

# 2009 Epsilon Aurigae Eclipse Campaign Newsletter #13 Summer 2009

Jeff Hopkins, Editor  
Hopkins Phoenix Observatory



Campaign Web Site  
<http://www.hposoft.com/Campaign09.html>  
[https://twitter.com/epsilon\\_Aurigae](https://twitter.com/epsilon_Aurigae)

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### SPECTROSCOPY REPORTS:

Robin Leadbeater  
Olivier Thizy

### FROM DR. BOB:

Final pre-eclipse report

### INTERESTING PAPERS:

French Paper by Laurent Corps  
*Epsilon Aurigae : une étoile à surveiller (1/2)*

Paper on Polarization Measurements  
*Polarimetric measures of selected variable stars*

## Editor's Remarks

Dear Colleagues,

First contact may have already happened by the time you get this newsletter.

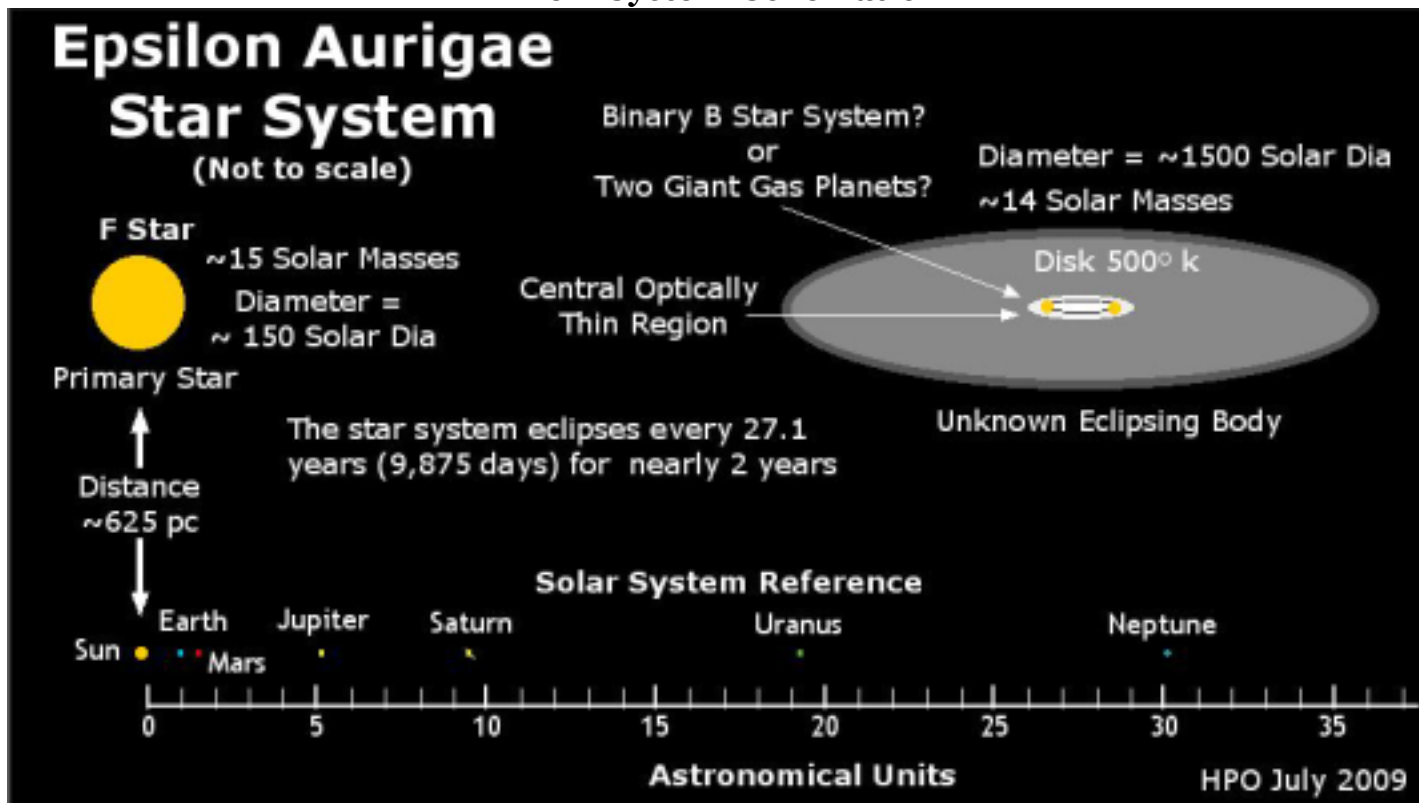
Predictions are for 1st contact to occur earlier in the longer wavelengths (V, R, I, J, H). Hopefully we will have some confirmation of this. As of early July Richard Miles of England has made some photometric observations that indicate the star system is still very bright, brighter than 2.9 in the V band.

Because of the poor position in the sky for observing epsilon Aurigae during June, there are few photometry reports. A summary plot of the data to-date for the 2008/2009 observing season and summary of photometric data reports are provided.

We have a detailed spectroscopy report from Robin Leadbeater. This is very important as it represents the last spectroscopy before the eclipse.

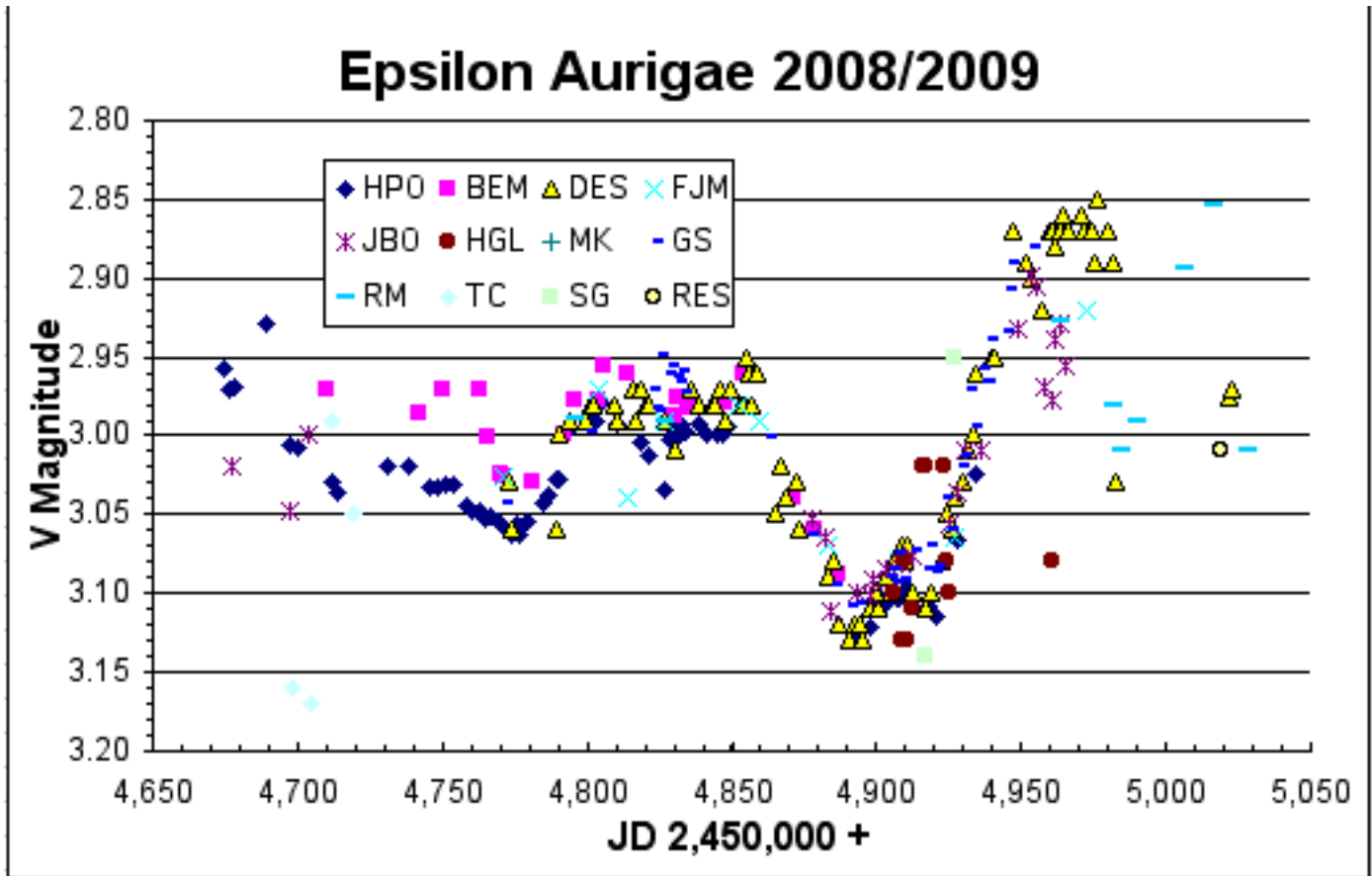
During the first week of August (4 -7 August 2009), the AAVSO, in conjunction with the IYA, will host the 2009 Citizen Sky Workshop at the Adler Planetarium, Chicago ([www.citizensky.org](http://www.citizensky.org)). I will be presenting two Workshops. Dr. Bob will be there to provide information on epsilon Aurigae and our Campaign. Arne Henden will present a Workshop on Bright Star Photometry and I will be presenting two Workshops, one on Spectroscopy and one on DSLR Photometry. The results of the Workshops will be available on-line.

### New System Schematic



Jeff Hopkins  
Campaign Newsletter Editor

# 2008/2009 Season Photometry Data Summary



- HPO** - Hopkins Phoenix Observatory, Arizona, USA  
**JBO** - Jim Beckmann Observatory, Minnesota, USA  
**RM** - Richard Miles, England  
**BEM** - Brian McCandless, Maryland, USA  
**HGL** - Hans-Goran Lindberg, Sweden  
**TC** - Dr. Tiziano Colombo, Italy  
**DES** - Des Loughney (Scotland)  
**MK** - Dr. Mukund Kurtadikar, India  
**SG** - Snaevarr Gudmundsson, Iceland  
**FJM** - Frank J. Melillo, New York, USA  
**GS** - Gerald Samolyk, Wisconsin, USA  
**RES** - Robert E. Stencel/Nicholas Long, Denver USA

## Alternate Software for Optec's SSP-4

From Brian Kloppenborg <bkloppen@du.edu>, July 6, 2009. I have just released alternate control software for Optec's SSP-4 J- &H-band photometer. The software is compatible with Windows (.NET 2.0 required) as well as Linux and Mac OS X (under Mono) operating systems. The software allows the user to select exposure times between 0.01 and 65.53 seconds in 0.01 second increments and is written to preserve data in case of accidental camera disconnects or power cycles. The software has been thoroughly tested over the last five weeks at DU's Mt. Evans observatory and improved during that time. The software is available for download from the "Software" tab on my portfolio page (<http://portfolio.du.edu/bkloppen>) and will be officially announced at the Citizen Sky Workshop at the Adler Planetarium in August.

