

## New Variable Stars in Perseus

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#	Name	Other	Coord (J2000)	Type	Max	Min	System	Period	Epoch (JD)	type	Sp	Comment	L.Curve	Find.Chart	Data
1		USNO-A2.0 1425-04225093	03 14 31.68, +57 00 59.5	BY	15.97	16.13		0.79323	2455080.8628	Max		<a href="#">Comm. 1</a>	<a href="#">01_PC-R.png</a>	<a href="#">01_chart.jpg</a>	<a href="#">01_data.txt</a>
2		USNO-B1.0 1477-0135136	03 15 05.44, +57 47 14.9	EW	18.21	18.85		0.331173	2455121.375	Min		<a href="#">Comm. 2</a>	<a href="#">02_PC-R.png</a>	<a href="#">02_chart.jpg</a>	<a href="#">02_data.txt</a>
3		USNO-B1.0 1470-0114084	03 15 19.50, +57 04 49.4	SR:	14.79	15.28		144.7	2455214.30	Max		<a href="#">Comm. 3</a>	<a href="#">03_PC-R.png</a>	<a href="#">03_chart.jpg</a>	<a href="#">03_data.txt</a>
4		USNO-A2.0 1425-04240025	03 15 53.29, +57 34 25.8	EW	14.87	15.24		0.262815	2455519.4924	Min		<a href="#">Comm. 4</a>	<a href="#">04_PC-R.png</a>	<a href="#">04_chart.jpg</a>	<a href="#">04_data.txt</a>
5		USNO-A2.0 1425-04240809	03 15 58.24, +57 26 40.7	HADS	14.02	14.36		0.057820	2455081.3219	Max		<a href="#">Comm. 5</a>	<a href="#">05_PC-R.png</a>	<a href="#">05_chart.jpg</a>	<a href="#">05_data.txt</a>
6		USNO-A2.0 1425-04244235	03 16 17.96, +57 08 58.5	BY:	14.25	14.49		11.34	2455125.05	Max		<a href="#">Comm. 6</a>	<a href="#">06_PC-R.png</a>	<a href="#">06_chart.jpg</a>	<a href="#">06_data.txt</a>
7		USNO-A2.0 1425-04244430	03 16 19.06, +57 03 42.5	EW	16.60	16.95		0.428883	2455145.3205	Min		<a href="#">Comm. 7</a>	<a href="#">07_PC-R.png</a>	<a href="#">07_chart.jpg</a>	<a href="#">07_data.txt</a>
8		USNO-A2.0 1425-04246106	03 16 29.28, +57 03 49.4	EA	14.33	14.77		2.10503	2455169.4598	Min		<a href="#">Comm. 8</a>	<a href="#">08_PC-R.png</a>	<a href="#">08_chart.jpg</a>	<a href="#">08_data.txt</a>
9		USNO-A2.0 1425-04246268	03 16 30.35, +57 14 02.0	EW	16.87	17.26		0.320676	2455120.5641	Min		<a href="#">Comm. 9</a>	<a href="#">09_PC-R.png</a>	<a href="#">09_chart.jpg</a>	<a href="#">09_data.txt</a>
10		USNO-A2.0 1425-04251964	03 17 05.88, +57 46 56.7	EW	13.35	13.39		0.299362	2455202.3051	Min		<a href="#">Comm. 10</a>	<a href="#">10_PC-R.png</a>	<a href="#">10_chart.jpg</a>	<a href="#">10_data.txt</a>
11		USNO-A2.0 1425-04255304	03 17 26.60, +57 38 00.5	EW	15.95	16.16		0.385632	2455169.5118	Min		<a href="#">Comm. 11</a>	<a href="#">11_PC-R.png</a>	<a href="#">11_chart.jpg</a>	<a href="#">11_data.txt</a>
12		USNO-A2.0 1425-04266646	03 18 38.51, +57 20 26.0	EB	13.80	13.88		1.65712	2455494.399	Min		<a href="#">Comm. 12</a>	<a href="#">12_PC-R.png</a>	<a href="#">12_chart.jpg</a>	<a href="#">12_data.txt</a>
13		USNO-A2.0 1425-04268517	03 18 50.58, +57 08 22.2	EW	16.17	16.55		0.401945	2455116.5799	Min		<a href="#">Comm. 13</a>	<a href="#">13_PC-R.png</a>	<a href="#">13_chart.jpg</a>	<a href="#">13_data.txt</a>
14		USNO-A2.0 1425-04276862	03 19 42.37, +57 04 49.8	EB	17.26	17.64		0.761452	2455163.3834	Min		<a href="#">Comm. 14</a>	<a href="#">14_PC-R.png</a>	<a href="#">14_chart.jpg</a>	<a href="#">14_data.txt</a>
15		USNO-A2.0 1425-04283111	03 20 23.65, +57 06 44.6	EA	14.65	14.80		2.8343	2455116.402	Min		<a href="#">Comm. 15</a>	<a href="#">15_PC-R.png</a>	<a href="#">15_chart.jpg</a>	<a href="#">15_data.txt</a>

