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Chromospherically active stars in the ASAS-3 database: Paper 3. 25 new variables

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Abstract: Another 25 new chromospherically active stars are presented, which were found in the ASAS-3 database:
GSC 07528-00257, GSC 08034-00251, GSC 07533-00380, GSC 08032-01102, GSC 08483-01210, GSC 08054-00859, GSC 08508-00663, GSC 08082-00357, GSC 07589-01602, GSC 08517-00957, GSC 08094-00919, GSC 08529-01246, GSC 07625-01623, GSC 08545-01235, GSC 08131-01761, GSC 08550-01650, GSC 07658-01345, GSC 07654-03725, GSC 07128-00437, GSC 08573-01902, GSC 08582-01705, GSC 07680-01454, GSC 08171-00157, GSC 07703-00931, GSC 08195-00762

During a programme of optical identification of X-ray sources from the ROSAT All-Sky Bright Source Catalogue (1RXS) (Voges et al. 1999) in the ASAS-3 database (Pojmanski, 2002) (http://www.astrouw.edu.pl/asas/?page=main) another 25 new chromospherically active stars have been found. This research continues the search for new chromospherically active stars in the ASAS-3 database (Bernhard et al., 2010).

The criteria for including a star in this list of chromospherically active stars after an analysis of the available data with Period 04 (Lenz and Breger, 2005) were:

i) the X-ray identification: Only those variable ASAS-3 objects were chosen, which were within the error ellipse of the ROSAT All-Sky Bright Source Catalogue. Therefore it is very likely that the X-ray identifications of the variable stars given in this paper are correct and types of variables like Cepheids or semiregular variables can be ruled out because of their low X-ray emission (see the more detailed discussion in Bernhard and Lloyd, 2008).

ii) period, amplitude and shape of the light curve are consistent with the definition of RS CVn, BY Dra and young stellar objects (IN) stars in the GCVS (http://www.sai.msu.su/groups/cluster/gcvs/gcvs/iii/vartype.txt), for a detailed description and sample light curves of the various types of chromospherically active stars see Berdyugina, 2005. Due to the shapes of the light curves other types of chromospherically active and X-ray emitting objects like W UMa variables and Algol stars can be ruled out.

iii) appropriate 2MASS J-K (Skrutskie et al. 2006, Table 8 in Gonzalez-Solares et al. 2008) and B-V (Høg et al. 2000) colour indices if available.

iv) Further information like
- -spectral types including the lithium content as indicator of young stellar objects,
- -the ratios of X-ray to optical flux f_X / f_opt (Voges et al., 1999),
- -proper motions,
- -the relation of the maximum amplitude vs. periods of main sequence stars given in Messina et al., 2003 and
- -an investigation of the respectively star fields using ALADIN (http://aladin.u-strasbg.fr/aladin.gml) to check, if there are nearby open star clusters or known young stellar objects

was also used for the classification of the objects.

The resulting list of variables (Table 1) contains with a very high likelihood chromospherically active stars of the types RS CVn (spectral types F-K), BY Dra (spectral types F-K) or young stellar objects (spectral types F-M).
The light variability of these objects is caused by axial rotation of a star with a variable degree of nonuniformity of the surface brightness (spots). Some of these variables are also eclipsing systems. Secular variations of the light curves, which are typical for many RS CVn, BY Dra variables and young stellar objects (see the detailed light curves below) can be explained by the existence of a long-period stellar activity cycle similar to the 11-year solar activity cycle, during which the number and total area of spots on the star's surface vary.

The ASAS-3 telescopes are situated at Las Campanas Observatory in Chile, V and I filters are used in combination with 200/2.8 lenses and AP-10 CCD cameras. The aperture suggested by the ASAS-3 system (first row of the ASAS-3 V data) was taken for the calculations of the ephemeris and the figures. The ranges given in Table 1 are derived from the time span of the ASAS-3 V observations, due to secular variations (activity cycles) the full ranges could be somewhat larger.

The values of the column "var" denote the extent of secular variations: "0" for no secular variation, "1" for weak secular variation, "2" for strong secular variation of amplitude and/or mean magnitude. The epochs are given for the minima as HJD-2450000, figures in brackets denote errors (sigma) in units of the last decimal.

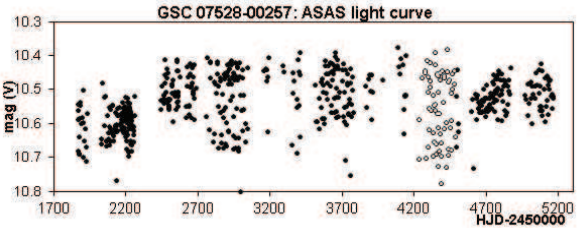
Table 1: Positions, identifications and photometric data for the new chromospherically active stars