## David Trowbridge

Comp stars 1 Aur, 2 Aur and Omega in order to average results I had obtained using Eta and Zeta on July 21 (I have no images of Lambda yet).

	<b>B</b>	<b>SD</b>	<b>V</b>	<b>SD</b>	<b>R</b>	<b>SD</b>	<b>I</b>	<b>SD</b>
21 July 2008	3.319	0.12	3.134	0.042	2.374	0.139	2.062	0.195

## Dr. Tiziano Colombo

<b>JD</b>		<b># Obs</b>	<b>Epsilon Aurigae V Mag</b>	<b>Rho Aurigae V Mag</b>
<b>2,450,000 +</b>	<b>UT</b>			
4698.60416	2:30	6	3.16	4.80
4705.58333	2:00	5	3.17	4.82
4712.56736	1:37	9	2.99	4.69
4713.63194	3:10	7	3.21	4.72
4719.60763	2:35	13	3.05	4.90
4720.63055	2:42	6	3.25	4.70

## Richard Miles

### Golden Hill Observatory

Location: Stourton Caundle, Dorset, England

Latitude/Longitude/Altitude (ASL): West 2.405 deg, North 50.931 deg

Time Zone: GMT = 0 hours

Telescope: 0.06-m Refractor (Takahashi FS60C)

Filter Set: Johnson V, Cousins Ic

Detector: CCD Camera (Type: Starlight Xpress SXV-H9)

<b>Observation Date</b>	<b>JD</b>	<b>UT</b>	<b>V mag</b>	<b>SD</b>	<b>Ic</b>	<b>SD</b>
25/26 November 2008	2,454,796.46	22:58	2.989	0.005		
26/27 December 2008	2,454,827.33	19:48	2.990	0.004		
11/12 May 2009	2,454,963.00	?????	2.927	.025		
30/31 May 2009	2,454,982.39	21:20	2.98	0.01		
01/02 June 2009	2,454,984.41	21:50	3.01	0.015		
07/08 June 2009	2,454,990.42	22:11	2.991	0.006		
23/24 June 2009	2,455,006.43	22:19	2.894	0.016		
03/04 July 2009	2,455,016.46	23:03	2.854	0.036	2.21	0.05
15/16 July 2009	2,455,028.59	02:07	3.010	0.025	2.29	0.015

**Comments:** Mean, standard deviation of 4 determinations bracketed either side in time by Lambda Aurigae.

Assumes V=4.71, Ic=3.99 for Lambda Aurigae

Each determination was an average of 50 frames.

Telescope was moved so that same area of CCD used to image both the variable and comparison star.

**Paul J. Beckmann: Jim Beckmann Observatory (JBO)**

**Mendota Heights, MN USA**

Latitude/Longitude/Altitude (ASL):

44°53'17.46" N 93°06'53.45" W 953 feet ASL

Time Zone: GMT -6 hours Telescope: 8" f/10 Meade 2080 optics

Optec SSP-3a Filter Set: Optec Johnson BVRI

**JBO 2008/2009 Data**

**Epsilon Aurigae**

UT Date	HJD	B	SD	V	SD	R	SD	I	SD
07/29/2008	4677	3.3049	.0776	3.0172	.0029	2.4731	.0115	2.3034	.1881
07/29/2008	4677	3.4503	.0332	3.0225	.0132	2.4650	.0265	2.2417	.0394
08/18/2008	4697	3.4840	.0095	3.0047	.0326	2.4453	.0236	2.1687	.0365
08/18/2008	4697	3.5795	.0246	3.0916	.0057	2.4531	.0065	2.2076	.0278
08/25/2008	4704	3.5040	.0299	2.9997	.0087	2.4380	.0084	2.1445	.0101
02/15/2009	4878	3.6954	.0100	3.0525	.0061	2.4833	.0014	2.0572	.0033
02/19/2009	4882	3.7094	.0074	3.0644	.0023	2.4106	.0008	2.0457	.0017
02/21/2009	4884	3.7728	.0392	3.1122	.0224	2.5033	.0081	2.0688	.0179
03/02/2009	4893	3.7496	.0012	3.0997	.0040	2.5293	.0039	2.0865	.0052
03/07/2009	4898	3.7571	.0017	3.1022	.0068	2.5256	.0052	2.0811	.0073
03/08/2009	4899	3.7400	.0052	3.0922	.0026	2.5181	.0028	2.0832	.0057
03/12/2009	4903	3.7286	.0007	3.0843	.0045	2.5142	.0014	2.0807	.0037
03/18/2009	4909	3.7396	.0069	3.0818	.0047	2.5079	.0041	2.0648	.0064
03/21/2009	4912	3.7312	.0067	3.0761	.0021	2.4875	.0064	2.0560	.0033
04/03/2009	4925	3.7110	.0256	3.0564	.0232	2.4859	.0150	2.0497	.0047
04/06/2009	4928	3.6976	.0177	3.0355	.0053	2.4640	.0079	2.0308	.0141
04/09/2009	4931	3.5989	.0071	3.0097	.0078	2.4452	.0050	2.0528	.0203
04/14/2009	4936	3.634	.018	3.010	.008	2.968	.002	2.0538	.013
04/27/2009	4949	3.594	.008	2.933	.006	2.355	.008	1.917	.012
05/01/2009	4953	3.537	.009	2.898	.001	2.338	.000	1.912	.012
05/03/2009	4955	3.526	.013	2.905	.009	2.351	.009	1.938	.029
05/06/2009	4958	3.620	.026	2.969	.023	2.258	.028	1.899	.029
05/10/2009	4962	3.5402	.0156	2.9390	.0115	2.3357	.0246	1.9726	.0134
05/11/2009	4963	3.5137	.0551	2.9292	.007	2.3439	.0074	1.9653	.0391
05/13/2009	4965	3.499	.057	2.955	.023	2.353	.007	1.985	.061

**10 July 2009**

**Stencel/Long, University of Denver, Denver, Colorado USA**

DSLR V Band Data

JD: 2,455,019.92 V= 3.01

## Des Loughney

### Edinburg, Scotland, UK

Canon DSLR, 200 ISO, f4, 85 mm lens, Exposure 5 seconds

Eta Aurigae used as the comparison star at  $V = 3.18$

Des uses a remote switch to activate the Canon 200 Digital Single Lens Reflex (DSLR) camera with 85 mm lens. He takes between 10 and 20 exposures stacks and processes them with AIP4WIN.

### Des Loughney 2008/2009 Data

JD 2,450,000 +	UT Date	UT	Epsilon Aurigae V Mag	
5,023	11 July 2009	02:15	2.971	SD 0.012
5,022	10 July 2009	02.20	2.975	SD 0.002
4,994	11 June 2009	23.50	2.56	(Very high air Mass)
4,983	31 May 2009	23.20	3.03	
4,982	30 May 2009	22.35	2.89	
4,980	28 May 2009	22.25	2.87	
4,976	24 May 2009	22.30	2.85	
4,975	23 May 2009	22.05	2.89	
4,974	22 May 2009	22.15	2.87	
4,972	20 May 2009	22.30	2.87	
4,971	19 May 2009	22.05	2.86	
4,966	14 May 2009	21.75	2.87	
4,964	12 May 2009	21.80	2.86	
4,463	11 May 2009	21.95	2.87	
4,962	10 May 2009	21.80	2.875	
4,961	09 May 2009	21.90	2.87	(good night)
4,960	08 May 2009	22.25	2.87	(poor night)
4,957	05 May 2009	21.65	2.92	
4,955	03 May 2009	21.05	2.75	(poor night)
4,953	01 May 2009	22.10	2.895	
4,952	30 April 2009	22.00	2.89	
4,947	25 April 2009	20.85	2.87	
4,941	19 April 2009	20.70	2.95	
4,940	18 April 2009	20.75	2.95	
4,934	12 April 2009	23.80	2.96	
4,933	11 April 2009	22.80	3.00	
4,932	10 April 2009	21.75	3.015	
4,932	10 April 2009	21.20	2.99	
4,932	10 April 2009	20.65	3.02	
4,930	08 April 2009	21.75	3.03	
4,927	05 April 2009	20.75	3.04	
4,926	04 April 2009	20.90	3.06	
4,924	02 April 2009	20.30	3.05	
4,922	31 March 2009	21.00	3.08	
4,919	28 March 2009	22.50	3.097	
4,919	28 March 2009	22.05	3.081	
4,919	28 March 2009	21.55	3.106	
4,919	28 March 2009	21.15	3.097	
4,919	28 March 2009	20.60	3.095	
4,917	26 March 2009	23.35	3.105	
4,912	21 March 2009	19.70	3.10	
4,911	20 March 2009	20.35	3.07	
4,910	19 March 2009	20.25	3.08	
4,909	18 March 2009	20.95	3.07	
4,906	15 March 2009	19.35	3.08	

## Des Loughney 2008/2009 Data (continued)

JD 2,450,000+	UT Date	UT	Epsilon Aurigae V Mag
4,905	14 March 2009	20.50	3.10
4,903	12 March 2009	19.25	3.09
4,901	10 March 2009	19.10	3.11
4,900	09 March 2009	19.30	3.10
4,898	08 March 2009	00.55	3.11
4,895	05 March 2009	23.05	3.14
4,895	05 March 2009	21.00	3.11
4,895	05 March 2009	19.10	3.14
4,894	04 March 2009	23.70	3.13
4,894	04 March 2009	21.20	3.10
4,894	04 March 2009	19.05	3.13
4,892	02 March 2009	20.35	3.12
4,891	01 March 2009	18.90	3.13
4,887	25 February 2009	19.50	3.12
4,885	23 February 2009	22.55	3.08
4,883	21 February 2009	23.80	3.09
4,873	11 February 2009	18.45	3.06
4,872	10 February 2009	22.35	3.03
4,869	07 February 2009	18.55	3.04
4,867	05 February 2009	23.75	3.02
4,865	03 February 2009	18.40	3.05
4,859	28 January 2009	20.00	2.96
4,857	26 January 2009	18.95	2.98
4,856	25 January 2009	20.95	2.96
4,855	24 January 2009	20.65	2.95
4,854	23 January 2009	23.30	2.98
4,853	22 January 2009	18.85	2.98
4,850	19 January 2009	22.45	2.97
4,848	17 January 2009	21.05	2.99
4,846	15 January 2009	21.15	2.97
4,844	13 January 2009	20.95	2.98
4,843	12 January 2009	21.05	2.98
4,839	08 January 2009	21.75	2.98
4,836	05 January 2009	20.95	2.97
4,836	05 January 2009	18.65	2.97
4,830	29 December 2008	20.95	3.01
4,827	26 December 2008	23.95	2.98
4,827	26 December 2008	21.00	3.00
4,827	26 December 2008	02.20	2.98
4,821	20 December 2008	00.00	2.98
4,820	19 December 2008	22.20	2.98
4,819	18 December 2008	21.85	2.96
4,819	18 December 2008	22.35	2.98
4,817	16 December 2008	22.35	2.99
4,817	16 December 2008	21.05	2.98
4,816	15 December 2008	00.57	2.97
4,810	09 December 2008	23.95	2.99
4,810	09 December 2008	23.20	2.98
4,809	08 December 2008	22.95	2.98
4,809	08 December 2008	22.45	2.97
4,802	01 December 2008	20.90	2.98
4,801	30 November 2008	21.80	2.97
4,801	30 November 2008	00.80	2.98
4,799	28 November 2008	08.80	2.97
4,799	24 November 2008	21.30	3.01