### Comments:

1. Infrared colors J-H = 0.622, H-K = 0.219, J-K = 0.841 (2MASS) are consistent with the dK spectral type (Bessell and Brett 1988) and BY classification.

2. Primary minima:

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HJD(TT)	$\pm$
2455116.416	0.002
2455120.382	0.004
2455121.375	0.001
2455122.368	0.003
2455123.358	0.003
2455144.230	0.002
2455230.333	0.001
2455516.461	0.002

Min<sub>II</sub>=18<sup>m</sup>.83.

3. IRAS 03114+5653. Infrared colors J-H = 1.598, H-K = 0.765, J-K = 2.363 (2MASS) are consistent with the gM spectral type (Bessell and Brett 1988) and SR: classification. Maximum: HJD(TT) 2455214.30  $\pm$  0.09.

4. O'Connell effect. Primary minima:

HJD(TT)	$\pm$
2455081.3827	0.0006
2455113.4447	0.0008
2455115.5475	0.0005
2455120.2788	0.0004
2455120.5417	0.0004
2455123.4327	0.0004
2455144.4573	0.0003
2455145.5093	0.0004
2455162.3283	0.0006
2455162.5910	0.0004
2455163.3796	0.0003
2455168.3725	0.0010
2455169.4242	0.0003
2455184.4048	0.0004
2455196.2290	0.0005
2455202.2766	0.0004
2455230.3968	0.0004
2455254.3135	0.0004
2455260.3585	0.0007
2455466.4052	0.0002

2455467.4553	0.0004
2455494.2633	0.0005
2455494.5261	0.0006
2455504.5133	0.0004
2455516.6043	0.0009
2455517.3908	0.0003
2455518.4419	0.0005
2455519.4924	0.0002

$\text{Min}_{\text{II}} = 15^{\text{m}}.20.$

5. Maxima:

HJD(TT)	$\pm$
2455081.323	0.003
2455081.3806	0.0005
2455081.4388	0.0005
2455084.330	0.002
2455084.3866	0.0009
2455084.4442	0.0002
2455085.370	0.001
2455109.364	0.001
2455109.424	0.002
2455113.470	0.002
2455142.3792	0.0006
2455168.225	0.001
2455168.3411	0.0009
2455168.399	0.001
2455168.4564	0.0001
2455168.5140	0.0006
2455168.5709	0.0002
2455169.2085	0.0006
2455169.3813	0.0007
2455169.440	0.001
2455169.4972	0.0008
2455169.5548	0.0009
2455169.6125	0.0006

2455230.4393	0.0003
2455230.4972	0.0009
2455254.2036	0.0008
2455254.261	0.001
2455254.3183	0.0005
2455466.2862	0.0004
2455466.4028	0.0008
2455466.4601	0.0007
2455467.3851	0.0003
2455494.2721	0.0009
2455494.3291	0.0004
2455494.5028	0.0006
2455495.5443	0.0006
2455504.3353	0.0008
2455519.3673	0.0009
2455519.425	0.001

6. Infrared colors  $J-H = 0.709$ ,  $H-K = 0.191$ ,  $J-K = 0.900$  (2MASS) are consistent with the K spectral type (Bessell and Brett 1988) and BY: classification.