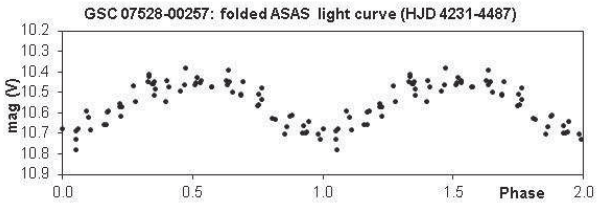
No.	GSC	RA (2000)	Dec	1RXS	Range(ASAS3-V)	Epoch(Min)	Per.(d)	var
51	07528-00257	00 27 42.87	-41 26 15.5	J002743.2-412612	10.40-10.75	4454.6(1)	16.94(4)	2
52	08034-00251	00 55 25.29	-49 56 57.3	J005525.8-495649	10.00-10.20	2972.63(2)	2.5669(5)	2
53	07533-00380	01 00 12.30	-38 18 38.5	J010013.6-381840	10.40-10.80	2552.6(1)	20.35(3)	2
54	08032-01102	01 01 16.69	-45 56 37.5	J010117.7-455632	11.65-12.00	2082.895(4)	0.373786(6)	1
55	08483-01210	02 10 07.91	-54 30 40.2	J021008.2-543036	9.75-10.25	3736.60(6)	5.919(1)	2
56	08054-00859	02 51 11.38	-47 53 07.9	J025111.7-475314	11.65-12.20	3365.6(1)	13.28(1)	2
57	08508-00663	04 11 55.66	-58 01 47.3	J041155.1-580154	9.90-10.05	3414.63(2)	2.617(1)	1
58	08082-00357	04 37 00.41	-51 50 26.7	J043700.1-515012	8.30-8.60	4399.7(7)	76.5(2)	2
59	07589-01602	04 43 14.91	-41 06 19.0	J044315.6-410607	10.15-10.55	1979.498(4)	0.46634(4)	2
60	08517-00957	05 05 36.49	-57 55 36.0	J050534.5-575526	11.25-11.75	2201.838(6)	0.63176(7)	2
61	08094-00919	05 36 00.73	-49 51 53.1	J053600.6-495200	11.45-11.80	2725.5(1)	11.255(5)	0
62	08529-01246	06 13 05.99	-56 20 25.2	J061305.2-562023	9.30-9.70	2636.7(1)	17.97(2)	2
63	07625-01623	06 20 43.46	-43 49 45.5	J062043.1-434937	10.45-10.80	4461.7(3)	31.365(7)	1
64	08545-01235	07 05 12.32	-57 34 13.8	J070512.3-573402	9.85-10.00	5123.83(7)	7.41(1)	1
65	08131-01761	07 08 54.25	-50 57 49.5	J070854.3-505757	9.65-9.85	4167.6(2)	24.434(8)	2
66	08550-01650	07 12 24.96	-53 56 42.1	J071225.6-535636	11.20-11.75	1877.77(4)	4.6135(8)	2
67	07658-01345	07 51 28.41	-43 28 22.7	J075128.1-432810	11.30-11.65	1871.74(6)	6.834(7)	1
68	07654-03725	07 56 36.12	-41 45 25.9	J075636.8-414506	8.70-8.95	4493.7(8)	84.17(5)	2
69	07128-00437	07 58 57.90	-35 22 17.1	J075858.1-352210	10.70-11.10	3644.86(2)	2.372(1)	2
70	08573-01902	08 45 08.25	-55 58 04.0	J084507.4-555816	9.80-10.05	4472.7(5)	53.31(6)	2
71	08582-01705	08 58 48.72	-53 03 25.1	J085849.4-530320	10.60-11.05	4883.76(3)	3.009(1)	2
72	07680-01454	08 59 52.40	-41 07 17.9	J085952.3-410703	8.90-9.15	1948.6(5)	55.66(8)	2
73	08171-00157	09 23 39.93	-47 11 13.6	J092339.4-471104	10.45-10.70	2071.4(2)	20.31(2)	1
74	07703-00931	09 25 06.19	-43 27 58.0	J092505.9-432752	11.20-11.85	3787.7(1)	9.985(7)	1
75	08195-00762	10 11 04.08	-51 19 47.3	J101104.8-511944	10.50-10.90	2989.81(4)	4.543(1)	2

Light curves, folded light curves (with the period given above) and comments:

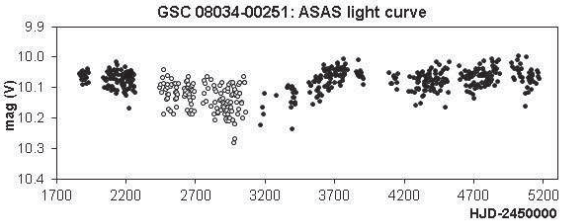
Almost all of the following stars showed a clear variation of the shape of the light curves, which is somewhat typical of chromospherically active stars.
The folded light curves are given for a distinct time period with only small changes in amplitudes and mean magnitudes, therefore a special detrending was not necessary (described in figure as HJD 245 ....-....). The time periods used for the folded light curves are marked as open circles in the original light curves.

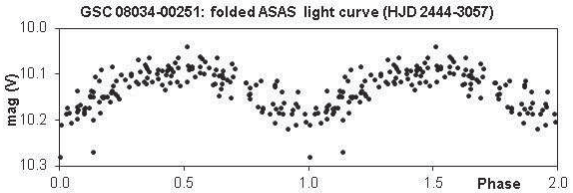
No. 51: GSC 07528-00257
Period: 16.94(4) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/002743-4126.3,asas3,0,0,500,0,0
2MASS J-K: 0.762
Johnson B-V = 1.340 (derived from Tycho-2)
ROSAT: HR1 = 0.17, HR2 = -0.02, fxfopt = -1.58
Proper motion: pmRA: 22.66 mas/yr, pmDE: -12.45 mas/yr (Roeser et al., 2008)
Spectral type: K2III(e), Li: 160 (0.1pm, Torres et al., 2006)
ASAS variable (type DCEP-FO/SR)
Likely an RS CVn variable