## Des Loughney 2008/2009 Data (continued)

JD 2,450,000+	UT Date	UT	Epsilon Aurigae V Mag
4,799	24 November 2008	22.60	3.01
4,799	24 November 2008	23.45	3.02
4,794	23 November 2008	21.85	2.99
4,790	19 November 2008	21.90	3.00
4,789	18 November 2008	22.55	3.06
4,774	03 November 2008	00.20	3.06
4,773	02 November 2008	21.80	3.03

### Hans-Goran Lindberg Skultuna, Sweden

Observation using:

(50 mm fl camera lens, HX-516 B/W Camera, y2-filter

Exp 30\*3sec, .fits images stacked

TeleAuto software, with Superstar)

Compstar lambda Aurigae at V= 4.71

Date	CV
03 April 2009	3.10
02 April 2009	3.08
01 April 2009	3.02
26 March 2009	3.018
25 March 2009	3.023
21 March 2009	3.113
20 March 2009	3.125
19 March 2009	3.078
18 March 2009	3.127
17 March 2009	
15 March 2009	3.102
15 March 2009	
01 March 2009	
28 February 2009	
27 February 2009	
<hr/>	
23 March 2008	3.045
22 March 2008	3.041
21 March 2008	3.054
28 March 2008	
13 March 2008	
04 March 2008	3.042
28 February 2008	2.971
28 February 2008	2.997
28 February 2008	3.041
27 February 2008	3.036
13 February 2008	3.057
11 February 2008	3.037
11 February 2008	3.054



**Brian E. McCandless**

**Elkton, MD USA**

Telescope: CGE1400

Detector \*(BVRI): SSP-3 Detector (JH): SSP-4 @ T= - 40C

Comp = Lam Aur HD34411 \* **Note:** JD = 2,450,000 +.

B= 5.34 V= 4.71 R= 4.19 I= 3.88 J= 3.62 H= 3.33

JD	B	Error	V	Error	Rc	Error	Ic	Error
4887.61			3.088	0.001	2.546	0.003		
4879.58			3.060	0.004	2.535	0.002		
4871.60			3.040	0.005	2.509	0.007		
4854.66			2.954	0.006				
4854.64			2.968	0.005	2.453	0.004		
4848.61			2.979	0.002	2.453	0.002		
4835.64			2.982	0.002	2.464	0.006		
4831.48	3.509	0.004	2.975	0.006				
4830.53	3.551	0.015	2.980	0.003	2.483	0.004	2.115	0.009
4830.49			3.003	0.010				
4830.49			2.982	0.007	2.477	0.008		
4814.59			2.961	0.002	2.418	0.008		
4806.60			2.956	0.001	2.437	0.003		
4804.53			2.977	0.007	2.469	0.005		
4796.65			2.977	0.005	2.469	0.003		
4792.73			3.001	0.002	2.485	0.003		
4792.59			3.006	0.006				
4792.58			2.990	0.002				
4781.66			3.030	0.003				
4771.78			3.034	0.005				
4771.72			3.017	0.010	2.508	0.008	2.128	0.005
4770.00			3.018	0.008				
4770.00	3.609	0.015	3.029	0.008				
4766.71					2.491	0.005	2.12	0.007
4766.70	3.589	0.012	3.001	0.005				
4763.68			2.971	0.010				
4750.76	3.581	0.015	2.959	0.006				
4750.76	3.566	0.012	2.981	0.009	2.473	0.005	2.093	0.003
4742.76			2.984	0.006			1.960	0.08
4742.75							2.024	0.06
4742.73			2.986	0.010				
4710.83	3.544	0.01	2.977	0.012	2.473	0.015	2.096	0.015
4710.82			2.962	0.012				
4572.62			3.064	0.008				
4572.57			3.067	0.009				
4559.56	3.668	0.004	3.033	0.005	2.518	0.004	2.106	0.003
4549.64	3.676	0.005	3.018	0.005	2.468	0.005	2.027	0.005
4549.59			3.017	0.006				
4547.55			3.009	0.004				
4547.54			3.018	0.004				
4538.55			2.978	0.005				
4538.55			2.979	0.004				
4531.51	3.591	0.015	2.980	0.008	2.475	0.008	2.107	0.008
4525.53			2.968	0.005				
4525.53			2.963	0.005				
4513.69	3.584	0.01	2.986	0.005				
4508.49			2.997	0.005				
4499.71	3.609		3.001	0.002				
4497.50			2.987	0.005				
4496.62	3.601		3.004	0.005				

**Brian E. McCandless Data (continued)**

<b>JD</b>	<b>B</b>	<b>Error</b>	<b>V</b>	<b>Error</b>	<b>Rc</b>	<b>Error</b>	<b>Ic</b>	<b>Error</b>
4494.40	3.586		3.000	0.005				
4493.50	3.594	0.011	3.002	0.005	2.495	0.011	2.119	0.011
4491.51			3.002	0.002				
4491.51			3.001	0.002				
4489.50	3.600		3.007	0.002				
4489.49			3.005	0.002				
4489.49			3.007	0.002				
4487.53			3.020	0.005				
4487.53			3.014	0.005				
4486.50			3.023	0.005				
4486.50			3.027	0.005				
4486.49			3.019	0.005				
4481.51	3.781	0.009	3.006	0.005	2.496	0.008	2.112	0.008
4475.52			3.041	0.010				

<b>JD</b>	<b>J</b>	<b>Error</b>	<b>H</b>	<b>Error</b>
4887.53	1.857	0.003	1.619	0.003
4887.51	1.862	0.004	1.608	0.007
4879.60	1.843	0.004	1.621	0.003
4876.74	1.877	0.010	1.598	0.011
4876.73	1.912	0.010	1.601	0.014
4861.51	1.815	0.020	1.608	0.006
4854.50	1.806	0.006	1.574	0.005
4851.55	1.794	0.003	1.574	0.004
4835.55	1.814	0.009	1.605	0.004
4835.45	1.846	0.010	1.609	0.006
4806.59	1.794	0.007	1.564	0.005
4792.66	1.813	0.005	1.592	0.002
4781.66	1.836	0.005	1.604	0.008
4771.69	1.804	0.010	1.599	0.007
4760.69	1.833	0.004	1.582	0.010
4742.76			1.658	0.090
4742.75			1.639	0.080
4710.86	1.860	0.02	1.624	0.020
4572.56	1.825	0.015	1.632	0.012
4559.60	1.797	0.011	1.569	0.008
4549.56	1.789	0.011	1.551	0.005
4549.55	1.815	0.011	1.543	0.007
4538.56	1.761	0.007	1.556	0.004
4531.56	1.762	0.009	1.532	0.001
4531.50	1.785	0.013	1.576	0.011
4525.56	1.761	0.003	1.528	0.006
4525.55	1.768	0.002	1.556	0.003
4513.70	1.784	0.002	1.552	0.003
4496.65	1.821	0.005	1.608	0.003
4494.40	1.875	0.04	1.607	0.08
4493.54	1.832	0.011	1.612	0.005
4493.53	1.854	0.009	1.628	0.004
4491.66	1.842	0.006	1.621	0.011
4491.63	1.834	0.032	1.633	0.022
4489.51	1.856	0.004	1.606	0.013
4487.62	1.855	0.006	1.633	0.008
4487.61	1.843	0.004	1.626	0.008
4481.61	1.840	0.039	1.617	0.012
4481.54	1.813	0.018	1.627	0.008
4481.53	1.848	0.011	1.622	0.015
4475.57	1.920	0.013	1.801	0.012
4475.50	1.974	0.009	1.644	0.019

**Jeff Hopkins****Hopkins Phoenix Observatory (HPO)****Phoenix, Arizona USA**

Latitude: 33.5017 North , Longitude: 112.2228 West

Altitude: 1097 feet ASL

Time Zone: MST (UT -7)

Telescope: C-8 8" SCT

Filter Set: UBV Standard

Detector: 1P21 PMT in Photon Counting Mode

Differential Photometry

lambda Aurigae as Comparison star

V= 4.71; B= 5.34; U= 5.46

Data transformed and corrected for nightly extinction.

HJD	V	SD	B	SD	U	SD
<b>April 2009</b>						
2454934.6385	3.0249	.0109	3.5995	.0089	3.8022	.0610
2454928.6454	3.0663	.0040	3.6556	.0046	3.8188	.0262
<b>March 2009</b>						
2454921.6524	3.1142	.0048	3.7030	.0065	3.8676	.0328
2454918.6593	3.1076	.0044	3.7066	.0040	3.8792	.0015
2454911.6357	3.0956	.0065	3.6894	.0062	3.8568	.0059
2454908.6371	3.1028	.0035	3.6935	.0035	3.8630	.0039
2454907.6301	3.1032	.0008	3.6897	.0013	3.8497	.0180
2454906.6308	3.0998	.0170	3.6840	.0115	3.8544	.0172
2454903.6510	3.1062	.0042	3.6983	.0028	3.8635	.0026
2454901.6294	3.1023	.0042	3.6946	.0025	3.8611	.0024
2454900.6204	3.1087	.0028	3.6997	.0030	3.8651	.0061
2454898.6232	3.1209	.0031	3.7053	.0044	3.8689	.0062
2454892.6225	3.1235	.0103	3.7168	.0119	3.8709	.0057
<b>January 2009</b>						
2454849.6649	2.9938	.0045	3.5455	.0010	3.6470	.0060
2454847.6885	2.9998	.0050	3.5479	.0071	3.6321	.0301
2454845.7163	2.9996	.0030	3.5481	.0059	3.6521	.0028
2454841.6635	2.9990	.0029	3.5418	.0035	3.6208	.0079
2454839.6683	2.9932	.0068	3.5405	.0034	3.6196	.0122
2454834.6801	2.9978	.0017	3.5385	.0016	3.6163	.0199
2454832.6892	2.9919	.0074	3.5328	.0066	3.6329	.0011
<b>December 2008</b>						
2454831.6892	3.0011	.0028	3.5420	.0058	3.6278	.0044
2454830.7142	2.9984	.0030	3.5383	.0078	3.6260	.0141
2454829.7538	3.0030	.0009	3.5410	.0050	3.6312	.0089
2454827.7260	3.0353	.0162	3.5282	.0570	3.6165	.0477
2454821.7260	3.0128	.0028	3.5522	.0048	3.6335	.0235
2454819.7100	3.0045		3.5517		3.6303	
2454810.7524	2.9934		3.5572		3.6586	
2454805.6954	2.9789	.0044	3.5316	.0087	3.6265	.0082
2454803.6954	2.9903	.0036	3.5306	.0242	3.6424	.0212
2454801.7690	2.9930	.0007	3.5495	.0070	3.6719	.0117

