

25 new chromospherically active stars in the ROTSE-1 data base

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Abstract: 25 new chromospherically active stars are presented, which were found in the ROTSE-1 data base: GSC 4721-00552, GSC 2518-00781, GSC 2628-01345, GSC 164-01162, GSC 3345-01977, GSC 3525-01869, GSC 2912-01219, GSC 115-00801, GSC 3333-00117, GSC 1979-00569, GSC 1291-00887, GSC 2229-00611, GSC 105-00869, GSC 63-00006, GSC 5253-00472, GSC 2339-01230, GSC 4920-01189, GSC 1164-00392, GSC 1756-00430, GSC 2276-00205, GSC 2280-00897, GSC 234-00306, GSC 4912-01357, GSC 612-00169, GSC 1935-01066

One of these variables (No.4: GSC 164-01162) is a new long-period eclipsing RS CVn variable.

During a programme of optical identification of X-ray sources from the ROSAT All-Sky Faint Source Catalogue (1RXS) (Voges et al. 2000) in the ROTSE1 database (<http://skydot.lanl.gov/>), Wozniak et al., 2004) 25 new chromospherically active stars have been found.

The criteria for including a star in this list of chromospherically active stars were, i) the X-ray identification, ii) a suitable period after an analysis of the NSVS data with Period 04 (Lenz and Breger 2005) and iii) an appropriate B-V colour index (Høg et al. 2000) if available. Chromospherically active stars exhibit spectral types of F-K (these are mostly RS CVn systems, and a smaller number of FK Comae stars) and K-M (BY Dra variables). Partial information about spectral classifications (Wright et al., 2003) and high proper motions (Ivanov 2007) support the classification as chromospherically active stars. Because of the high absolute magnitudes of pulsating variables with similar light curves (especially Cepheids) their large distances should result in small proper motions.

Cepheids are not expected to show X-ray emission any greater than non-variable supergiants of similar temperatures (Böhm-Vitense and Parsons 1983, Schmidt and Parsons 1984) so if the X-ray identifications are correct then these stars are most likely chromospherically active. An estimate by Norton et al. (2007) showed that there is a chance of less than 0.001% that one of 13 active stars found in the SuperWASP survey area would coincide with one of the ROSAT sources falling within their survey area. Therefore, it is also very likely that the X-ray identifications of the variables given in this paper are correct.

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

| No. | GSC | RA (2000) | Dec | 1RXS | Range (NSVS) | Per. (d) | NSVS ID |
|-----|------------|-------------|-------------|------------------|--------------|----------|----------|
| 01 | 4721-00552 | 03 50 39.55 | -03 53 53.4 | J035039.4+035356 | 12.2-12.3 | 1.37330 | 12167174 |
| 02 | 2518-00781 | 10 46 46.89 | +37 17 29.4 | J104646.9+371730 | 11.6-11.8 | 14.902 | 4956842 |
| 03 | 2628-01345 | 18 35 42.42 | +32 58 46.0 | J183542.4+325846 | 12.7-13.1 | 3.6265 | 8225014 |
| 04 | 164-01162 | 07 18 14.83 | +01 41 26.0 | J071814.7+014128 | 10.7-11.0 | 14.820 | 12674712 |
| 05 | 3345-01977 | 05 10 43.94 | +46 14 39.5 | J051044.3+461435 | 11.5-11.7 | 24.920 | 4420571 |
| 06 | 3525-01869 | 18 14 14.25 | +46 14 10.2 | J181414.0+461408 | 12.0-12.2 | 1.59309 | 5414983 |
| 07 | 2912-01219 | 05 53 13.44 | +38 24 07.0 | J055313.4+382412 | 11.5-11.7 | 14.003 | 4527442 |
| 08 | 115-00801 | 05 39 14.88 | +00 31 12.9 | J053914.8+003110 | 13.1-13.4 | 4.05459 | 12353370 |
| 09 | 3333-00117 | 04 19 11.53 | +47 16 40.7 | J041911.9+471637 | 11.6-11.7 | 4.7334 | 4257087 |
| 10 | 1979-00569 | 10 45 56.75 | +26 29 57.9 | J104556.8+262959 | 12.0-12.1 | 2.51292 | 7549220 |
| 11 | 1291-00887 | 05 12 39.34 | +19 28 35.5 | J051239.3+192831 | 12.9-13.2 | 1.93115 | 9552176 |
| 12 | 2229-00611 | 22 47 05.52 | +26 52 54.3 | J224705.3+265257 | 11.2-11.3 | 2.22033 | 8957530 |
| 13 | 105-00869 | 05 26 15.92 | +03 05 01.7 | J052615.6+030502 | 11.9-12.0 | 3.6492 | 12331039 |
| 14 | 63-00006 | 03 24 05.62 | +07 29 27.5 | J032405.3+072926 | 10.2-10.4 | 20.504 | 9318075 |
| 15 | 5253-00472 | 23 57 57.33 | -01 09 47.4 | J235757.1-010952 | 10.3-10.4 | 6.17421 | 11912481 |
| 16 | 2339-01230 | 03 02 39.90 | +30 32 18.1 | J030239.7+303213 | 12.4-12.6 | 3.20744 | 6596978 |