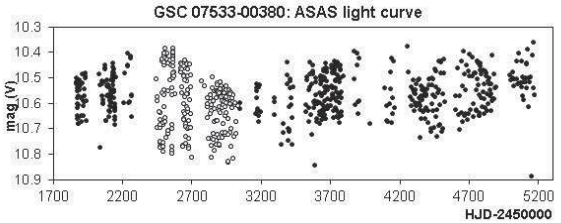


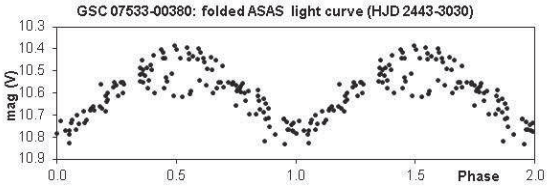
No. 52: GSC 08034-00251
Period: 2.5669(5) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/005525-4957.0,asas3,0,0,500,0,0
2MASS J-K: 0.468
Johnson B-V = 0.734 (derived from Tycho-2)
ROSAT: HR1 = -0.02, HR2 = 0.08, fxfopt = -2.08
Proper motion: pmRA: 42.76 mas/yr, pmDE: 30.44 mas/yr (Roeser et al., 2008)
Spectral type: G9V, Li: 172 (0.1pm, Torres et al., 2006)
Likely an RS CVn variable



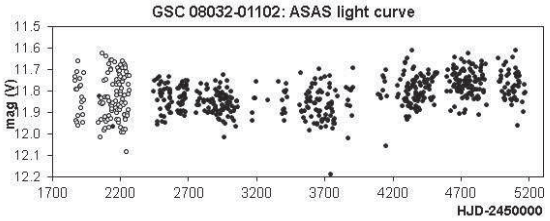


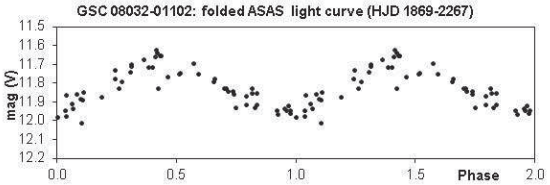
No. 53: GSC 07533-00380
Period: 20.35(3) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/010012-3818.6,asas3,0,0,500,0,0
2MASS J-K: 0.738
Johnson B-V = 1.253 (derived from Tycho-2)
ROSAT: HR1 = 0.05 , HR2 = 0.19, fxfopt = -1.93
Proper motion: pmRA: -10.57 mas/yr, pmDE: 8.29 mas/yr (Roeser et al., 2008)
Spectral type: K0IIIe SB2, Li: 60 (0.1pm, Torres et al., 2006)
ASAS variable (type DCEP-FU)
Likely an RS CVn variable



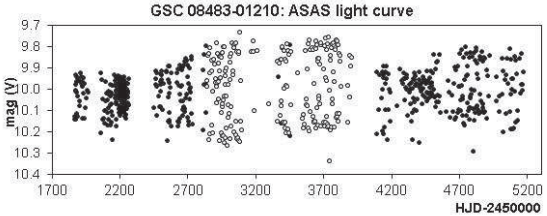


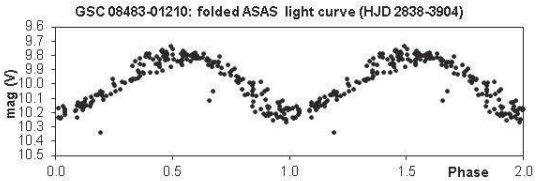
No. 54: GSC 08032-01102
Period: 0.373786(6) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/010117-4556.6,asas3,0,0,500,0,0
2MASS J-K: 0.773
Johnson B-V = 0.873 (derived from Tycho-2)
ROSAT: HR1 = 0.09, HR2 = -0.23 , fxfopt = -1.62
Proper motion: pmRA: 33.39 mas/yr, pmDE: 22.40 mas/yr (Roeser et al., 2008)
Spectral type: K6Ve, Li: 100 (0.1pm, Torres et al., 2006)
ASAS variable (type RRc)
Probable BY Dra variable



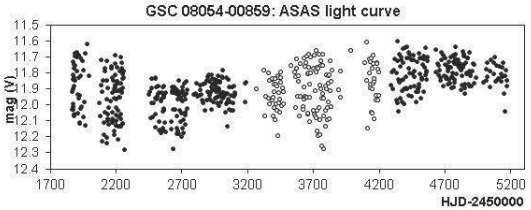


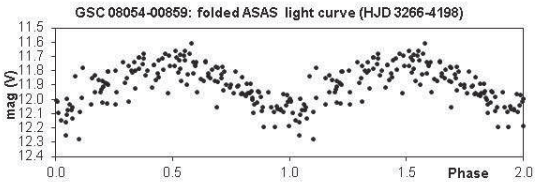
No. 55: GSC 08483-01210
Period: 5.919(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/021008-5430.6,asas3,0,0,500,0,0
2MASS J-K: 0.782
Johnson B-V= 1.089 (derived from Tycho-2)
ROSAT: HR1=0.13 , HR2=0.14 , fxfopt= -1.55
Proper motion: pmRA: 35.87 mas/yr, pmDE: 24.76 mas/yr (Roeser et al., 2008)
Spectral type: K1IIIe SB2, Li: 175 (0.1pm, Torres et al., 2006)
ASAS variable (type MISC)
GCVS: ER Eri, type UV Ceti
Likely an RS CVn variable



