**2009 Epsilon Aurigae**
**Eclipse Campaign Newsletter #4**
**Winter 2008/February 2008**

Dear Colleagues,

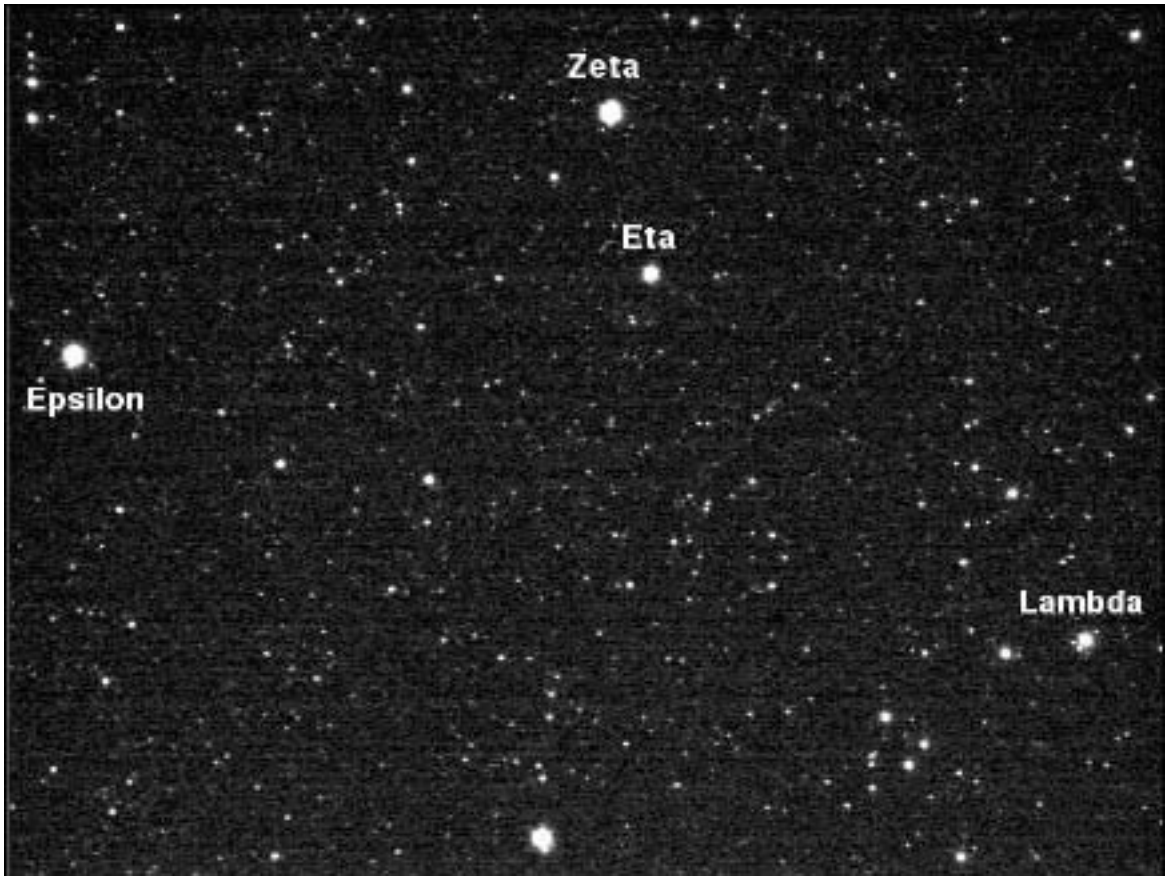
This is the time of year when epsilon Aurigae is at the meridian and at the best observing position in the early evening. Cool clear nights also help.

We have had several new members added to the Campaign. Please see the Campaign web site and Members section for details on our new colleagues.

Our star system of interest continues to present surprises. In the past, a strong 66 day period has been seen. The last minimum was the during first week of December 2007. That would seem to indicate that during the last part of January to first week of February 2008 we should see another minimum. Instead, the star system has been getting brighter and is currently (first/second week of February) at a season high.