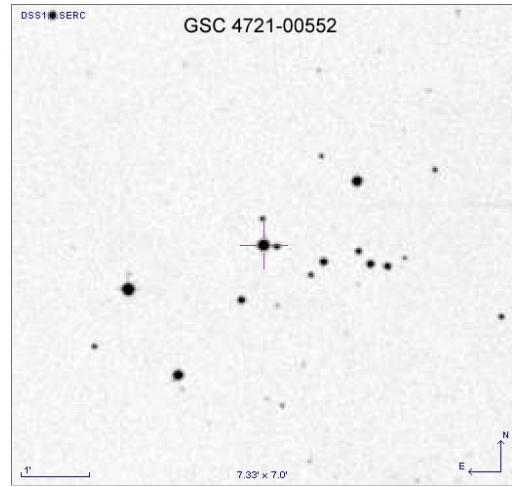
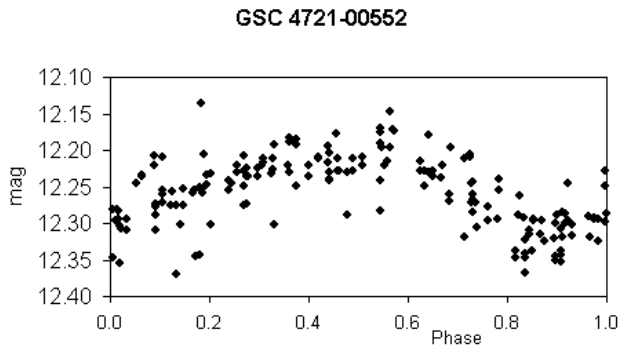
| | | | | | | | | | | | |
|----|------------|----|----|-------|-----|----|------|------------------|-----------|----------|----------|
| 17 | 4920-01189 | 10 | 56 | 09.64 | -05 | 40 | 20.8 | J105609.5-054016 | 12.4-12.6 | 1.483315 | 13100346 |
| 18 | 1164-00392 | 23 | 17 | 08.18 | +11 | 37 | 00.9 | J231707.7+113657 | 12.1-12.3 | 0.942903 | 11844458 |
| 19 | 1756-00430 | 01 | 47 | 10.24 | +23 | 45 | 31.9 | J014709.9+234529 | 9.8-9.9 | 21.203 | 6500037 |
| 20 | 2276-00205 | 00 | 47 | 05.49 | +30 | 18 | 23.8 | J004705.9+301823 | 11.1-11.2 | 12.464 | 6363421 |
| 21 | 2280-00897 | 00 | 49 | 57.84 | +32 | 56 | 07.3 | J004958.0+325613 | 12.2-12.5 | 6.8388 | 6366189 |
| 22 | 234-00306 | 09 | 22 | 05.06 | +07 | 00 | 01.7 | J092204.7+070003 | 11.9-12.0 | 1.72442 | 12976829 |
| 23 | 4912-01357 | 10 | 30 | 02.66 | -00 | 47 | 32.6 | J103002.8-004726 | 11.7-11.9 | 16.1239 | 13085670 |
| 24 | 612-00169 | 01 | 05 | 06.41 | +09 | 35 | 08.3 | J010506.8+093505 | 12.2-12.5 | 10.0108 | 9158567 |
| 25 | 1935-01066 | 08 | 10 | 35.27 | +27 | 49 | 27.9 | J081035.5+274934 | 11.6-11.9 | 17.737 | 7383299 |

Folded light curves (with the period given above), finding charts and comments:

No.1: GSC 4721-00552

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=12167174&mask=32004>



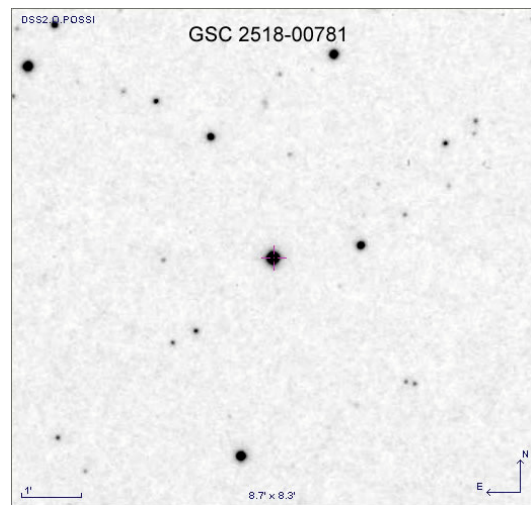
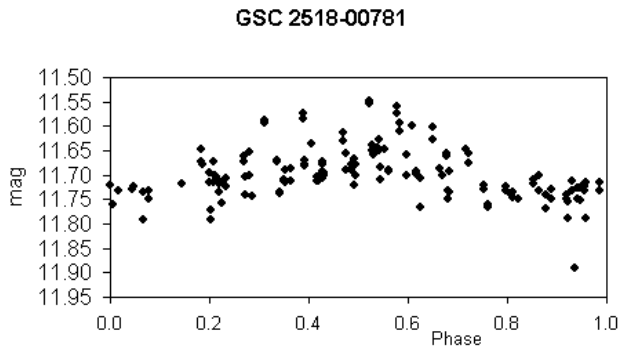
No.2: GSC 2518-00781

Tycho-2: 2518-781-1: Johnson B-V=1.345 (derived from Tycho-2)