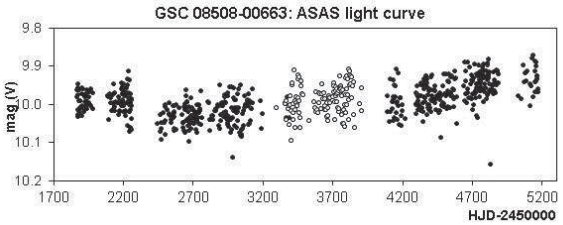


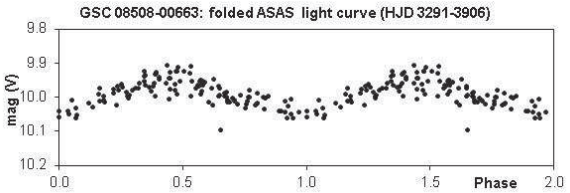
No. 56: GSC 08054-00859
Period: 13.28(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/025112-4753.1,asas3,0,0,500,0,0
2MASS J-K: 0.834
ROSAT: HR1 = 0.41, HR2 = 0.11 , fxfopt = -1.86
Proper motion: pmRA: 3.20 mas/yr, pmDE: -2.19 mas/yr (Roeser et al., 2008)
Spectral type: K5 (Riaz et al., 2006)
ASAS variable (type DCEP-FU)
Likely an RS CVn variable



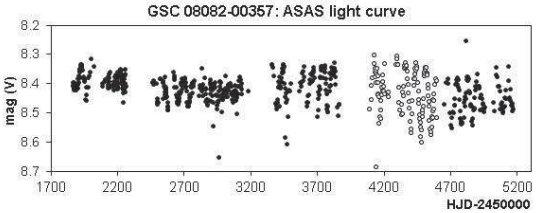


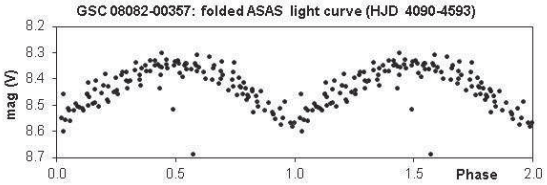
No. 57: GSC 08508-00663
Period: 2.617(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/041156-5801.8,asas3,0,0,500,0,0
2MASS J-K: 0.427
Johnson B-V = 0.670 (derived from Tycho-2)
ROSAT: HR1 = -0.08, HR2= -0.11, fxfopt= -2.63
Proper motion: pmRA: -3.64 mas/yr, pmDE: 34.38 mas/yr (Roeser et al., 2008)
Spectral type: G6V, Li: 225 (0.1pm, Torres et al., 2006)
Likely an RS CVn variable



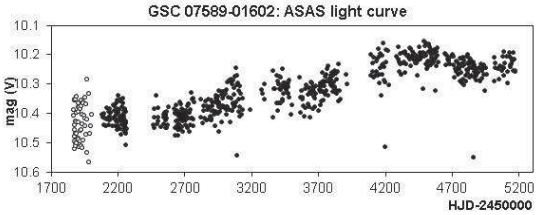


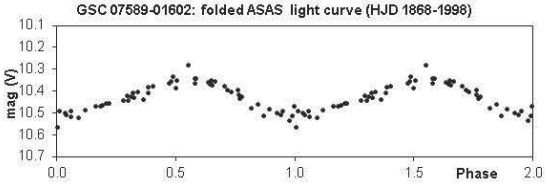
No. 58: GSC 08082-00357
Period: 76.5(2) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/043700-5150.4,asas3,0,0,500,0,0
2MASS J-K: 0.566
Johnson B-V = 0.857 (derived from Tycho-2)
ROSAT: HR1 = 0.27, HR2 = 0.06, fxfopt= -3.06
Proper motion: pmRA: 2.83 mas/yr, pmDE: -22.59 mas/yr (Roeser et al., 2008)
Spectral type: G9III, SB3?, Li: 0 (0.1pm, Torres et al., 2006)
NSV catalogue: NSV 16127
Data inferred from the Hipparcos catalog:
Distance: 145 ± 15 parsecs (473 ± 47 light-years)
Luminosity: 7.7 ± 1.5 times that of the sun
Absolute magnitude: 2.58 ± 0.22
Likely an RS CVn variable



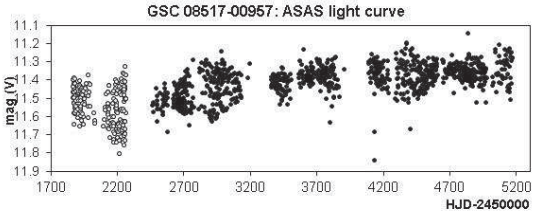


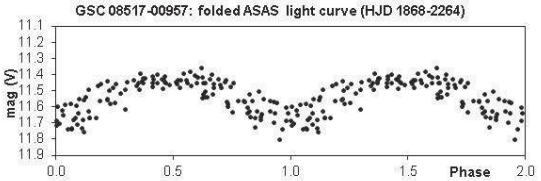
No. 59: GSC 07589-01602
Period: 0.46634(4) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/044315-4106.3,asas3,0,0,500,0,0
2MASS J-K: 0.643
Johnson B-V = 0.847 (derived from Tycho-2)
ROSAT: HR1 = 0.07, HR2 = 0.14 , fxfopt = -1.79
Proper motion: pmRA: 51.36 mas/yr, pmDE: -135.39 mas/yr (Roeser et al., 2008)
Spectral type: K1Ve SB2, Li 50 (0.1pm, Torres et al., 2006)
ASAS variable (type DCEP-FO)
Data inferred from the Hipparcos catalog:
Distance: 74.5 ± 7.2 parsecs (243 ± 24 light-years)
Luminosity: 0.370 ± 0.072 times that of the sun
Absolute magnitude: 5.88 ± 0.21
Probable BY Dra variable



