg.fr/cgi-bin/cdsbib?1999PASJ...51..115N

SY Cnc- (0855+18) Varying between 10.6 and 14.0, this active UGZ is always visible in modest telescopes. Lying so near the ecliptic presents problems as the moon passes through Cancer each month, and occasionally a bright planet, like Jupiter, will plant itself right in the field, making observations interesting and a bit difficult.

AH Her- (1640+25) This is another fairly typical UGZ. The range from outburst to quiescence is 10.6-14.7, with occasional standstills around 12.5-13.0 after outbursts.

UZ Ser- (1805-14) UZ Ser is misclassified in both GCVS and Downes et al. As early as 1987 standstill behavior was observed in UZ Ser. 1987JAVSO..16...91D - J. Am. Assoc. Variable star obs., 16, 91-93 (1987) Unusual behavior of UZ Serpentis. http://simbad.u-strasbg.fr/cgi bin/cdsbib?1987JAVSO..16...91D More recently, this star was included as one of 16 examples of UGZ. 2005PASP..117..931S - Publ. Astron. Soc. Pac., 117, 931-937 (2005) - September 2005 A recurrence time versus orbital period relation for the Z Camelopardalis stars. http://simbad.u-strasbg.fr/cgi-bin/cdsbib?2005PASP..117..931S It seems to be general knowledge amongst many that this star is a UGZ, but it is not included as such in GCVS or Downes et al.

V1504 Cyg- (1925+42) GCVS lists this star as a suspected UGZ. Downes et al lists it as UGSU. Considering the fact that both normal and super outbursts have been observed and superhumps have been detected in outburst, this star must be considered a UGSU. This is in fact the subject of IBVS 4532, November 1997, Confirmation of the SU UMa nature of V1504 Cyg http://www.konkoly.hu/cgi-bin/IBVS?4532

EM Cyg- (1934+30) This is a very active UGZ in a beautiful star field in Cygnus. It ranges from 12.5-14.4, with short standstills in the low 12th mag range. This is also the only known case of an eclipsing UGZ, so the accurate type is UGZ+E.

FY Vul- (1937+21) Listed as UGZ in Downes and GCVS, this CV has an outburst cycle between 30 and 50 days, but also shows some quasi-periodic variation on shorter time scales, perhaps 15-20 days. The amplitude of variation is rather small for a UGZ type dwarf nova. It has been suggested that this star and V1101 Aql may actually represent a previously unrecognized group of low-amplitude dwarf novae (IBVS 4766, 1999). http://www.konkoly.hu/cgi-bin/IBVS?4766 Ranging from 13.4-15.3V this very active star is doing something every night.

V1285 Cyg- (1941+35) Listed in GCVS as a suspected UGZ, this star is actually a SR as described in the paper 1987A&A...185..203B - Astron. Astrophys., 185, 203-205 (1987) The reclassification of the supposed dwarf nova V1285 Cygni as a semiregular variable. http://simbad.u-strasbg.fr/cgi-bin/cdsbib?1987A%26A...185..203B

EV Aqr- (2101+00) Listed as UGZ in both GCVS and Downes et al, here is another case where both catalogs have it wrong. EV Aqr is obviously a SR with a period of roughly 124 days, ranging from 11.2-14.0V. This can be seen clearly in the ASAS data for this star. http://www.astrouw.edu.pl/cgi-asas/asas_variable/210618+0052.7,asas3,%20124.919464,0,1000,0

HX PEG- (2335+12) Although not classified as UGZ in either GCVS or Downes' catalog, HX Peg exhibits obvious standstills as well as the outbursts and

quiescent periods that generally describe UGZ-like behavior. It is variously described as UGZ in other sources (Honeycutt et al. 1998 and the aforementioned 2005PASP..117..931S - Publ. Astron. Soc. Pac., 117, 931-937 (2005), but not the two catalogs we have examined.

Another puzzling fact seems to contradict the accepted normal behavior of Z Cam variables. It is generally accepted that standstills are triggered by outbursts, and that standstills always end with a fade to quiescence. This is stated plainly in Cataclysmic Variable Stars, How and Why They Vary by Coel Hellier (pp. 73-74). However, both AT Cnc and HX Peg have been known to go into outburst from a standstill. Does this fact make them non-UGZ, does it make them a special sub-group of UGZ or does this throw a wrench into the current models of enhanced mass-transfer sustained by enhanced irradiation? How do these systems ramp back up to outburst levels after entering a standstill? I don't know, but clearly the observational evidence does not always agree with the theories.

So, where does this leave the visual observer interested in Z Cam type variables? I'd say it puts you in great demand. Obviously, there is much to learn about these CVs and there are plenty of examples bright enough to follow and active enough to keep your interest for years to come. Unfortunately, there is no one definitive list of UGZ type CVs from which to pick your targets. Don't waste your precious observing time on EV Aqr and V1285 Cyg if you want to observe CVs. Do keep an open mind and don't accept everything you read as gospel.

Your observations may help shine a light on a previously suspected UGZ, or help to classify a new type of variable, or just add to the important data and general knowledge of CVs. It is your data that researchers use to create models of CVs and try to untangle the mysteries of their behaviors. And it is the unpredictable nature of CVs that keeps observers observing them night after night, year after year. Who knows, maybe tonight AT Cnc will go into outburst from a standstill. We'll never know if you don't get out there and make the observations.

Good luck and clear skies to you all.

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Good observing!

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