At the Hopkins Phoenix Observatory we continue to make UBV observations with our PMT based photon counting unit and experiment with BVRI CCD photometry with a DSI Pro camera and 50 mm F/2.0 lens.

Since zeta Aurigae will be eclipsing in March of 2009 we have added that to the BVRI project. It works well as zeta and epsilon along with lambda Aurigae can all fit in the same image.



During previous observations a 66 days cycle has shown a strong presence. During the current season the last minimum was around MJD 4,435 so the next should have been around MJD 4,501. Instead of a minimum the system has continued to get brighter, in fact it is the brightest so far this season. While it appears there was a start of a minimum it seemed to stop and the system just kept getting brighter.

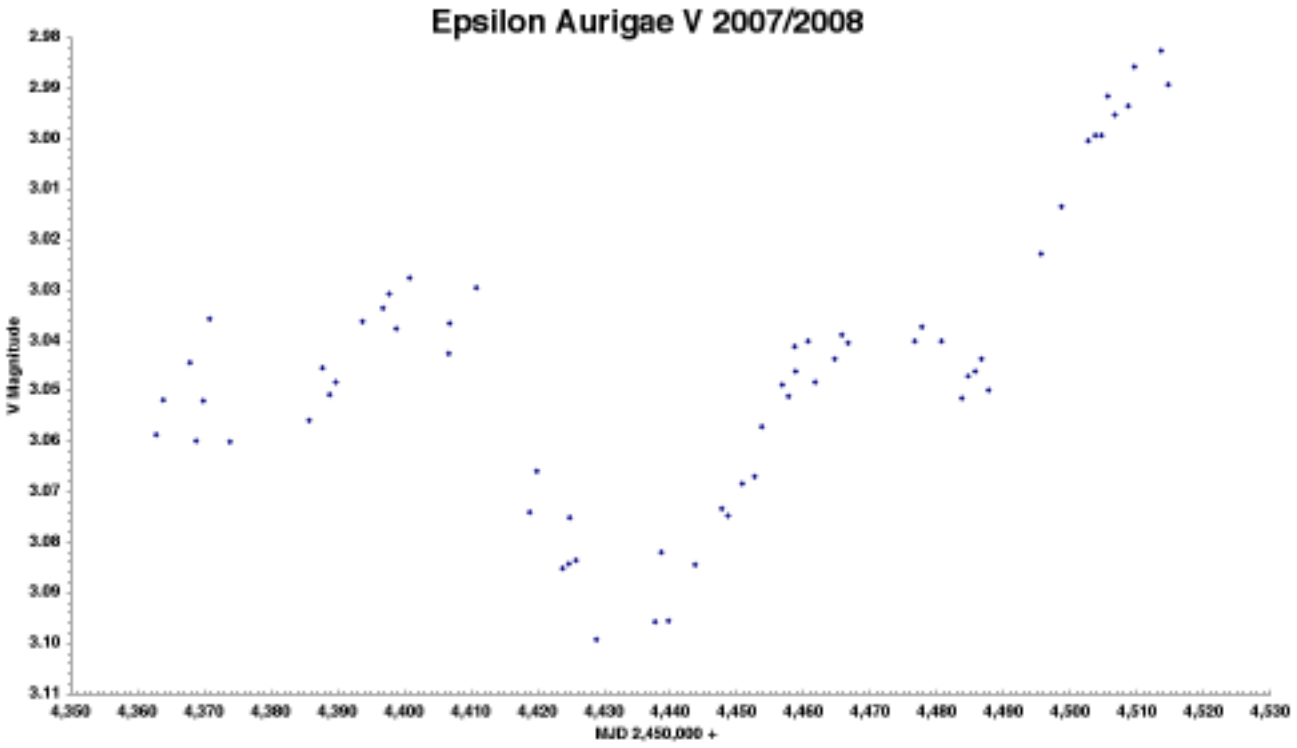
Hopkins Phoenix Observatory UBV Data for 18 September 2007 to 7 February 2008 Data taken with a C-8 and UBV photon counting unit. See Table I.