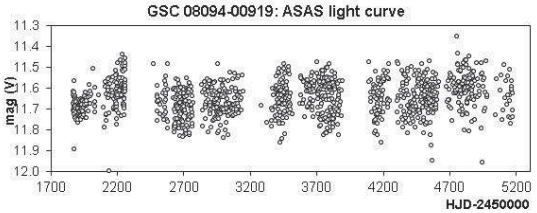


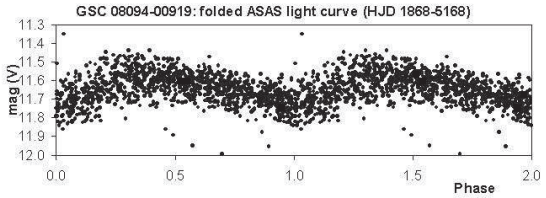
No. 60: GSC 08517-00957
Period: 0.63176(7) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/050536-5755.6,asas3,0,0,500,0,0
2MASS J-K: 0.76
Johnson B-V = 0.606 (derived from Tycho-2)
ROSAT: HR1 = 0.17, HR2 = 0.47 , fxfopt = -1.73
Proper motion: pmRA: 25.36 mas/yr, pmDE: 22.05 mas/yr (Roeser et al., 2008)
ASAS variable (type EC)
Likely an RS CVn variable



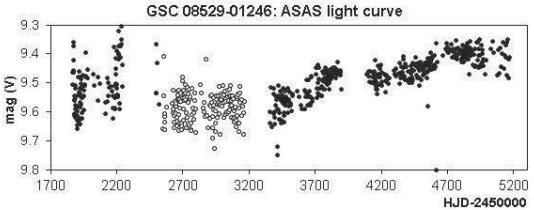


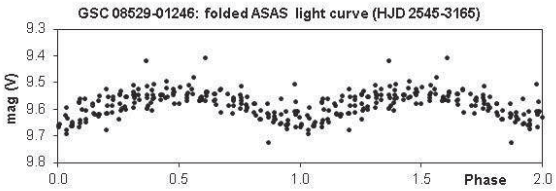
No. 61: GSC 08094-00919
Period: 11.255(5) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/053601-4951.9,asas3,0,0,500,0,0
2MASS J-K: 0.714
Johnson B-V = 0.972 (derived from Tycho-2)
ROSAT: HR1 = 0.22 , HR2 = -0.02 , fxfopt = -1.96
Proper motion: pmRA: 18.40 mas/yr, pmDE: 4.79 mas/yr (Roeser et al., 2008)
Spectral type: K1III(e) SB2, Li: 80 (0.1pm, Torres et al., 2006)
Likely an RS CVn variable



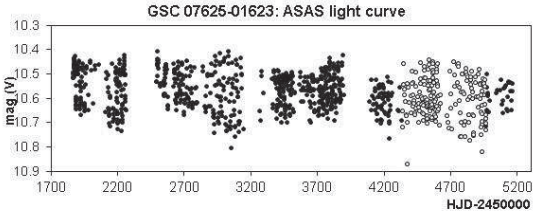


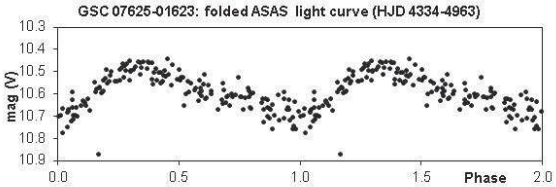
No. 62: GSC 08529-01246
Period: 17.97(2) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/061306-5620.4,asas3,0,0,500,0,0
2MASS J-K: 0.723
Johnson B-V = 0.952 (derived from Tycho-2)
ROSAT: HR1 = 0.29, HR2 = 0.18, fxfopt = -2.61
Proper motion: pmRA: -7.33 mas/yr, pmDE: -10.63 mas/yr (Roeser et al., 2008)
Spectral type: K0III , Li: 90 (0.1pm, Torres et al., 2006)
ASAS variable (type MISC/EC/ESD)
Likely an RS CVn variable