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=4956842&mask=32004>

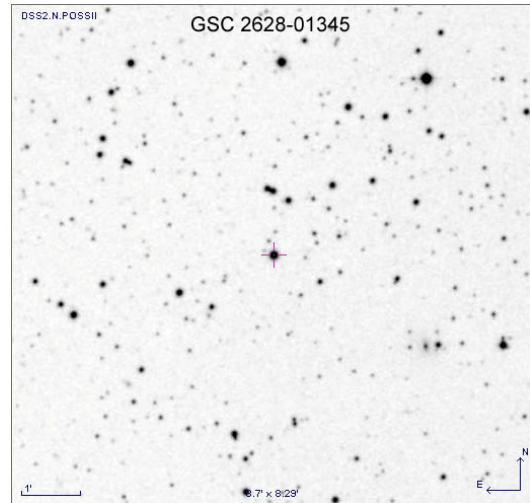
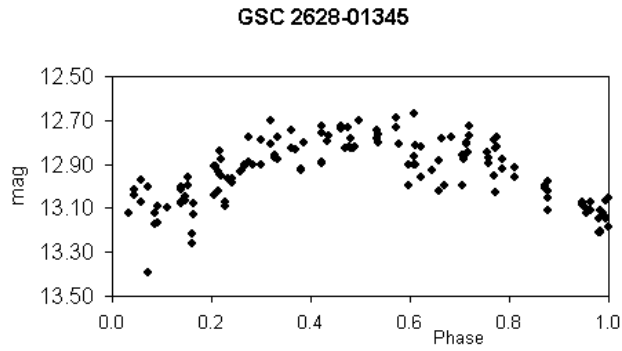
Possible BY Dra star



No.3: GSC 2628-01345

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=8225014&mask=32004>



No.4: GSC 164-01162

Tycho-2: 164-1162-1: Johnson B-V=0.595 (derived from Tycho-2)

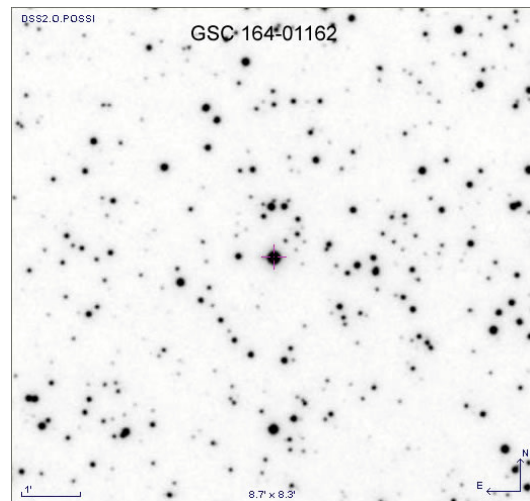
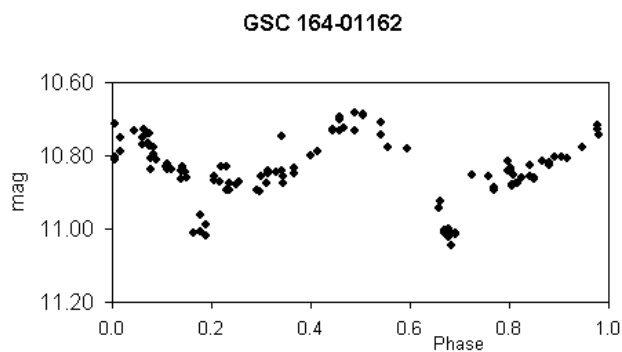
ASAS variable:

<http://vizier.u-strasbg.fr/viz-bin/vizExec/Vgraph?II/264/vareq/071815%2b0141.4.lc=18167624&>

NSVS data:

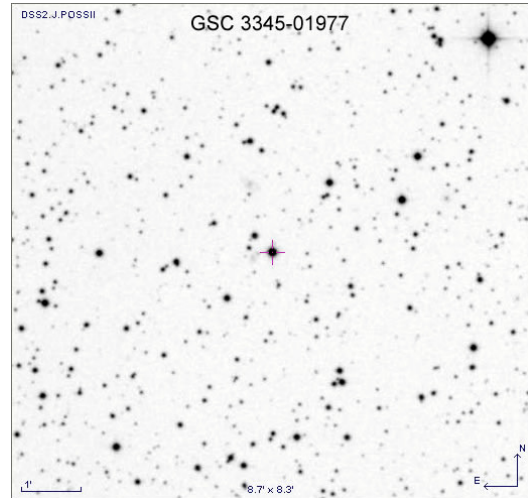
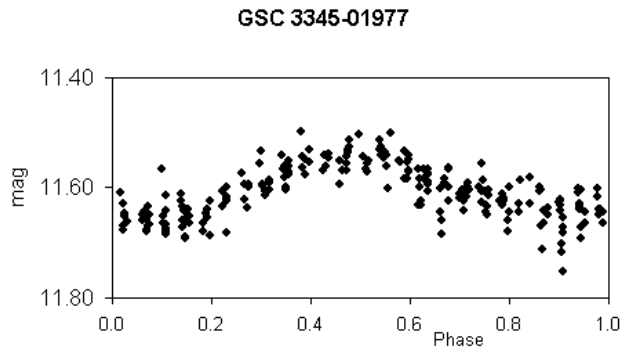
<http://skydot.lanl.gov/nsvs/star.php?num=12674712&mask=32004>