## Hopkins Data Continued

HJD	V	SD	B	SD	U	SD
<b>November 2008</b>						
2454800.7420	2.9909	.0029	3.5586	.0038	3.6544	.0211
2454794.7524	2.9949	.0365	3.5350	.0511	3.6520	.0539
2454790.7649	3.0282	.0031	3.5938	.0034	3.7104	.0082
2454787.7857	3.0378	.0039	3.6020	.0051	3.7292	.0216
2454785.7697	3.0421	.0068	3.6113	.0045	3.7328	.0166
2454779.7850	3.0540	.0039	3.6285	.0012	3.7731	.0047
2454778.7864	3.0568	.0004	3.6329	.0068	3.7750	.0090
2454777.8010	3.0625	.0023	3.6342	.0039	3.7680	.0114
2454776.7850	3.0559	.0021	3.6332	.0023	3.7513	.0120
2454774.7788	3.0619	.0031	3.6371	.0016	3.7667	.0051
2454771.7857	3.0584	.0054	3.6363	.0059	3.7555	.0128
<b>October 2008</b>						
2454769.7996	3.0548	.0046	3.6373	.0059	3.7523	.0129
2454767.7808	3.0510	.0022	3.6234	.0054	3.7389	.0058
2454765.8093	3.0519	.0006	3.6236	.0056	3.7580	.0130
2454763.8134	3.0472	.0019	3.6164	.0039	3.7533	.0166
2454760.8030	3.0479	.0039	3.6122	.0095	3.7309	.0207
2454758.8162	3.0437	.0034	3.6193	.0037	3.7237	.0135
2454754.8350	3.0309	.0063	3.6126	.0108	3.6967	.0034
2454751.8732	3.0311	.0098	3.5974	.0025	3.7416	.0159
2454748.8371	3.0329	.0054	3.5938	.0041	3.7023	.0074
2454746.8190	3.0326	.0036	3.5892	.0027	3.6971	.0155
<b>September 2008</b>						
2454738.8593	3.0189	.0031	3.5779	.0031	3.6640	.0068
2454731.9002	3.0192	.0021	3.5794	.0044	3.6806	.0114
2454714.9655	3.0362	.0012	3.5986	.0061	3.6935	.0248
2454712.9454	3.0292	.0048	3.5941	.0050	3.6863	.0125
<b>August 2008</b>						
2454700.9565	3.0080	.0009	3.5628	.0057	3.6348	.0134
2454697.9634	3.0064	.0068	3.5519	.0016	3.6281	.0129
2454689.9704	2.9289	.0219	3.4897	.0193	3.5766	.0375
<b>July 2008</b>						
2454678.9551	2.9691	.0393	3.5190	.0373	3.5369	.0698
2454676.9503	2.9709	.0128	3.5234	.0086	3.5577	.0203
2454675.9621	2.9570	.0106	3.5088	.0099	3.5815	.0103

**Frank J. Melillo**

**Holtsville, NY USA**

Lat:+ 40d 40' Long: 73 W Elevation: 100'

Instrument: Optec SSP-3

Telescope: C-8 8"

Gate Time: 10 Seconds

JD 2,450,000 +	Date	UT	V Mag	#	SD
4804	02/03 Dec 08	05:30	2.98	4	
4804	02/03 Dec 08	05:50	2.96	4	
4814	12/13 Dec 08	05:20	3.04	4	
4814	12/13 Dec 08	05:30	3.04	4	
4827	25/26 Dec 08	04:30	2.98	4	
4827	25/26 Dec 08	04:40	3.00	4	
4835	03/04 Jan 09	05:00	2.980	4	0.014
4835	03/04 Jan 09	05:15	2.983	4	0.015
4852	21/22 Jan 09	02:10	2.97	4	0.022
4852	21/22 Jan 09	02:20	2.98	4	
4860	29/30 Jan 09	05:00	3.00	4	0.012
4860	29/30 Jan 09	05:15	2.98	4	0.034
4883	21/22 Feb 09	05:00	3.05	4	0.022
4883	21/22 Feb 09	05:15	3.08	4	0.017
4908	17/18 Mar 09	03:30	3.08	4	0.12
4908	17/18 Mar 09	03:20	3.07	4	0.01
4927	05/06 Apr 09	02:10	3.065	3	0.02
4973	20/21 May 09	01:30	2.92	4	0.03

**Snaevarr Gudmundsson (Iceland)**

**Lindarberg Observatory**

Location (WGS 84)

Latitude:+64d 03.740

Longitude:21d 55.297

Optec SSP-3 on 12" Meade LX 200

Double Date	HJD	B	#	V	#	X
25/26 March 2009	2454917.49	3.72	4	3.14	4	1.51
10/11 April 2009	2454927.46	3.55	4	2.95	4	1.61

**Dr. Mukund Kurtadikar**

**Maharashtra, India**

Postgraduate Department of Physics

Jalna Education Society's

R.G.B.Arts , S.B.Lakhotia Commerce & R.Bezonji Science College

13 April 2009

<b>Date</b>	<b>JD</b>	<b>V</b>	<b>B-V</b>	<b>B</b>
11/19/2008	2454789.414	3.00	0.58	3.58
11/23/2008	2454793.379	2.87	0.54	3.41
11/25/2008	2454795.385	2.91	0.58	3.49
11/26/2008	2454796.380	2.86	0.63	3.49
12/17/2008	2454817.389	2.91	0.57	3.48
12/24/2008	2454824.393	2.94	0.55	3.49
12/25/2008	2454825.363	2.93	0.56	3.49
12/26/2008	2454826.364	2.94	0.54	3.48
12/28/2008	2454828.379	2.93	0.56	3.49
12/29/2008	2454829.374	2.94	0.49	3.43
12/30/2008	2454830.372	2.93	0.54	3.47
01/13/2009	2454844.392	2.94	0.52	3.46
01/21/2009	2454852.399	2.95	0.58	3.53
01/22/2009	2454853.384	2.90	0.54	3.44
01/26/2009	2454857.378	2.91	0.56	3.47

**Gerald Samolyk**

**Greenfield, Wisconsin, USA**

Equipment, CCD Camera and Camera Lens, ST9XE + 50 mm lens

22 May 2009

<b>JD</b>	<b>V</b>	<b>SD</b>	<b>B</b>	<b>SD</b>
4561	3.038	.011	3.543	.008
4562	3.042	.008	3.580	.008
4580	3.083	.010	3.590	.019
4771	3.042	.005	3.668	.010
4800	2.997	.007	3.550	.008
4822	2.970	.012		
4823	2.982	.011	3.497	.012
4824	2.984	.037	3.501	.019
4825	2.949	.015	3.498	.020
4828	2.960	.021	3.491	.013
4829	2.955	.009	3.497	.024
4830	2.962	.010	3.495	.016
4831	2.966	.012	3.498	.017
4832	2.959	.010	3.497	.010
4833	2.973	.010	3.496	.013
4862	3.001	.004	3.554	.012
4877	3.062	.005	3.631	.010
4885	3.095	.008	3.675	.011
4891	3.108	.011	3.681	.012
4893	3.106	.006	3.681	.016
4904	3.090	.007	3.660	.012
4905	3.084	.006	3.656	.028
4906	3.093	.009	3.663	.009
4907	3.075	.011	3.647	.032
4909	3.091	.012	3.666	.019
4912	3.073	.005	3.661	.017
4917	3.084	.013	3.666	.018
4918	3.069	.011	3.657	.018
4920	3.087	.019	3.666	.014
4921	3.083	.007	3.657	.021
4923	3.040	.018	3.637	.018
4925	3.060	.006	3.635	.014
4929	3.020	.010	3.581	.012
4930	3.013	.005	3.585	.022
4931			3.599	.009
4932	2.971	.022	3.568	.071
4933	2.994	.008	3.560	.009
4936	2.958	.007	3.520	.017
4937	2.966	.010	3.528	.010
4938	2.965	.011		
4939	2.939	.018	3.506	.026
4944	2.934	.008	3.471	.028
4945	2.907	.019	3.451	.011
4946	2.891	.005	3.438	.013
4953	2.881	.006	3.367	.009
4953				