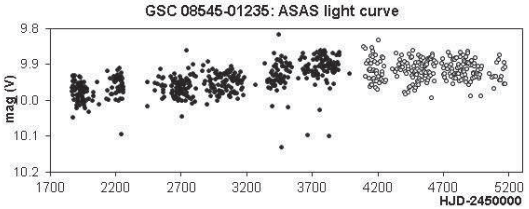


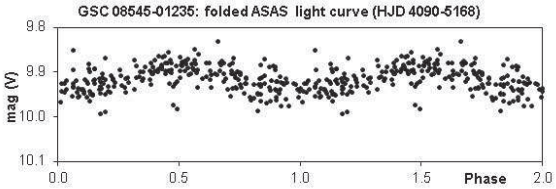
No. 63: GSC 07625-01623
Period: 31.365(7) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/062043-4349.8,asas3,0,0,500,0,0
2MASS J-K: 0.709
Johnson B-V = 0.826 (derived from Tycho-2)
ROSAT: HR1 = 0.87, HR2 = -0.05 , fxfopt= -2.37
Proper motion: pmRA: -0.28 mas/yr, pmDE: 0.88 mas/yr (Roeser et al., 2008)
Spectral type: K0III, Li: 40 (0.1pm, Torres et al., 2006)
ASAS variable (type DCEP-FU/EC/ESD)
Likely an RS CVn variable



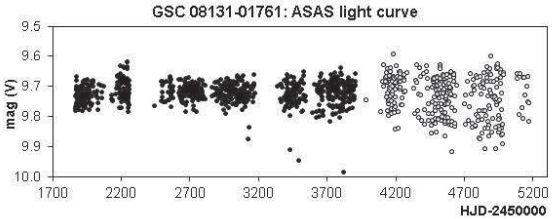


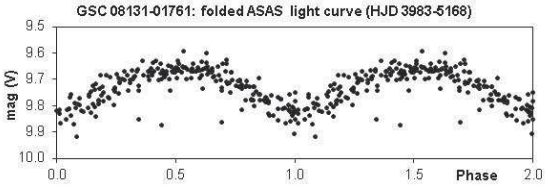
No. 64: GSC 08545-01235
Period: 7.41(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/070512-5734.2,asas3,0,0,500,0,0
2MASS J-K: 0.556
Johnson B-V = 0.822 (derived from Tycho-2)
ROSAT: HR1 = 0.37, HR2 = 0.03 , fxfopt = -2.59
Proper motion: pmRA: 3.18 mas/yr, pmDE: -19.54 mas/yr (Roeser et al., 2008)
Spectral type: G8V SB2, Li: 70 (0.1pm, Torres et al., 2006)
ASAS variable (type MISC)
Likely an RS CVn variable



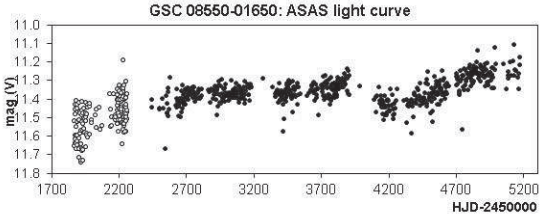


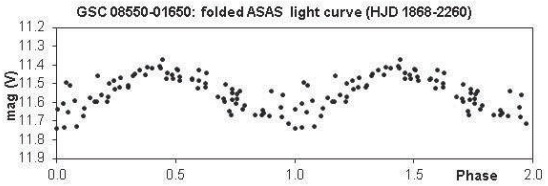
No. 65: GSC 08131-01761
Period: 24.434(8) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/070854-5057.8,asas3,0,0,500,0,0
2MASS J-K: 0.701
Johnson B-V = 0.632 (derived from Tycho-2)
ROSAT: HR1 = 0.86 , HR2 = 0.38 , fxfopt = -2.25
Proper motion: pmRA: 1.37 mas/yr, pmDE: -4.44 mas/yr (Roeser et al., 2008)
Spectral type: G6III, Li: 60 (0.1pm, Torres et al., 2006)
Likely an RS CVn variable



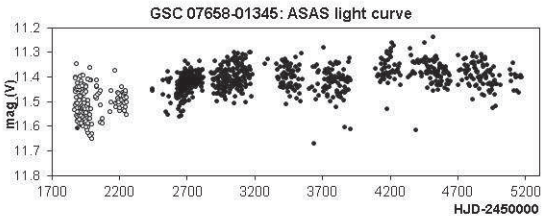


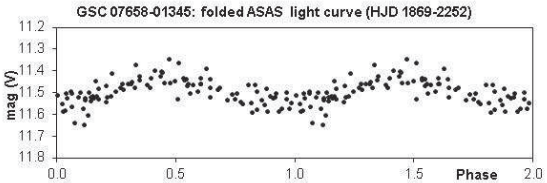
No. 66: GSC 08550-01650
Period: 4.6135(8) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/071225-5356.7,asas3,0,0,500,0,0
2MASS J-K: 0.733
Johnson B-V = 0.579 (derived from Tycho-2)
ROSAT: HR1 = -0.08, HR2 = 0.35, fxfopt = -2.10
Proper motion: pmRA: -0.31 mas/yr, pmDE: 17.63 mas/yr (Roeser et al., 2008)
ASAS variable (type MISC)
Likely an RS CVn variable