Eclipsing RS CVn variable



No.5: GSC 3345-01977

<http://skydot.lanl.gov/nsvs/star.php?num=4420571&mask=32004>



No.6: GSC 3525-01869

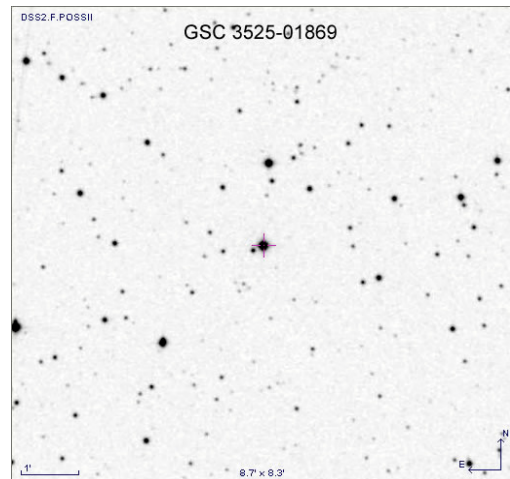
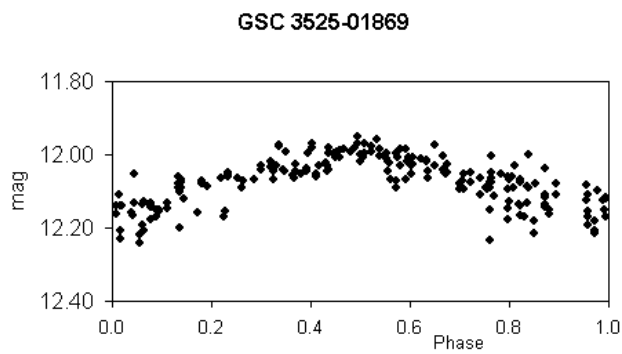
Tycho-2: 3525-1869-1 Johnson B-V=1.096 (derived from Tycho-2)

Star with high proper motion (Ivanov 2007)

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=5414983&mask=32004>

Likely a RS CVn variable



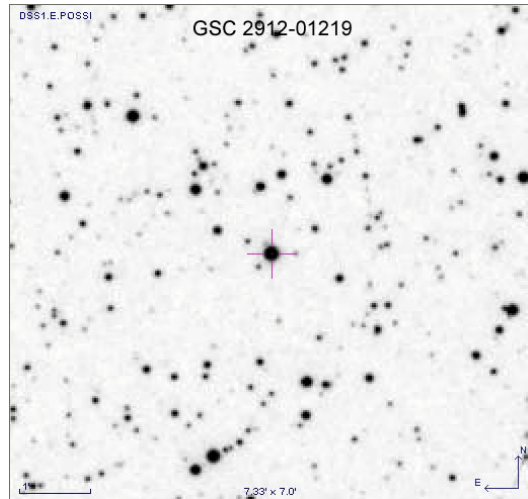
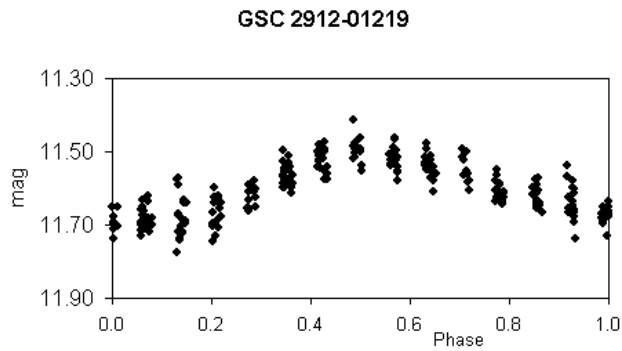
No.7: GSC 2912-01219

Tycho-2: 2912-1219-1: Johnson B-V=0.879 (derived from Tycho-2)

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=4527442&mask=32004>

Likely a RS CVn variable



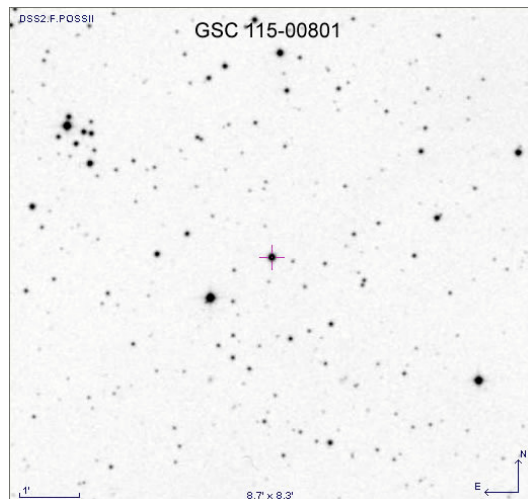
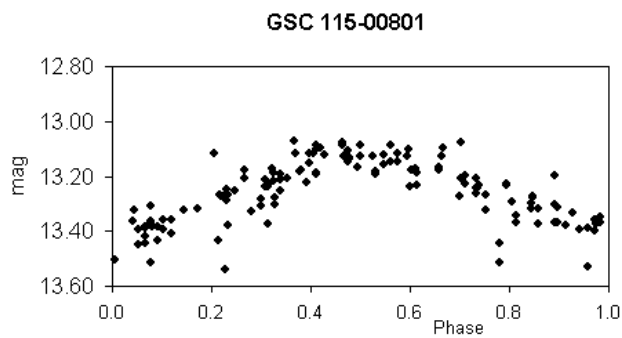
No.8: GSC 115-00801

ASAS variable:

<http://vizier.u-strasbg.fr/viz-bin/vizExec/Vgraph?II/264/vareq/053915%2b0031.2.lc=7872557&>