| Date | MJD 2,450,000+ | V Mag | SD | B Mag | SD | U Mag | SD |
|---|---|---|---|---|---|---|---|
| 09/18/2007 | 4362.8275 | 3.0588 | .0114 | 3.6378 | .0085 | 3.7135 | .019 |
| 09/19/2007 | 4363.8011 | 3.0519 | .0111 | 3.6150 | .0110 | 3.6750 | .023 |
| 09/23/2007 | 4367.8011 | 3.0443 | .0085 | 3.6219 | .0143 | 3.6791 | .016 |
| 09/24/2007 | 4368.8157 | 3.0599 | .0146 | 3.6307 | .0046 | 3.7081 | .013 |
| 09/25/2007 | 4369.8059 | 3.0521 | .0046 | 3.6242 | .0082 | 3.6936 | .031 |
| 09/26/2007 | 4370.8108 | 3.0357 | .0127 | 3.6200 | .0148 | 3.7007 | .001 |
| 09/29/2007 | 4373.8018 | 3.0601 | .0146 | 3.6228 | .0103 | 3.6889 | .001 |
| 10/11/2007 | 4385.7788 | 3.0560 | .0022 | 3.6156 | .0046 | 3.6884 | .005 |
| 10/13/2007 | 4387.7816 | 3.0454 | .0058 | 3.6149 | .0099 | 3.6836 | .010 |
| 10/14/2007 | 4388.7837 | 3.0509 | .0016 | 3.6129 | .0015 | 3.6881 | .016 |
| 10/15/2007 | 4389.7816 | 3.0483 | .0053 | 3.6128 | .0079 | 3.6719 | .024 |
| 10/19/2007 | 4393.7837 | 3.0362 | .0051 | 3.5997 | .0052 | 3.6855 | .016 |
| 10/22/2007 | 4396.7802 | 3.0336 | .0103 | 3.5949 | .0074 | 3.6700 | .015 |
| 10/23/2007 | 4397.7851 | 3.0307 | .0011 | 3.5954 | .0121 | 3.6889 | .007 |
| 10/24/2007 | 4398.7983 | 3.0376 | .0060 | 3.5918 | .0034 | 3.6871 | .008 |
| 10/26/2007 | 4400.7795 | 3.0276 | .0011 | 3.5885 | .0033 | 3.6893 | .007 |
| 11/01/2007 | 4406.6872 | 3.0425 | .0098 | 3.5970 | .0074 | 3.6501 | .011 |
| 11/01/2007 | 4406.7865 | 3.0366 | .0011 | 3.6108 | .0019 | 3.7215 | .006 |
| 11/13/2007 | 4418.8024 | 3.0741 | .0036 | 3.6452 | .0035 | 3.8023 | .014 |
| 11/14/2007 | 4419.8115 | 3.0659 | .0020 | 3.6561 | .0039 | 3.8032 | .008 |
| 11/18/2007 | 4423.7816 | 3.0852 | .0051 | 3.6681 | .0032 | 3.8139 | .005 |
| 11/19/2007 | 4424.7136 | 3.0842 | .0040 | 3.6639 | .0018 | 3.7986 | .016 |
| 11/19/2007 | 4424.7948 | 3.0752 | .0168 | 3.6688 | .0014 | 3.8299 | .009 |
| 11/20/2007 | 4425.7830 | 3.0835 | .0038 | 3.6758 | .0023 | 3.8347 | .003 |
| 11/05/2007 | 4410.7837 | 3.0295 |  | 3.5857 |  | 3.6957 |  |
| 11/23/2007 | 4428.7788 | 3.0993 | .0036 | 3.6862 | .0040 | 3.8343 | .004 |
| 12/02/2007 | 4437.7219 | 3.0958 | .0030 | 3.6851 | .0045 | 3.8351 | .009 |
| 12/03/2007 | 4438.7330 | 3.0820 | .0017 | 3.6864 | .0111 | 3.8221 | .008 |
| 12/04/2007 | 4439.7240 | 3.0956 | .0032 | 3.6789 | .0023 | 3.8294 | .009 |
| 12/08/2007 | 4443.7219 | 3.0845 | .0052 | 3.6648 | .0069 | 3.8048 | .024 |
| 12/12/2007 | 4447.7441 | 3.0733 | .0015 | 3.6550 | .0021 | 3.8055 | .017 |
| 12/13/2007 | 4448.7240 | 3.0747 | .0018 | 3.6502 | .0010 | 3.7866 | .008 |
| 12/15/2007 | 4450.7399 | 3.0684 | .0032 | 3.6408 | .0047 | 3.7762 | .008 |
| 12/17/2007 | 4452.7205 | 3.0670 | .0010 | 3.6342 | .0028 | 3.7643 | .006 |
| 12/18/2007 | 4453.7240 | 3.0572 | .0062 | 3.6309 | .0017 | 3.7796 | .011 |
| 12/21/2007 | 4456.7913 | 3.0489 | .0018 | 3.6142 | .0041 | 3.7694 | .001 |
| 12/22/2007 | 4457.7205 | 3.0512 | .0068 | 3.6135 | .0047 | 3.7495 | .005 |
| 12/23/2007 | 4458.7254 | 3.0412 | .0138 | 3.6014 | .0086 | 3.7422 | .013 |
| 12/23/2007 | 4458.7427 | 3.0461 | .0064 | 3.6053 | .0055 | 3.7544 | .014 |
| 12/25/2007 | 4460.6892 | 3.0401 | .0041 | 3.6050 | .0063 | 3.7199 | .024 |
| 12/26/2007 | 4461.7101 | 3.0483 | .0051 | 3.6063 | .0053 | 3.7478 | .003 |
| 12/29/2007 | 4464.6906 | 3.0436 | .0212 | 3.6138 | .0177 | 3.7351 | .017 |
| 12/30/2007 | 4465.7212 | 3.0388 | .0032 | 3.6077 | .0039 | 3.7535 | .005 |