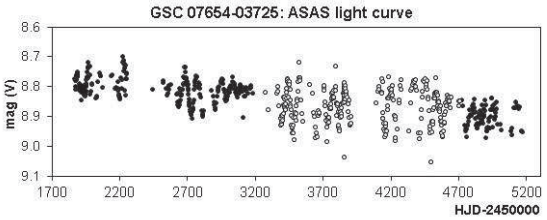


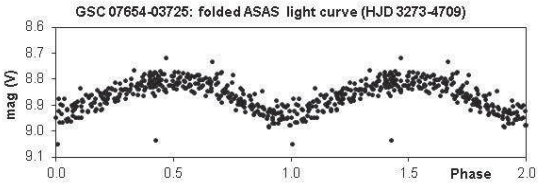
No. 67: GSC 07658-01345
Period: 6.834(7) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/075128-4328.4,asas3,0,0,500,0,0
2MASS J-K: 0.69
Johnson B-V= 0.696 (derived from Tycho-2)
ROSAT: HR1= 0.47, HR2= 0.01 , fxfopt= -1.06
Proper motion: pmRA: -25.48 mas/yr, pmDE: 8.39 mas/yr (Roeser et al., 2008)
Spectral type: G8IIIe SB2, Li: 70 (0.1pm, Torres et al., 2006)
Likely an RS CVn variable



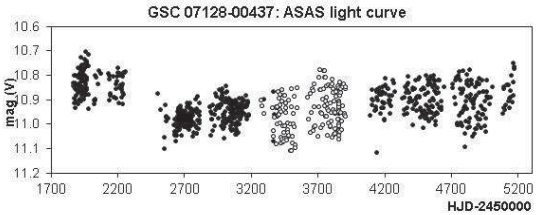


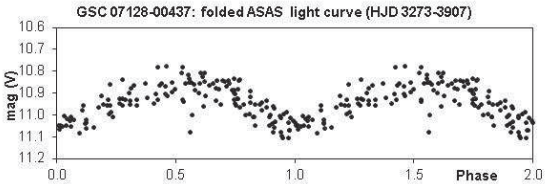
No. 68: GSC 07654-03725
Period: 84.17(5) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/075636-4145.4,asas3,0,0,500,0,0
2MASS J-K: 0.72
Johnson B-V = 1.165 (derived from Tycho-2)
ROSAT: HR1 = 0.81 , HR2 = -0.08 , fxfopt = -1.01
Proper motion: pmRA: -5.90 mas/yr, pmDE: 5.50 mas/yr (Roeser et al., 2008)
Spectral type: K1III, Li: 0 (0.1pm, Torres et al., 2006)
ASAS variable (type MISC)
Likely an RS CVn variable



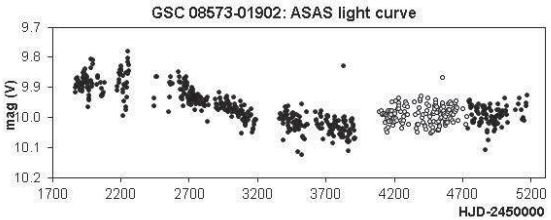


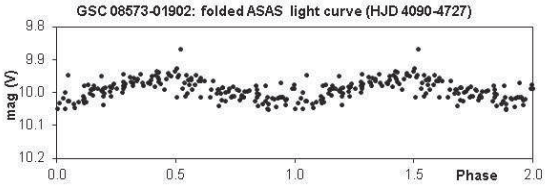
No. 69: GSC 07128-00437
Period: 2.372(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/075858-3522.3,asas3,0,0,500,0,0
2MASS J-K: 0.764
Johnson B-V = 0.971 (derived from Tycho-2)
ROSAT: HR1 = 0.47, HR2 = 0.29, fxfopt = -1.98
Proper motion: pmRA: 35.07 mas/yr, pmDE: -9.05 mas/yr (Roeser et al., 2008)
Spectral type: G8IIIe, Li: 50 (0.1pm, Torres et al., 2006)
ASAS variable (type MISC)
Likely an RS CVn variable



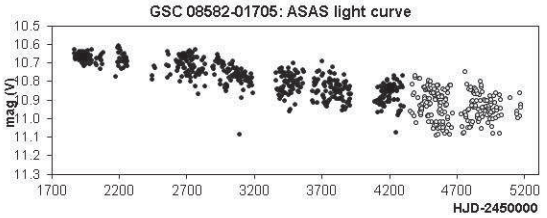


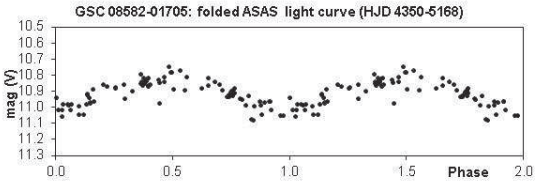
No. 70: GSC 08573-01902
Period: 53.31(6) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/084508-5558.1,asas3,0,0,500,0,0
2MASS J-K: 0.766
Johnson B-V = 1.373 (derived from Tycho-2)
ROSAT: HR1 = 0.72, HR2 = 0.57 , fxfopt = -2.27
Proper motion: pmRA: -11.31 mas/yr, pmDE: 9.62 mas/yr (Roeser et al., 2008)
Spectral type: K1III, Li: 20 (0.1pm, Torres et al., 2006)
Likely an RS CVn variable



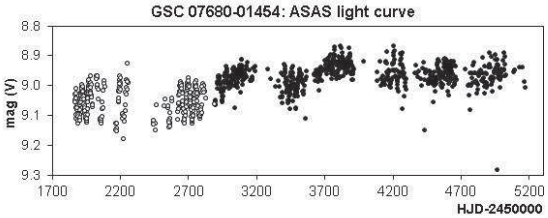


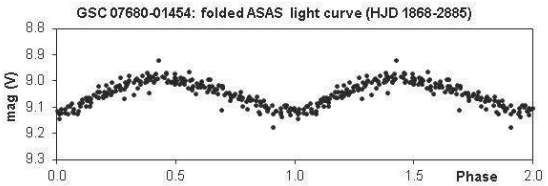
No. 71: GSC 08582-01705
Period: 3.009(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/085849-5303.4,asas3,0,0,500,0,0
2MASS J-K: 0.682
Johnson B-V = 1.005 (derived from Tycho-2)
ROSAT: HR1 = -0.09, HR2 = 0.03, fxfopt = -2.40
Proper motion: pmRA: -64.95 mas/yr, pmDE: 100.43 mas/yr (Roeser et al., 2008)
Spectral type: K4V, Li: 160 (0.1pm, Torres et al., 2006)
Probable BY Dra variable