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=12353370&mask=32004>



No.9: GSC 3333-00117

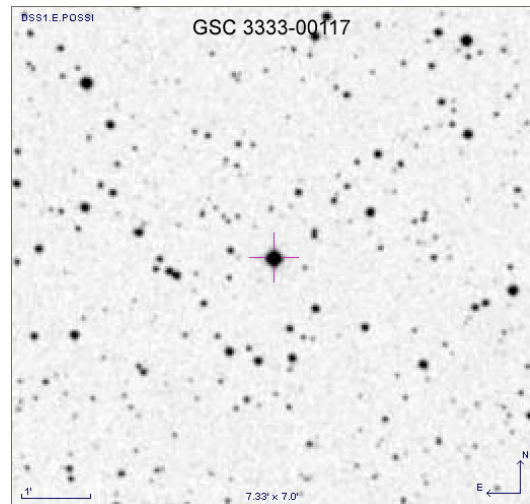
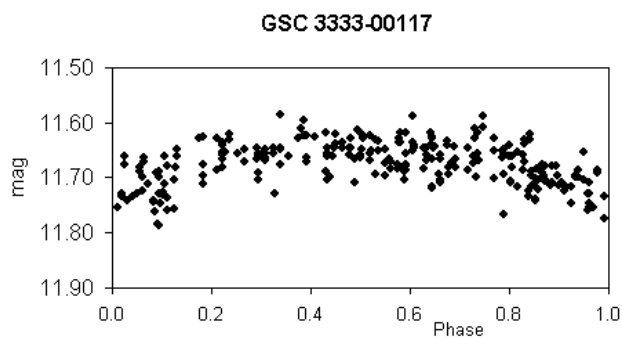
Tycho-2: 3333-117- 1: Johnson B-V=0.997 (derived from Tycho-2)

Star with high proper motion (Ivanov 2007)

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=4257087&mask=32004>

Likely a RS CVn variable

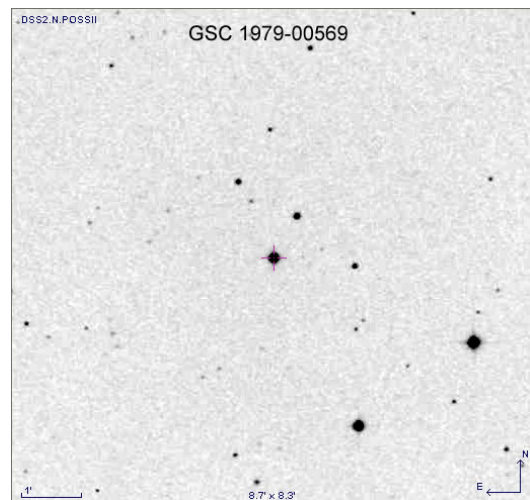
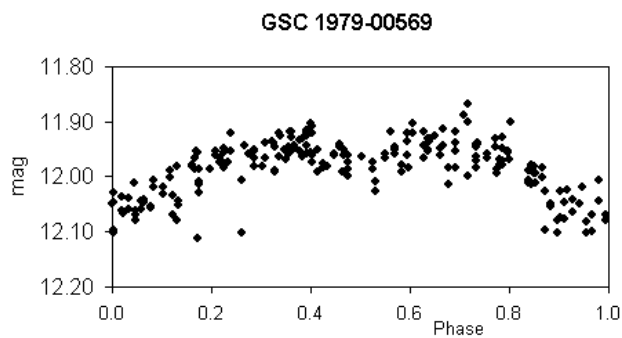
**No.10: GSC 1979-00569**

Tycho-2: 1979-569-1: Johnson B-V=0.609 (derived from Tycho-2)

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=7549220&mask=32004>

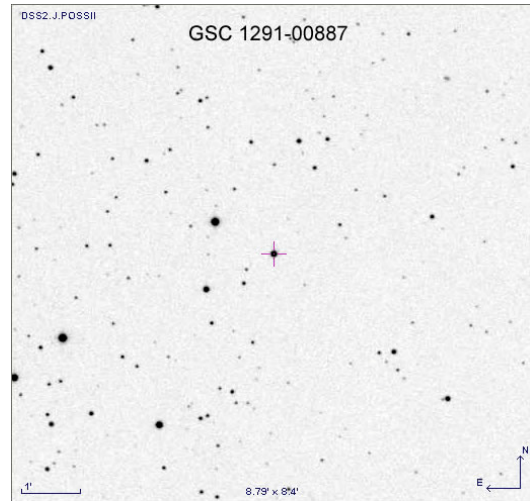
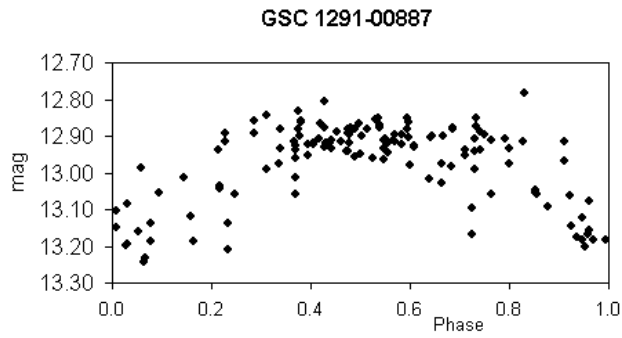
Likely a RS CVn variable