| | MJD | V | | B | | U | |
|---|---|---|---|---|---|---|---|
| Date | 2,450,000+ | Mag | SD | Mag | SD | Mag | SD |
| 12/31/2007 | 4466.7177 | 3.0404 | .0024 | 3.6033 | .0050 | 3.7391 | .002 |
| 01/10/2008 | 4476.7156 | 3.0401 | .0018 | 3.6049 | .0028 | 3.7397 | .01 |
| 01/11/2008 | 4477.7087 | 3.0373 | .0046 | 3.6054 | .0049 | 3.7256 | .004 |
| 01/14/2008 | 4480.6892 | 3.0400 | .0047 | 3.6066 | .0012 | 3.7168 | .018 |
| 01/17/2008 | 4483.6719 | 3.0515 | .0033 | 3.6070 | .0034 | 3.7220 | .006 |
| 01/18/2008 | 4484.6969 | 3.0472 | .0034 | 3.6056 | .0011 | 3.7220 | .007 |
| 01/19/2008 | 4485.6885 | 3.0460 | .0021 | 3.6033 | .0017 | 3.7140 | .002 |
| 01/20/2008 | 4486.6885 | 3.0436 | .0021 | 3.6049 | .0016 | 3.7145 | .003 |
| 01/21/2008 | 4487.6753 | 3.0499 | | 3.6041 | | 3.7154 | |
| 01/29/2008 | 4495.6371 | 3.0228 | .0044 | 3.5825 | .0018 | 3.6813 | .012 |
| 02/01/2008 | 4498.6594 | 3.0134 | .0063 | 3.5765 | .0018 | 3.6876 | .003 |
| 02/05/2008 | 4502.6246 | 3.0004 | .0029 | 3.5669 | .0006 | 3.6787 | .003 |
| 02/06/2008 | 4503.7156 | 2.9993 | .0030 | 3.5656 | .0036 | 3.6930 | .004 |
| 02/07/2008 | 4504.6594 | 2.9994 | .0042 | 3.5588 | .0020 | 3.6857 | .002 |
| 02/08/2008 | 4505.6337 | 2.9916 | .0070 | 3.5540 | .0042 | 3.6758 | .006 |
| 02/09/2008 | 4506.6399 | 2.9953 | .0042 | 3.5582 | .0029 | 3.6746 | .001 |
| 02/11/2008 | 4508.6517 | 2.9936 | .0031 | 3.5531 | .0058 | 3.6769 | .003 |
| 02/12/2008 | 4509.6135 | 2.9858 | .0117 | 3.548 | .0024 | 3.6576 | .004 |
| 02/16/2008 | 4513.6392 | 2.9826 | .0036 | 3.5524 | .0039 | 3.6761 | .003 |
| 02/17/2008 | 4514.6246 | 2.9894 | .0019 | 3.5502 | .0019 | 3.6801 | .010 |