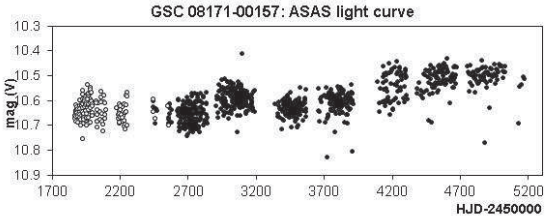


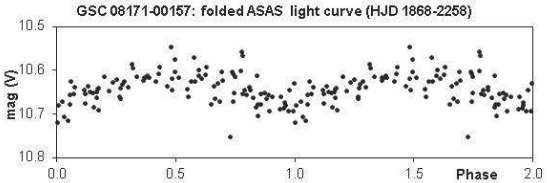
No. 72: GSC 07680-01454
Period: 55.66(8) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/085952-4107.3,asas3,0,0,500,0,0
2MASS J-K: 0.722
Johnson B-V = 1.123 (derived from Tycho-2)
ROSAT: HR1 = 0.51, HR2 = 0.08, fxfopt= -3.00
Proper motion: pmRA: 16.70 mas/yr, pmDE: -43.62 mas/yr (Roeser et al., 2008)
Spectral type: K2III, Li: 0 (0.1pm, Torres et al., 2006)
ASAS variable (type EC / DCEP-FU / ESD)
Likely an RS CVn variable



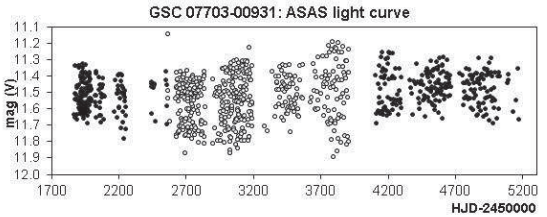


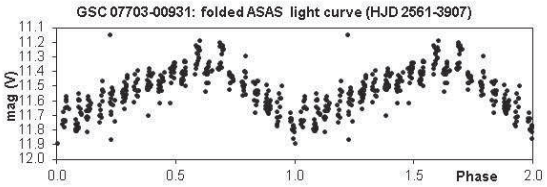
No. 73: GSC 08171-00157
Period: 20.31(2) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/092340-4711.2,asas3,0,0,500,0,0
2MASS J-K: 0.621
Johnson B-V = 0.921 (derived from Tycho-2)
ROSAT: HR1 = 0.52, HR2 = 0.29, fxfopt = -2.36
Proper motion: pmRA: 82.88 mas/yr, pmDE: 48.04 mas/yr (Roeser et al., 2008)
Spectral type: K0III(e) SB2, Li: 0 (0.1pm, Torres et al., 2006)
Likely an RS CVn variable



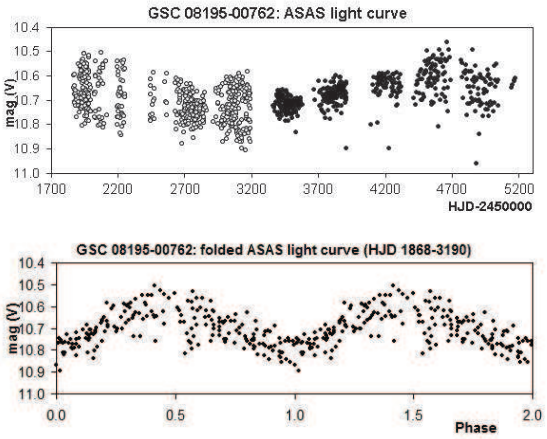


No. 74: GSC 07703-00931
Period: 9.985(7) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/092506-4328.0,asas3,0,0,500,0,0
2MASS J-K: 0.754
Johnson B-V = 0.925 (derived from Tycho-2)
ROSAT: HR1 = 0.59 , HR2 = 0.14 , fxfopt = -1.45
Proper motion: pmRA: 12.79 mas/yr, pmDE: -3.45 mas/yr (Roeser et al., 2008)
Spectral type: M0IIIe, Li: 100 (0.1pm, Torres et al., 2006)
ASAS variable (type DCEP-FU)
Likely an RS CVn variable





No.75: GSC 08195-00762
Period: 4.543(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/101104-5119.8,asas3,0,0,500,0,0
2MASS J-K: 0.817
Johnson B-V = 0.971 (derived from Tycho-2)
ROSAT: HR1 = 0.46 , HR2 = 0.29, fxfopt = -1.79
Proper motion: pmRA: 51.58 mas/yr, pmDE: -33.79 mas/yr (Roeser et al., 2008)
Spectral type: K1IIIe, Li: 100 (0.1pm, Torres et al., 2006)
ASAS variable (type MISC)
Likely an RS CVn variable



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