No.11: GSC 1291-00887

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=9552176&mask=32004>



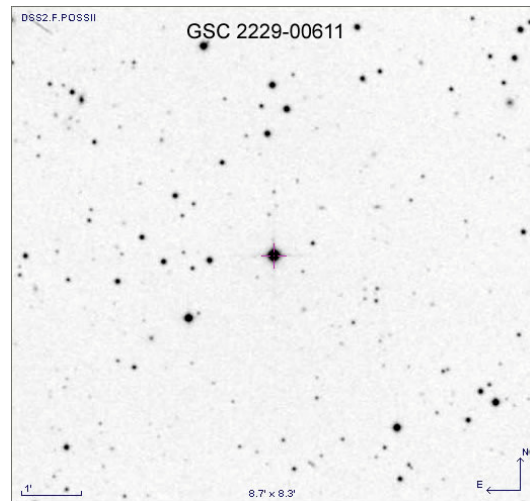
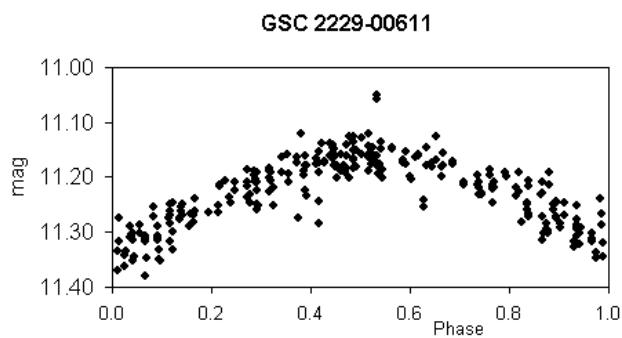
No.12: GSC 2229-00611

Tycho-2: 2229-611-1: Johnson B-V=0.918 (derived from Tycho-2)

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=8957530&mask=32004>

Likely a RS CVn variable



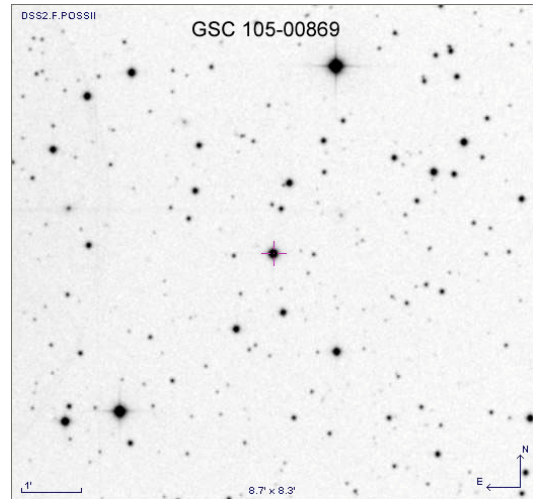
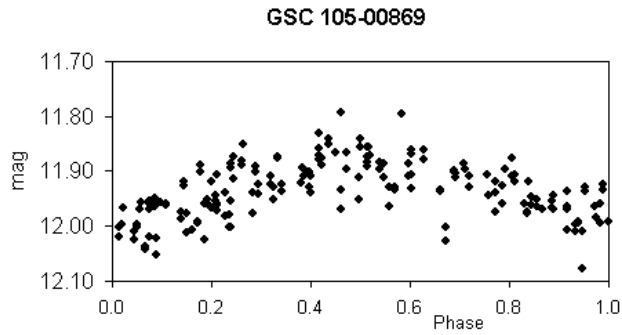
No.13: GSC 105-00869

Tycho-2: 105-869-1: Johnson B-V=0.466 (derived from Tycho-2)

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=12331039&mask=32004>

Likely a RS CVn variable



No.14: GSC 63-00006

Tycho-2: 63-6-1: Johnson B-V=1.482 (derived from Tycho-2)

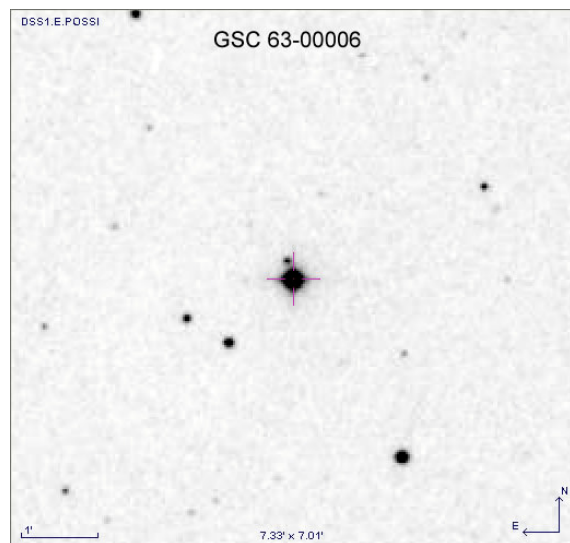
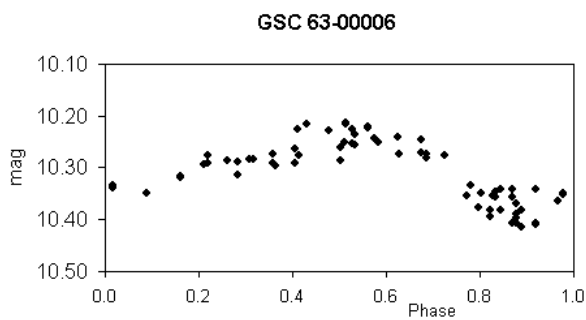
ASAS variable:

<http://vizier.u-strasbg.fr/viz-bin/vizExec/Vgraph?II/264/vareq/032406%2b0729.5.lc=2741713&>

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=9318075&mask=32004>

Possible BY Dra star



No.15: GSC 5253-00472

HD 224440

Tycho-2: 5253-472-1: Johnson B-V=1.027 (derived from Tycho-2)