7. Primary minima:

HJD(TT)	$\pm$
2455081.418	0.002
2455120.4509	0.0007
2455123.448	0.001
2455144.461	0.001
2455145.3205	0.0008
2455162.4771	0.0010
2455163.339	0.001
2455169.341	0.002
2455202.361	0.002
2455230.2400	0.0008
2455254.2555	0.0009
2455467.415	0.001
2455518.4507	0.0005

$\text{Min}_{\text{II}} = 16^{\text{m}}.95.$

8.  $\text{Min}_{\text{II}} = 14^{\text{m}}.75.$

9. Primary minima:

HJD(TT)	$\pm$
2455081.437	0.001
2455109.3400	0.0002
2455113.509	0.002
2455115.426	0.002
2455116.395	0.002
2455120.5641	0.0008
2455121.5244	0.0009
2455122.4884	0.0007
2455123.4463	0.0009
2455144.2906	0.0007
2455145.253	0.001
2455145.578	0.001
2455162.568	0.003
2455163.5350	0.0009
2455230.233	0.001
2455495.434	0.002
2455497.359	0.001
2455504.404	0.002
2455517.5526	0.0009
2455518.518	0.002

$\text{Min}_{\text{II}} = 17^{\text{m}}.26.$

10. Primary minima:

HJD(TT)	$\pm$
2455116.388	0.003
2455121.480	0.001
2455162.4874	0.0010
2455168.477	0.001
2455202.3051	0.0005
2455230.442	0.002

2455466.342	0.001
2455504.3571	0.0007

$\text{Min}_{\text{II}} = 13^{\text{m}}.39.$

11. Primary minima:

HJD(TT)	$\pm$
2455109.355	0.002
2455114.374	0.001
2455115.5301	0.0008
2455116.302	0.002
2455144.454	0.001
2455145.2194	0.0009
2455162.577	0.002
2455169.5118	0.0004
2455202.297	0.001
2455230.4455	0.0005
2455466.459	0.001
2455518.5110	0.0009

$\text{Min}_{\text{II}} = 16^{\text{m}}.16.$

12. Primary minimum: HJD(TT)  $2455494.399 \pm 0.002$ .  $\text{Min}_{\text{II}} = 13^{\text{m}}.83.$

13. O'Connell effect. Primary minima:

HJD(TT)	$\pm$
2455084.420	0.001
2455109.345	0.002
2455115.375	0.002
2455116.5799	0.0005
2455121.4045	0.0006
2455123.4133	0.0005
2455142.3062	0.0010
2455144.3155	0.0008
2455145.5221	0.0004
2455162.4015	0.0008
2455163.2013	0.0010
2455163.6062	0.0007

2455169.236	0.001
2455230.3297	0.0008
2455467.4784	0.0007
2455504.4630	0.0009
2455516.5124	0.0007
2455518.5234	0.0009

Min<sub>II</sub> = 16<sup>m</sup>.52.

14. Primary minima:

HJD(TT)	±
2455115.404	0.001
2455121.509	0.002
2455144.357	0.001
2455163.3834	0.0007
2455466.4409	0.0010
2455517.446	0.001

Min<sub>II</sub> = 17<sup>m</sup>.60.

15. Primary minimum: HJD(TT) 2455116.402 ± 0.001.

**Remarks:**

During observations of a field in Perseus, we discovered fifteen new variable stars. Our observations were carried out at the Astrotel-Caucasus observatory, located at the Astronomical station of the Kazan Federal university, using the 300-mm Ritchey-Chretien telescope, equipped with an unfiltered Apogee Alta U9000 CCD camera. A total of 2316 images with 5-minute exposures were obtained on JD 2455080–2455519. For basic reductions for dark current, flat fields, bias, and for removing cosmic rays hits we used IRAF routines. For search and photometry of new variable stars, we applied VaST software by Sokolovsky and Lebedev (2005). The comparison star was USNO-A2.0 1425-04237176 = USNO-B1.0 1473-0129296 ( $\alpha=03^{\text{h}}15^{\text{m}}37^{\text{s}}.41$ ,  $\delta=+57^{\circ}19'36''.5$ , J2000; 2MASS),  $R_1 = 14^{\text{m}}.33$ ,  $R_2 = 14^{\text{m}}.60$  (USNO-B1.0). Unfiltered magnitudes were calibrated using the comparison star, assuming  $R_{\text{comp}} = 14^{\text{m}}.465$ . The coordinates of the variable stars in the table were drawn from the 2MASS catalogue (Skrutskie et al. 2006). To search for period and derive epochs of extrema, we use [Peranso](#) software.

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**References:**

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