**Table I**

**Note:** The B and U light curves look very similar, just different amplitudes.




A summary of this season so far (from 18 September 2007 to 17 February 2008):

**Vmax = 2.9858 Vmin = 3.0993 ΔV = 0.1135**

**Bmax = 3.5480 Bmin = 3.6864 ΔB = 0.1384**

**Umax = 3.6576 Umin = 3.8351 ΔU = 0.1775**

## Communications from Campaign Members

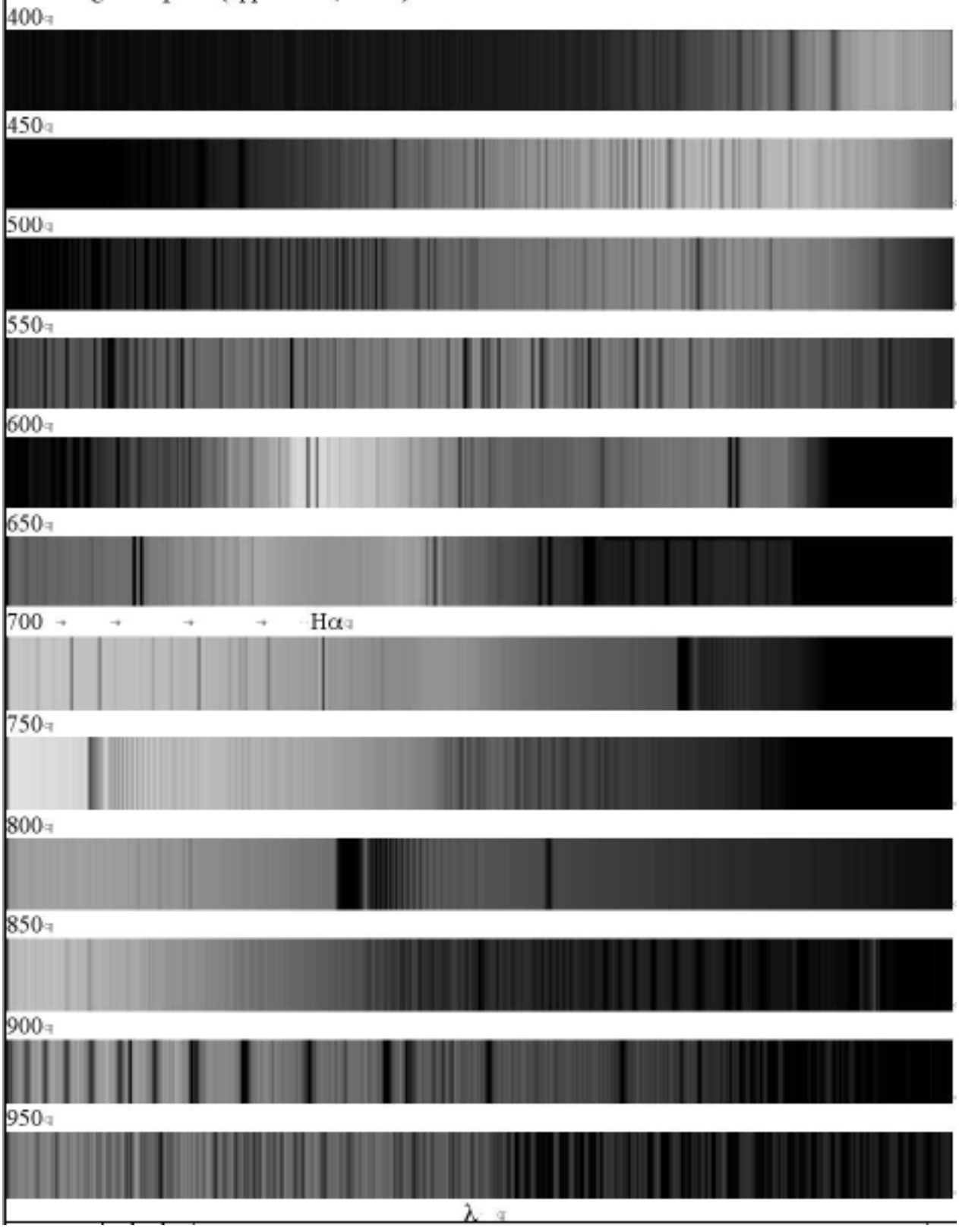
**On 1 Feb 2008 Brian McCandless wrote:**
I have had some more time at the telescope and am sending my photometry data (attached). I haven't added the Wing band measurements yet, but the initial results show a lot of activity in the A band (712 nm), corresponding to TiO. I will be taking spectra the next time out to get a handle on any absorption in this region. I'm planning to use Pi2 Orion as the reference star, since I have good Wing and spectral flux data on it. It could be nothing, but generating a good quality spectrum from 400 to 900 nm will be worth it, I think.