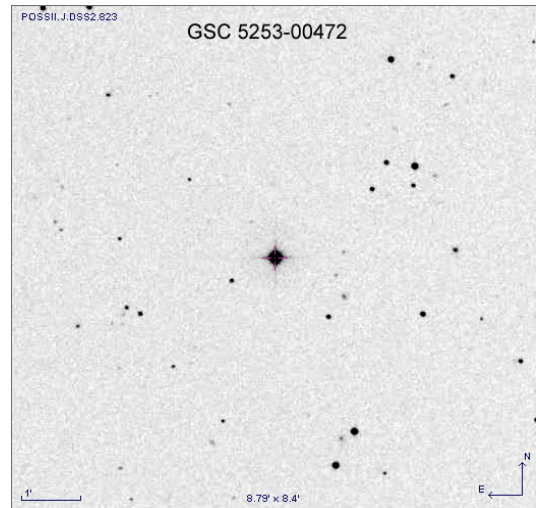
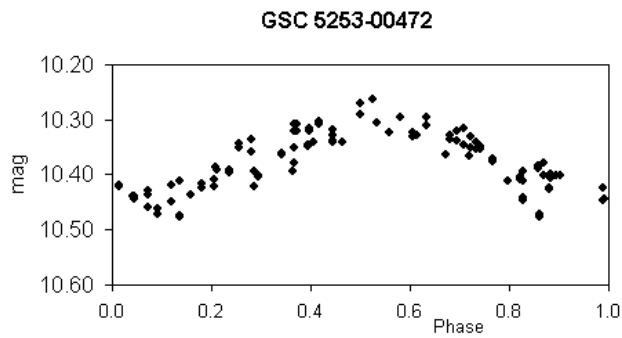
ASAS variable:

<http://vizier.u-strasbg.fr/viz-bin/vizExec/Vgraph?II/264/var03/235757-0109.8.lc=10123165&>

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=11912481&mask=32004>

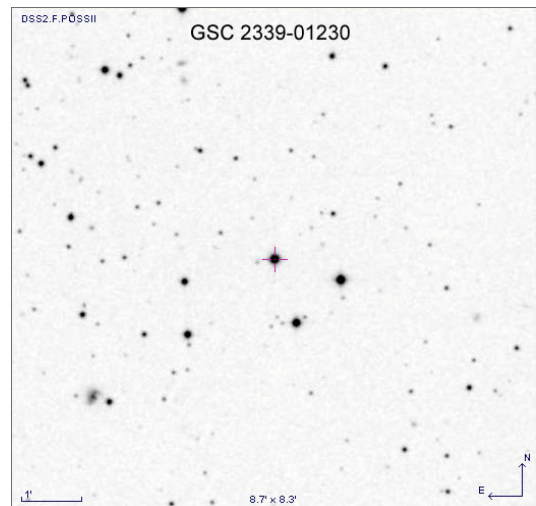
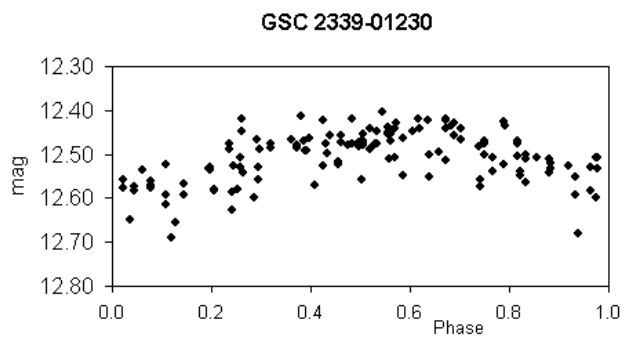
Likely a RS CVn variable



No.16: GSC 2339-01230

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=6596978&mask=32004>



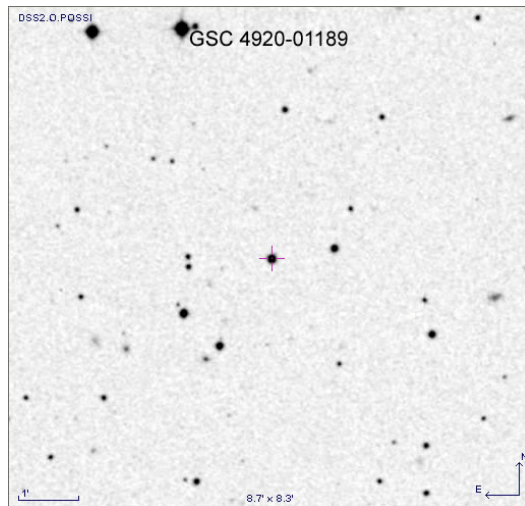
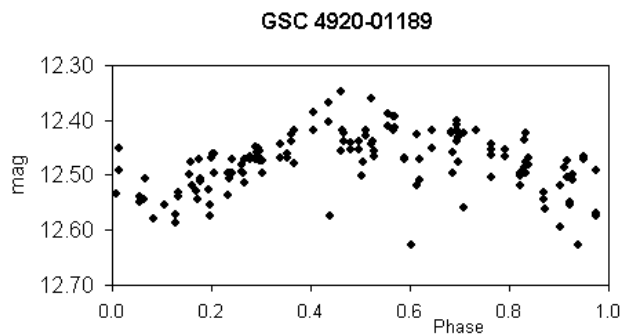
No.17: GSC 4920-01189

spectral type: K7 (V) E (Buscombe 1999)