# Spectroscopy Report

**28 June 2009**

**Robin Leadbeater Reports**

**Location: Cubria, England**



**Robin Leadbeater Spectroscopic Equipment**

## **Equipment:**

### **Telescope**

Vixen VC200L Cassegrain, 200mm f 6.4/f9

### **Spectrographs**

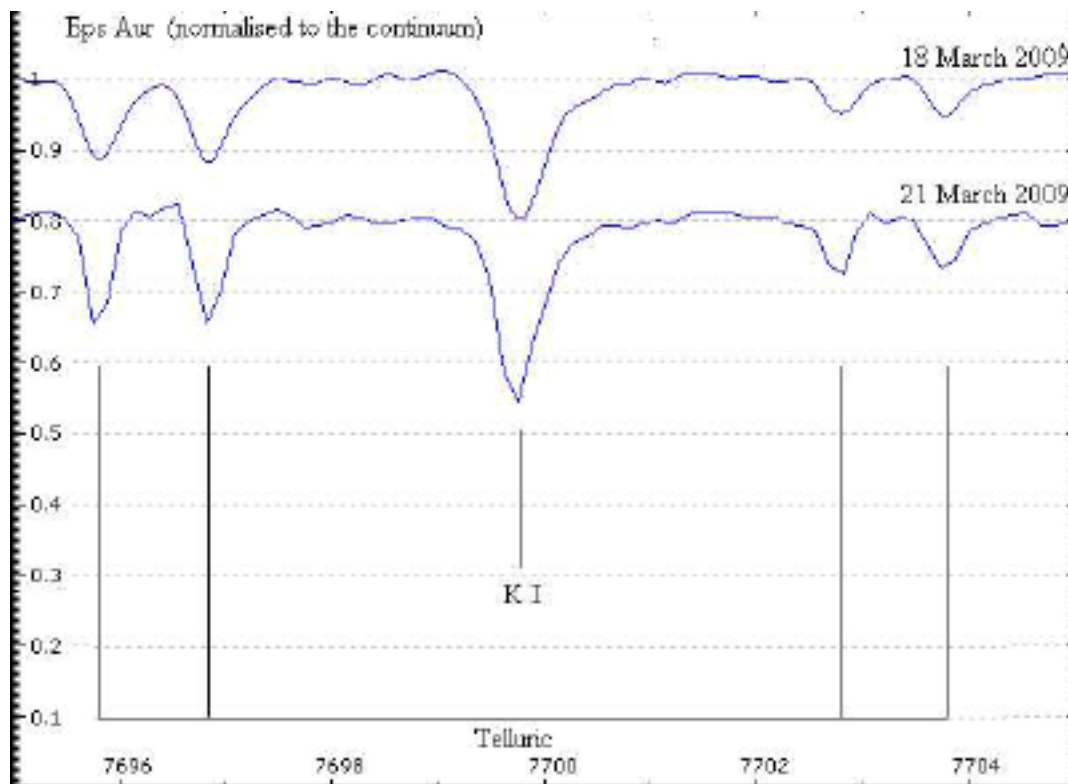
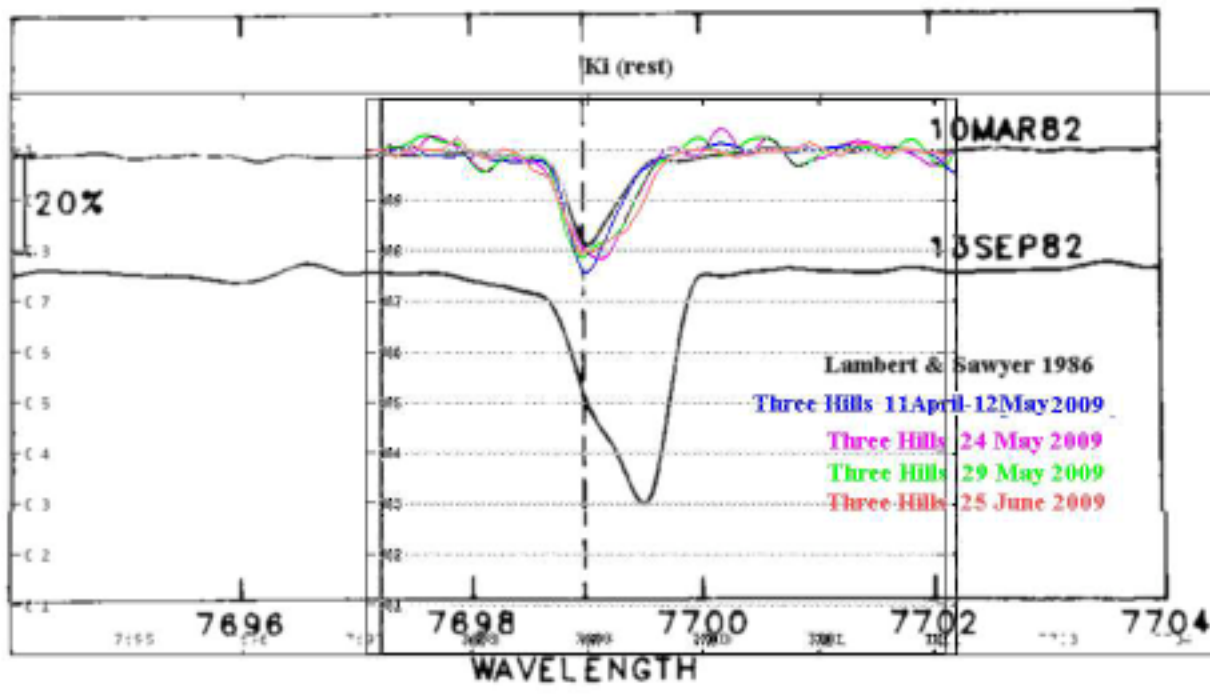
Star Analyser

Lhires III



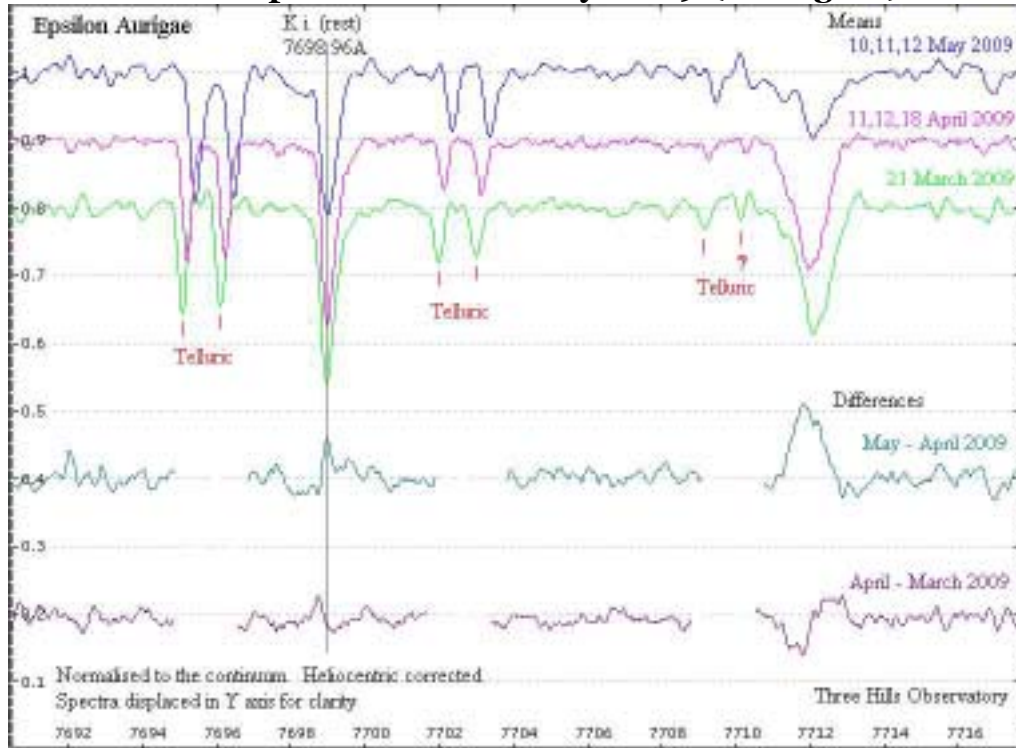
There is evidence of a broadening on the red edge of the KI line profile in results from 24/29 May 2009. This may be the first indication of the start of the ingress phase. The line has broadened further slightly during June.

### Evolution of KI line profile (May/June 2009) compared with previous eclipse



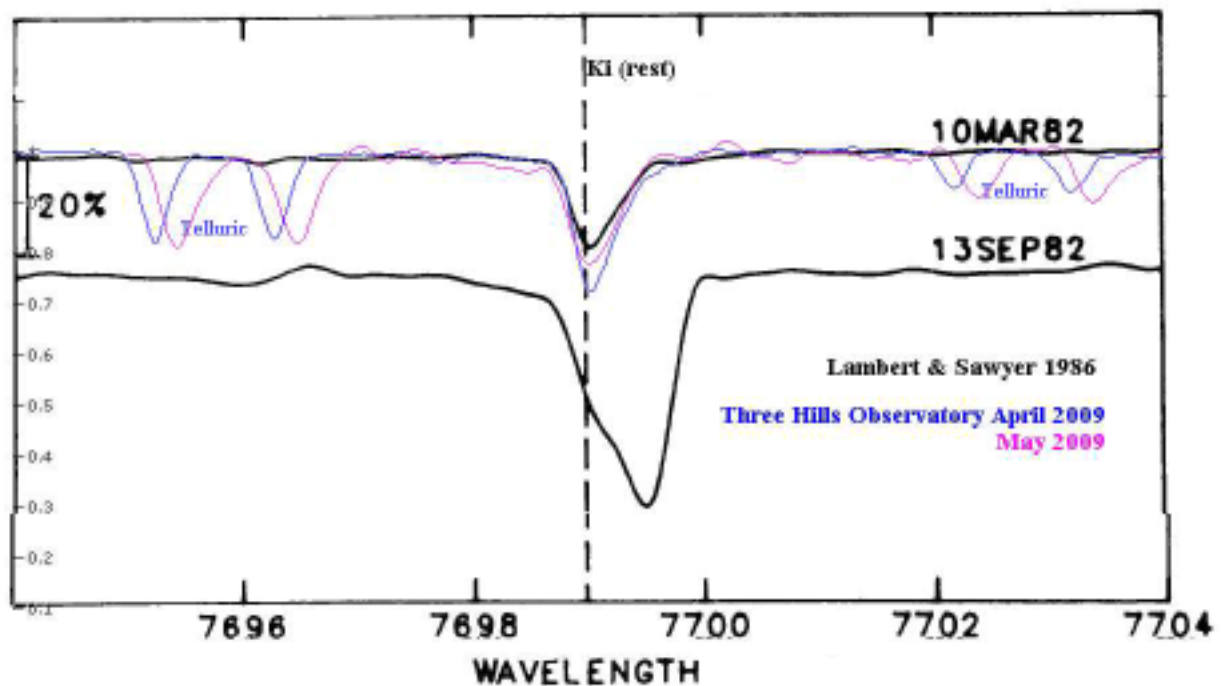
There have been small variations in the intensity of the KI line. The broad line at 7712A (Fe II multiplet) however reduced significantly from April to May 2009. This line is sensitive to variations in circumstellar material (as seen in Be stars for example).