| EST Date | MJD | B | V | Rc | Ic | J | H |
|---|---|---|---|---|---|---|---|
| 31 Jan 08 | 4497 | | 2.987 | | | | |
| 30 Jan 08 | 4496 | 3.601 | 3.004 | | | 1.821 | 1.608 |
| 28 Jan 08 | 4494 | 3.586 | 3.000 | | | 1.875 | 1.607 |
| 27 Jan 08 | 4493 | 3.594 | 3.002 | 2.535 | 1.909 | 1.843 | 1.623 |
| 25 Jan 08 | 4491 | | 3.001 | | | 1.838 | 1.627 |
| 23 Jan 08 | 4489 | 3.600 | 3.006 | | | 1.856 | 1.606 |
| 21 Jan 08 | 4487 | | 3.017 | | | 1.849 | 1.630 |
| 20 Jan 08 | 4486 | | 3.023 | | | | |
| 15 Jan 08 | 4481 | 3.781 | 3.006 | 2.536 | 1.902 | 1.834 | 1.622 |
| 09 Jan 08 | 4475 | | 3.041 | | | 1.947 | 1.723 |

**On 3 Feb 2008 Brian McCandless wrote:**
I acquired these spectra on Saturday night along with some V and NIR of Lambda Aur for comparison. I have wavelength calibrated them all and will be preparing graphical plots – will send when completed. Flux calibration over such a wide survey isn't so easy, since it takes most of the night to simply acquire the shots (plus I did some V band photometry) – later I plan to concentrate on a few wavelength ranges and then add flux calibration star data as well, with the same telescope and spectrograph settings. I did this survey to compare to other F stars in my records and see what is happening with respect to the photometry data. Notice the H-alpha line emission/absorption feature. Also, lots to see in the NIR.

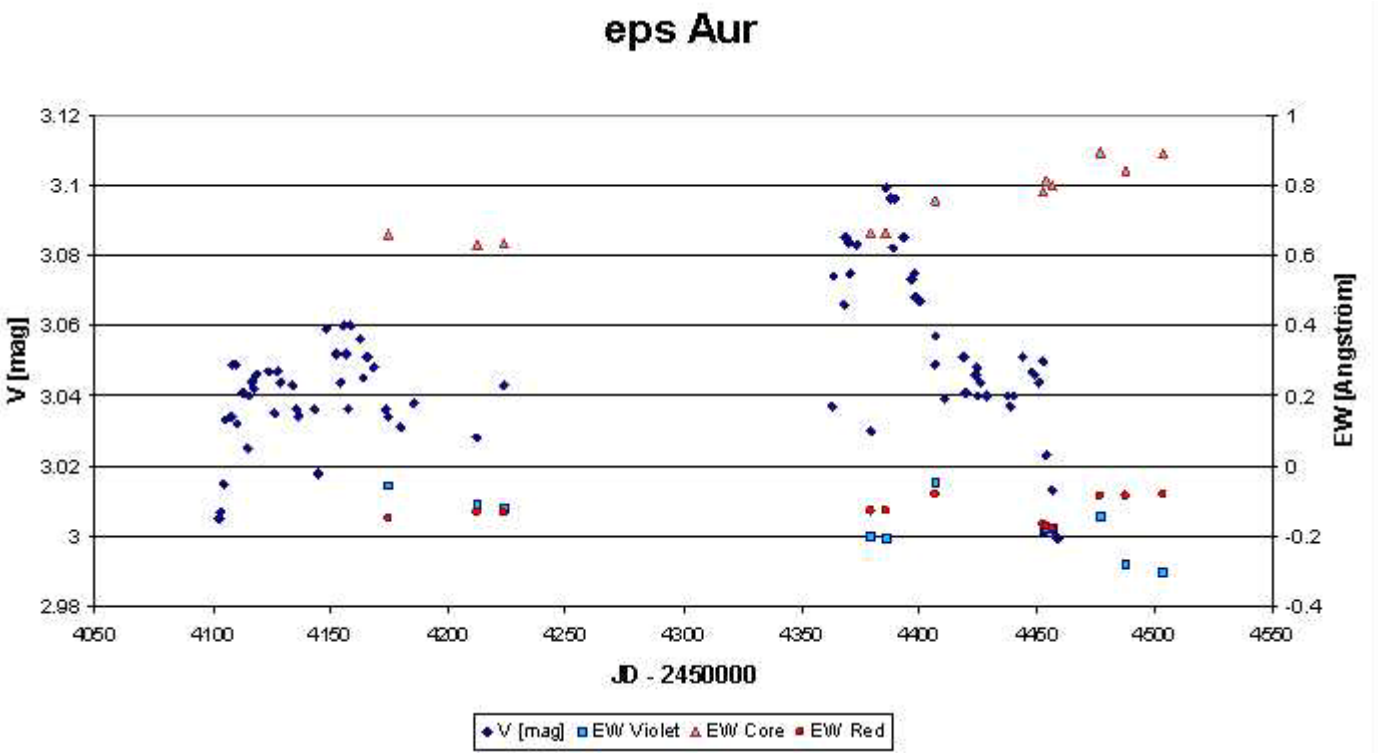
Epsilon Aurigae; 02 Feb 08 (2454495.5); CGE1400+SGS+ST7XME; 300 sec
f/6.3, 18 μm entrance slit, 0.107 nm per pixel, 600 l/mm

Wavelength set point (upper limit, in nm):