### Pre-Eclipse Variations May 2009 (KI region)

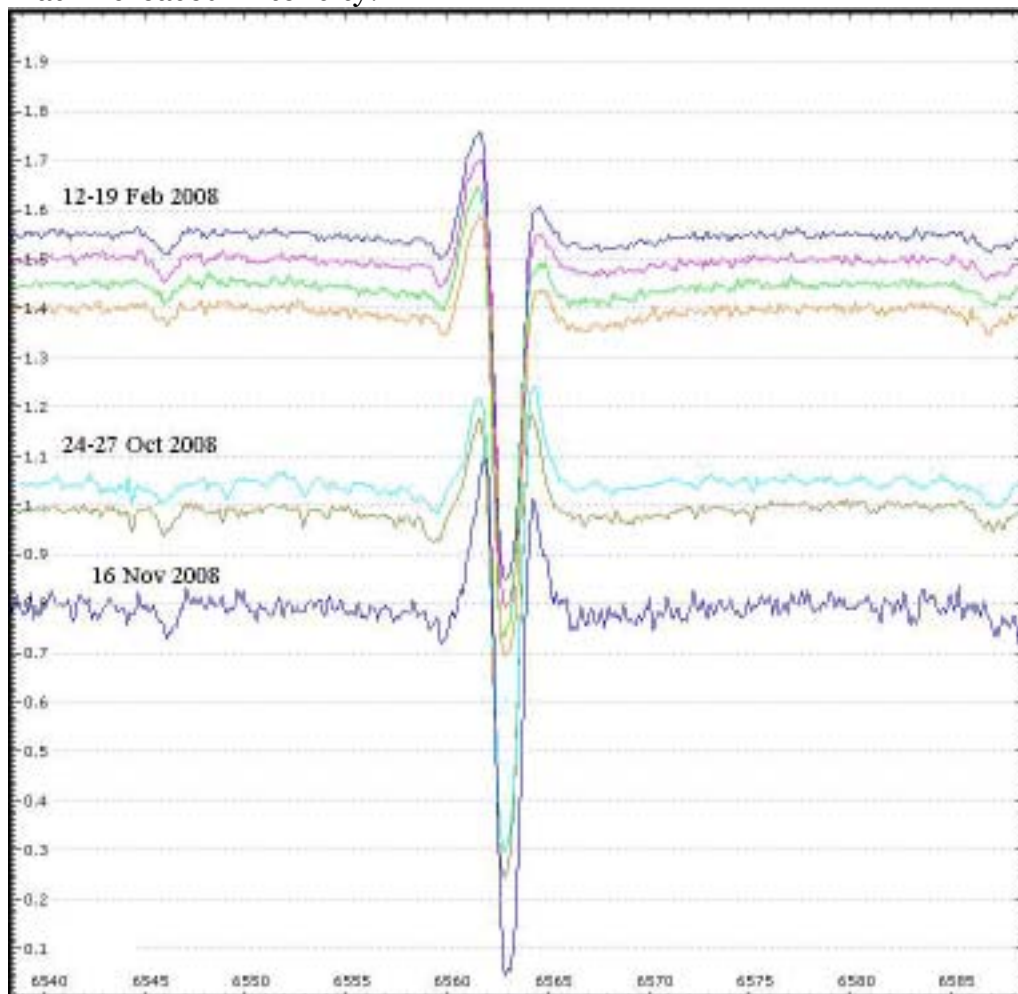


The KI line results have been overlaid on results from the beginning of the previous eclipse. (Epsilon Aurigae in eclipse. II - Optical absorption lines from the secondary Lambert, D. L.; Sawyer, S. R. *Astronomical Society of the Pacific, Publications*, vol. 98, April 1986, p. 389-402)

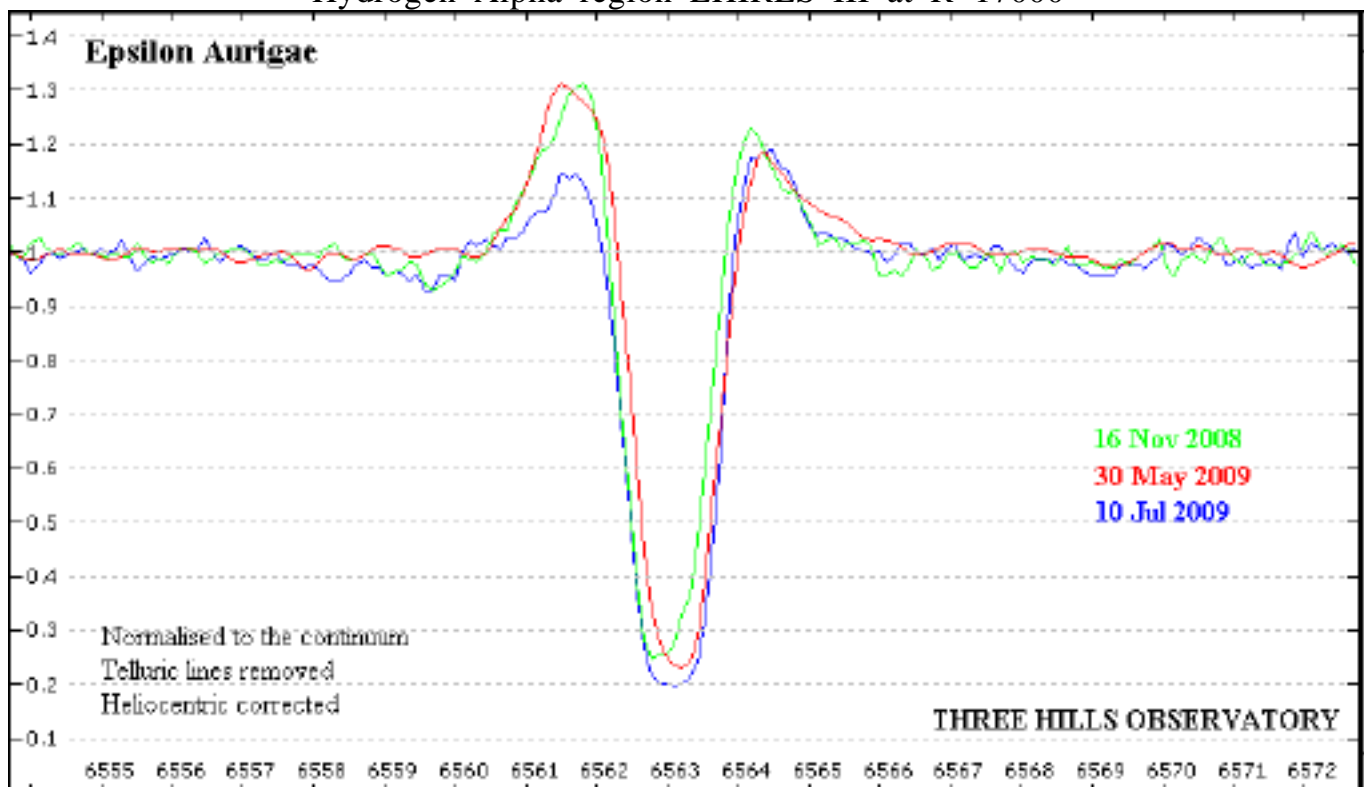
### Comparison of KI line profile with previous eclipse



The Hydrogen alpha line profile April /May 2009 is similar to that seen pre-1982 eclipse, but with a somewhat increased intensity.

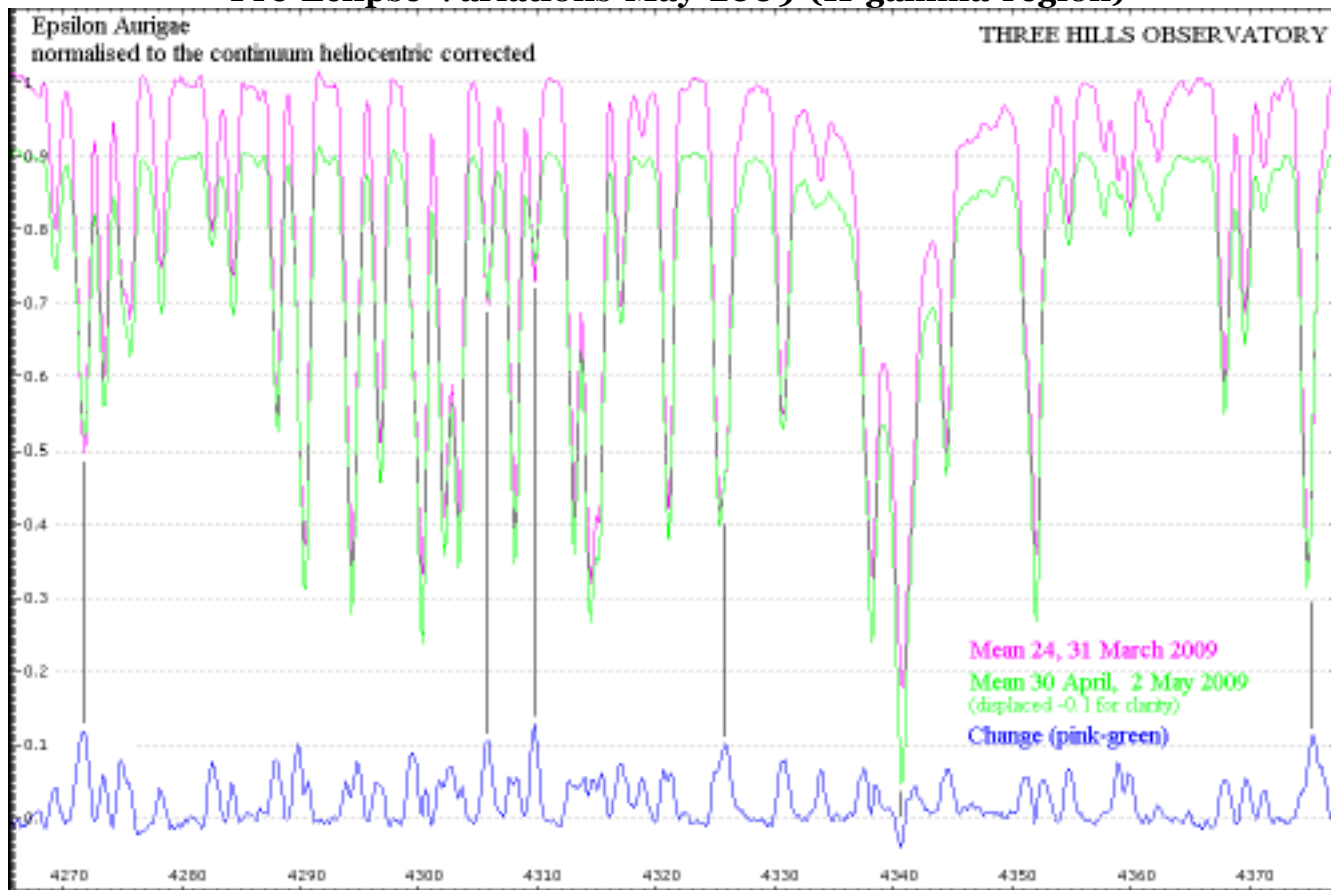


Hydrogen Alpha region LHIRES III at R~17000

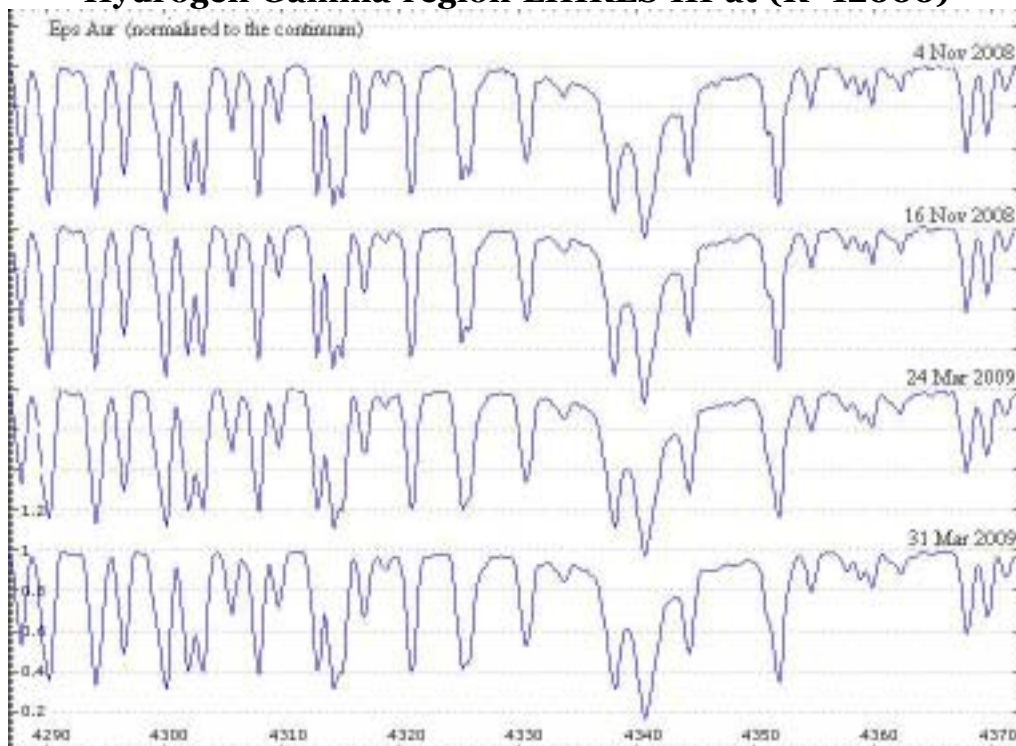


The intensity of many of the metal absorption lines in the Hydrogen gamma region have reduced by a few percent from March to May 2009. The core of the H gamma absorption line however has increased in depth slightly. These changes are most likely due to changes in the FO star rather than the eclipsing object.

### Pre-Eclipse Variations May 2009 (H gamma region)



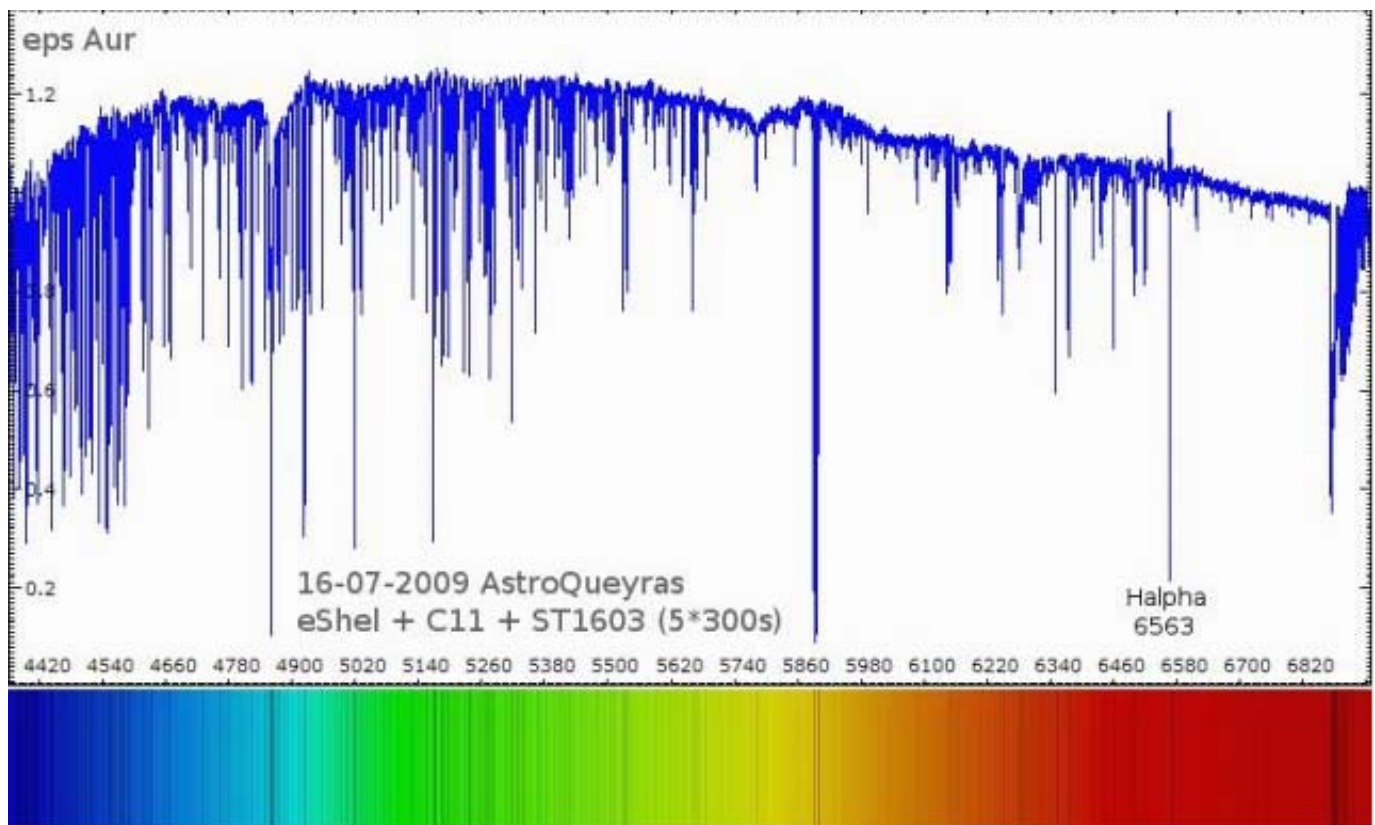
### Hydrogen Gamma region LHIRES III at (R~12000)



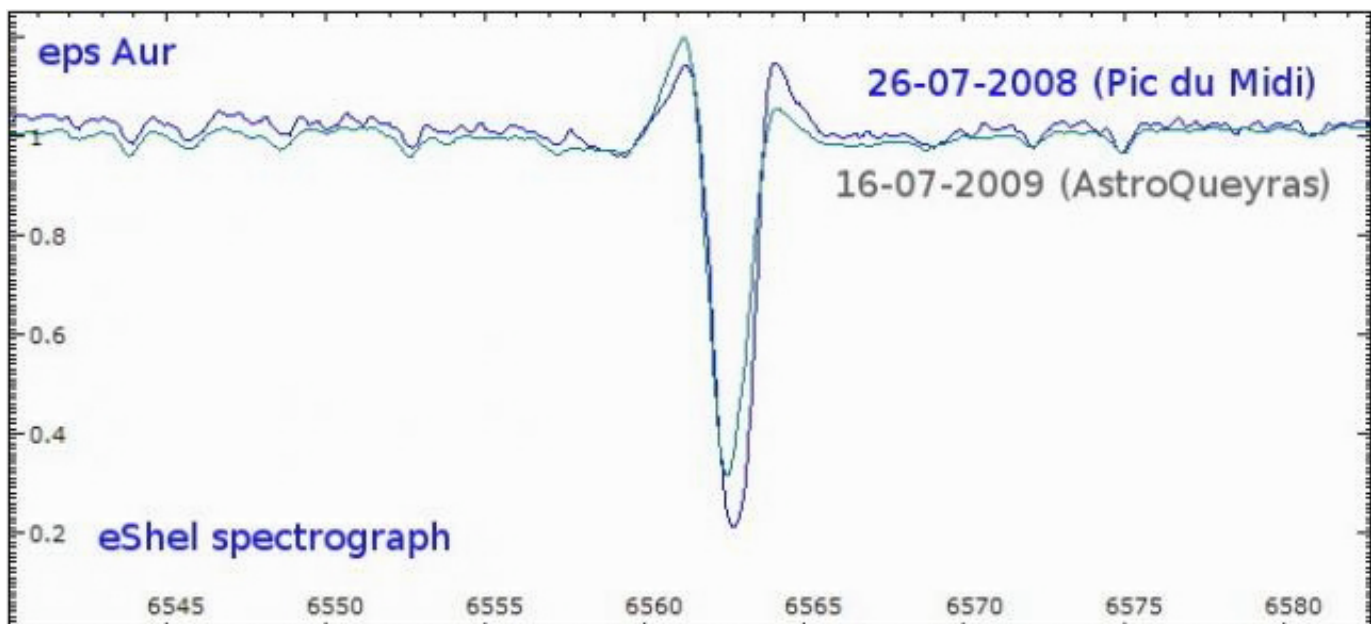


**16 July 2009**  
**Olivier Thizy, France**

Taken with a Celestron C11 and ST1603 camera (5X300 second exposures)  
eShel spectrograph



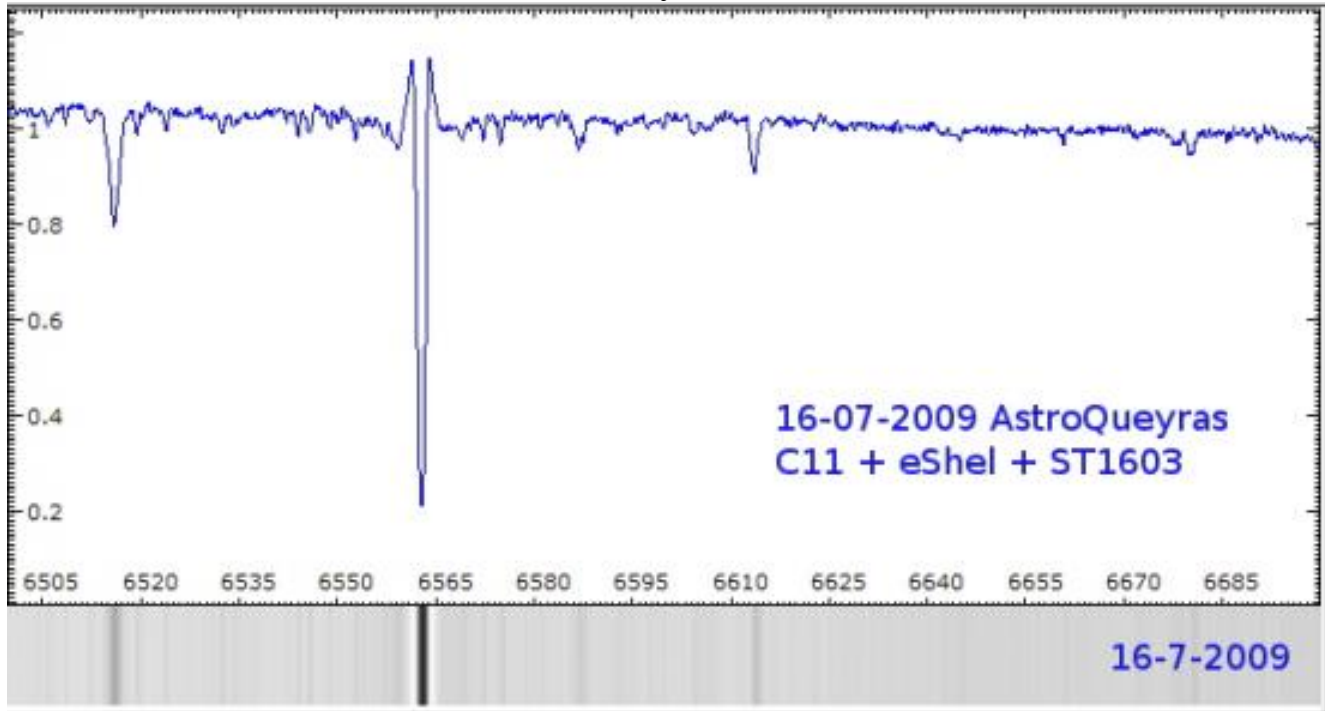
**Note:** Exceptional strong sodium D line absorption.