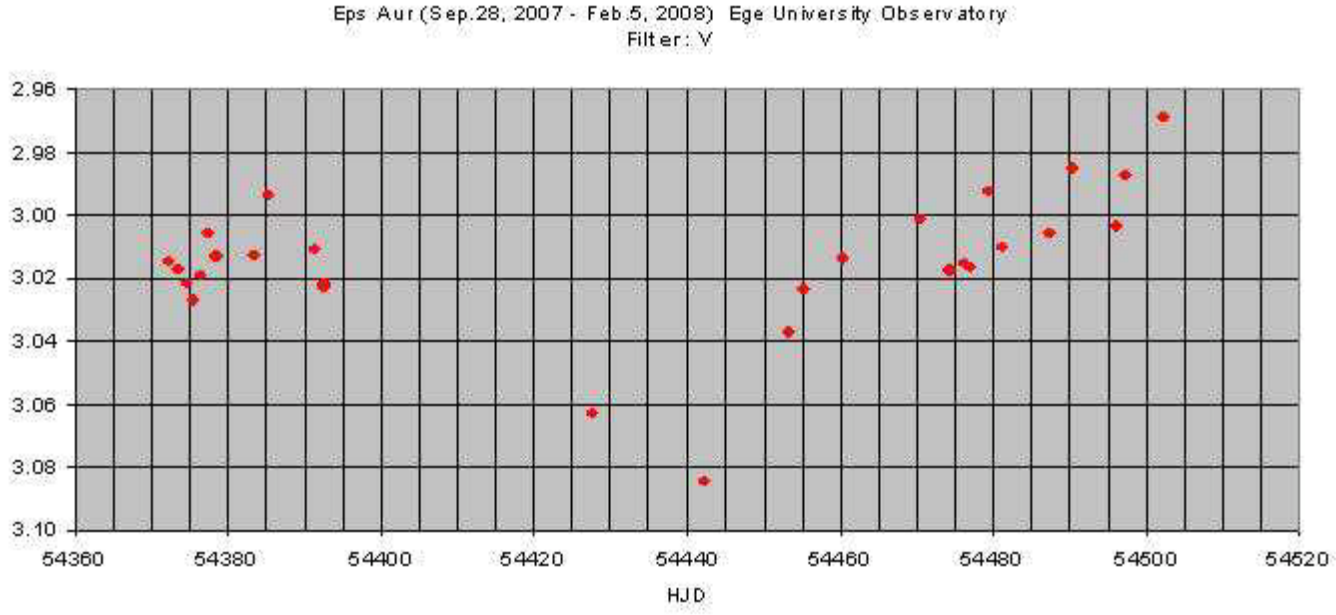
**On 9 Feb 2008 Lothar Schanne wrote:**

In the annex a evaluation of the V-Data of Jeff and the equivalent with (EW) of the Ha-line: absorption core, violet emission wing and red emission wing. Since JD 24544000 the absorption strength of the Halpha core absorption increases. The last 2 weeks also the violet emission wing strengthens. Perhaps this behavior is in parallelity with the increase of the visibility V ? We will see that in the future.




**On 10 Feb 2008 Serdar Evren writes:**

We continue to observe Eps Aur. The range of observation date is between Sep.28, 2007-Feb.5, 2008. Nowadays, the system is still brightening. We obtained the minimum light in V filter on Dec.7, 2007. I attached to mail a jpeg graph for Eps Aur obtained in V filter.



**From Doctor Bob:**
**18 February 2008**

It is heartening to see the diversity of photometry and spectroscopy efforts underway, reported in this and previous Newsletters. The fact that these data are being obtained IN ADVANCE of eclipse this cycle, which will help provide valuable context for eclipse phenomena. Here at Denver University, we continue to pursue interferometric and polarimetric observations designed to test the models outlined in Newsletter 3. Palomar Testbed Interferometer (PTI) observations still were being obtained over the weekend of 2008 Feb. 16-17, to complement the October and December data already obtained. Unfortunately, the observing season for PTI on this star ends soon (hour angle limits). A report on findings will be presented in a future newsletter and elsewhere [http://www.du.edu/~rstencel/epsaur.htm ]. New reports include HiVis spectropolarimetric observations that show dramatic polarization variations across the H-alpha line, analogous to the optical changes. Finally, a reference spectrum of epsilon Aurigae in the near infrared obtained by Dan Clemens et al. with the Mimir spectrometer on the Perkins Telescope at Lowell Observatory has been published in http://adsabs.harvard.edu/abs/2007PASP..119.1385C . These K band data are useful in interpreting the PTI interferometry, also in the K band.

--Dr.Bob Stencel, Univ. Denver Astronomy Program, rstencel at du.edu

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For those who are members of the AAVSO, Arne Henden has indicated that there is a SSP-4 available to be loaned to an AAVSO member to do J and H band infrared work. This could provide significant contribution to the Eclipse Campaign. If you wish to use this for epsilon Aurigae, be aware that you will need at least a 12" telescope and 14" or 16" or larger is preferred. The reason is that with less than a 12" telescope lambda Aurigae produces a poor signal to noise ratio. If you are interested contact Arne directly at arne@aavso.org

Anyone wishing to contribute to the Newsletter, is most welcome. Please send contributions to me at phxjeff@hposoft.com.

In addition to sending this directly to those who have expressed an interest in epsilon Aurigae, I will post this on the campaign's web site.

Anyone not desiring to receive these Newsletters, please e-mail me and I will remove your name from the list.

http://www.hposoft.com/Campaign09.html

Jeff