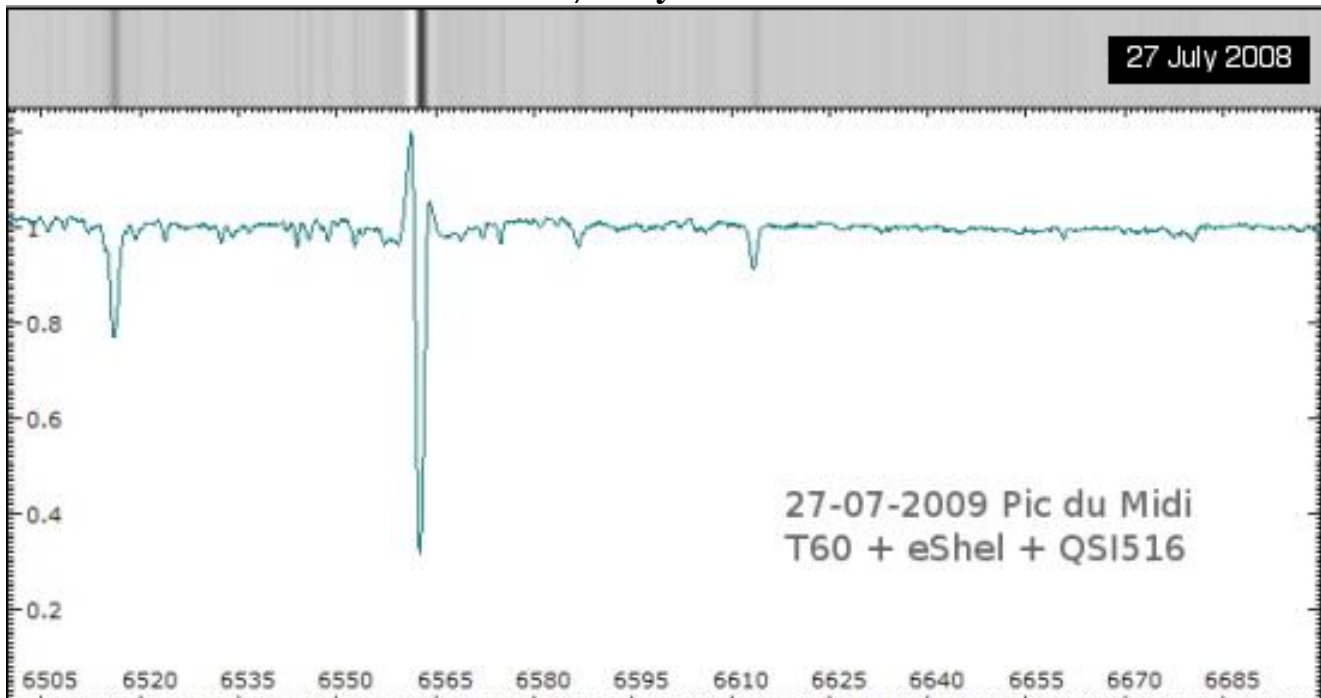
A comparison of the hydrogen alpha region of epsilon Aurigae from 16 July 2009 to nearly a year ago, 27 July 2008.

Details of the hydrogen alpha region current and last year.

**16 July 2009**



**27 July 2008**



## From Dr. Bob

**SAS** -- The spring symposium of the Society of Astronomical Sciences ([www.socastrosci.org](http://www.socastrosci.org)), held jointly with the American Association of Variable Star Observers ( [www.aavso.org](http://www.aavso.org) ) in Big Bear, CA in late May, was a well attended meeting where Jeff and I gave parallel talks on the campaign and spectroscopy of epsilon Aurigae. Pdf copies of these papers are available at the campaign web site, <http://www.hposoft.com/Campaign09.html> .

**The recent light variations** -- is epsilon Aurigae really brighter now than it was during Mar/Apr, or is the high air mass near solar conjunction (RJD 54990 = JD 2,454,990) deceiving us? It is tempting to draw a parallel between the time offset of minimum light (54760, Oct'08) and maximum light (54810, Dec'08) -- with the time offset of the last minimum (54910, Mar'09) and current max (?54960? May'09) - suggesting a semi-period 50 days, or "period" ~100 days. On this schedule, the next minimum would occur around 55010 (Jul'09), but the star has not been fading much. Eclipse is predicted to be underway after 55055 (Aug'09). Denver undergraduate Nick Long has begun a series of DSLR imaging tests and found  $V=3.01$  on July 8th, consistent with reports by observers Richard Miles and Des Loughney in Scotland, and with visual comparisons (eta) at the Mt. Evans telescope eyepiece.

**SSP-4 effort** – After spring classes ended, we've moved up to Denver University's high altitude observatory at 14,148 ft atop Mt. Evans, Colorado (<http://www.du.edu/~rstencil/MtEvans> ) for the purpose of attempting daytime near-IR observing of epsilon Aurigae with the Optec SSP-4, assuming the combination of pointing and daytime dark skies at elevation permit. Solar conjunction occurs for epsilon Aurigae in early June, so thereafter the sun angle increases. Denver graduate student Brian Kloppenborg and undergraduate Nick Long are participating in this adventure. On 6/23/09 we were fortunate to begin getting photometric measures in the J & H bands on stars in broad daylight - including alpha Cet, alpha Tau, alpha Aur and epsilon Aurigae - marginally in the latter case at first pass, but we improved on the statistics in following weeks. The initial results suggest that epsilon Aurigae remains near its nominal J and H magnitudes in advance of eclipse. Observing during July is normally compromised by "monsoon" moisture coming up from the Gulf, and this year by the state highway department deciding to close the road for rebuilding thereof for days at a time. We are preparing a full report for the Adler planetarium meeting in early August and in the next Newsletter.

**Eclipse run-up** -- As mid-summer approached, we've entered a special time with THREE terrestrial eclipse events heralding the predicted start of eclipse for epsilon Aurigae: a partial lunar eclipse July 7, a total solar eclipse on July 22 and another lunar eclipse on August 5 - same week as predicted start of epsilon Aurigae's eclipse, and the Adler planetarium special meeting ( [www.citizensky.org](http://www.citizensky.org) )! Is it a coincidence that this is also Newsletter #13? In addition to the expected 0.8 magnitude fade between August and December 2009, strong spectroscopic redshifts are anticipated. Polarimetry and interferometry sessions are being planned. All photons welcome. What are your observing plans? Let us know!

### **Last Call:**

The supply is nearly gone - original paper copies of the **1985 epsilon Aurigae Workshop Proceedings** are available free. Provide me with a snail mail address. A collector's item!

Dr. Robert Stencil University of Denver Astronomy Program <[rstencil@du.edu](mailto:rstencil@du.edu)>  
[https://twitter.com/epsilon\\_Aurigae](https://twitter.com/epsilon_Aurigae)

# Interesting Papers

New French Paper by Laurent Corps

## **Epsilon Aurigae : une étoile à surveiller (1/2)**

Laurent Corp - Membre AFOEV-AAVSO

<http://www.astrosurf.com/lcorp>

### **Abstract**

Dans cet article en deux parties nous allons aborder l'étude et le suivi des étoiles variables de type «binaires à éclipses». La deuxième partie traitera des techniques d'observation de ce type d'étoiles : prédiction des instants du phénomène, observation et obtention des courbes de lumières. Dans cette première partie nous allons nous intéresser à un cas particulier : l'étoile Epsilon Aurigae.

\*\*\*\*\*

An interesting paper on Polarization Measurements of epsilon Aurigae

### **Polarimetric measures of selected variable stars**

N. M. Elias II<sup>1,2</sup>, R. H. Koch<sup>3</sup>, and R. J. Pfeiffer<sup>4</sup>

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210 Roberts Road, Ardmere, PA 19003, USA

e-mail: [rhkoch@earthlink.net](mailto:rhkoch@earthlink.net)

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Received 6 February 2008 / Accepted 1 July 2008

### **ABSTRACT**

**Aims.** The purpose of this paper is to summarize and interpret unpublished optical polarimetry for numerous program stars that were observed over the past decades at the Flower and Cook Observatory (FCO), University of Pennsylvania. We also make the individual calibrated measures available for long-term comparisons with new data. **Methods.** We employ three techniques to search for intrinsic variability within each dataset.

**First**, when the observations for a given star and filter are numerous enough and when a period has been determined previously via photometry or spectroscopy, the polarimetric measures are plotted versus phase. If a statistically significant pattern appears, we attribute it to intrinsic variability.

**Second**, we compare means of the FCO data to means from other workers. If they are statistically different, we conclude that the object exhibits long-term intrinsic variability.

**Third**, we calculate the standard deviation for each program star and filter and compare it to the standard deviation estimated from comparable polarimetric standards. If the standard deviation of the program star is at least three times the value estimated from the polarimetric standards, the former is considered intrinsically variable. All of these statements are strengthened when variability appears in multiple filters.



**Results.** We confirm the existence of an electron-scattering cloud at L1 in the beta Per system, and find that LY Aur and HR 8281 possess scattering envelopes. Intrinsic polarization was detected for Nova Cas 1993 as early as day +3. We detected polarization variability near the primary eclipse of 32 Cyg. There is marginal evidence for polarization variability of the beta Cepheid type star gamma Peg. The other objects of this class exhibited no variability. All but one of the ? Cepheid objects (ES Vul) fall on a tight linear relationship between linear polarization and  $E(B - V)$ , in spite of the fact that the stars lay along different lines of sight. This dependence falls slightly below the classical upper limit of Serkowski, Mathewson, and Ford.

Name	Filter	$q$ (%)	$\sigma_q$ (%)	$u$ (%)	$\sigma_u$ (%)	$N_{lin}$	$v$ (%)	$\sigma_v$ (%)	$N_{circ}$
$\epsilon$ Aur / HD 31964	<i>U</i>	+0.33	-	-1.95	-	1	-	-	0
	<i>B</i>	+0.79	0.07	-2.03	0.01	2	-	-	0
	<i>V</i>	+0.81	-	-1.98	-	1	-	-	0
	<i>R</i>	+0.78	-	-1.87	-	1	-	-	0

**Key words.** polarization – binaries: close – Cepheids – circumstellar matter – accretion, accretion disks – dust, extinction

<http://cds.aanda.org/index.php?option=article&access=bibcode&bibcode=2008A%2526A...489..911E>

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## BOOK

### *Epsilon Aurigae A Mysterious Star System*

by

Hopkins and Stencel

This is a 287 page soft cover book covering the history of epsilon Aurigae and the observations both in and out-of-eclipse as well as the different techniques used.

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Clear Skies!

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