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=13100346&mask=32004>

Possible BY Dra star

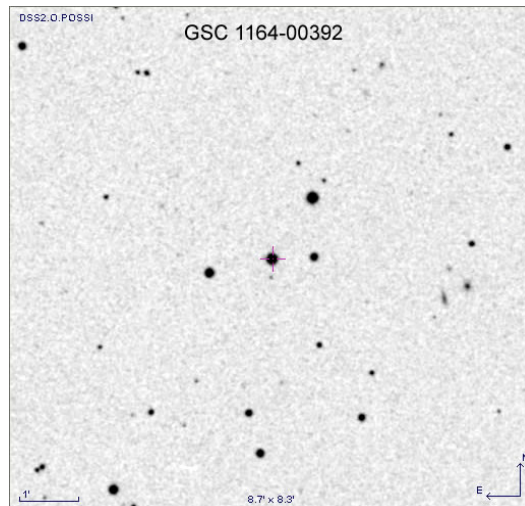
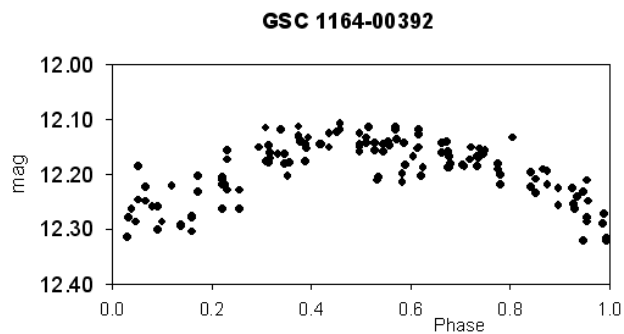


No. 18: GSC 1164-00392

Star with high proper motion (Ivanov 2007)

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=11844458&mask=32004>



No.19: GSC 1756-00430

BD+23 235, Tycho-2: 1756-430-1; Johnson B-V=1.122 (derived from Tycho-2)

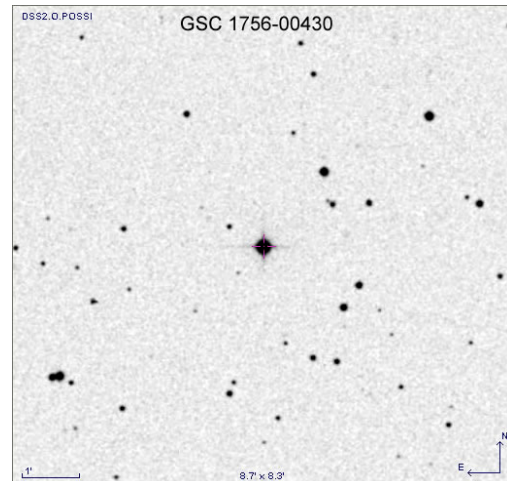
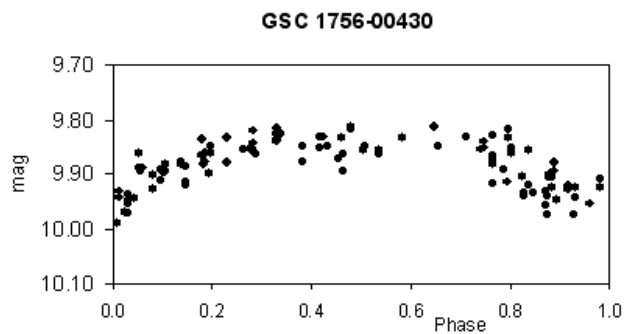
Star with high proper motion (Ivanov 2007)

Spectral type: K0 (Wright et al., 2003)

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=6500037&mask=32004>

Likely a RS CVn variable

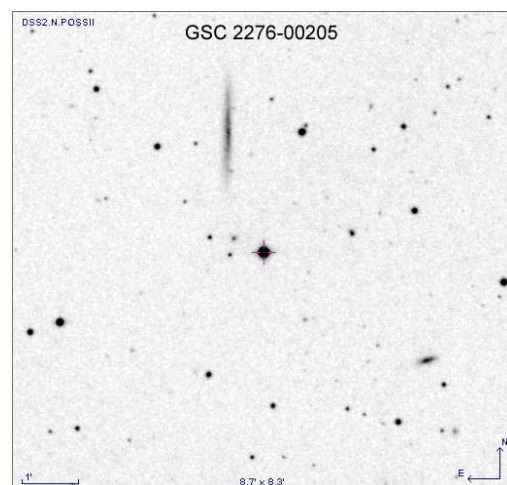
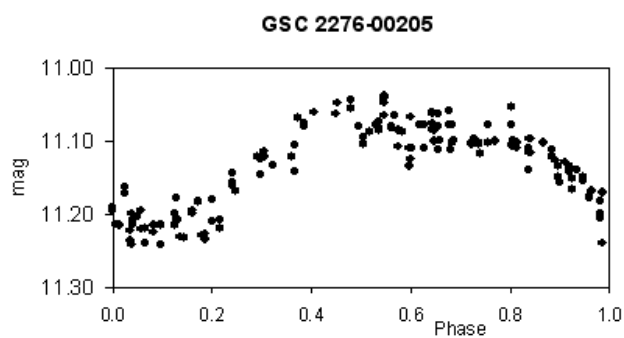
**No.20: GSC 2276-00205**

BD+29 135, Tycho-2: 2276-205-1; Johnson B-V=0.730 (derived from Tycho-2)

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=6363421&mask=32004>

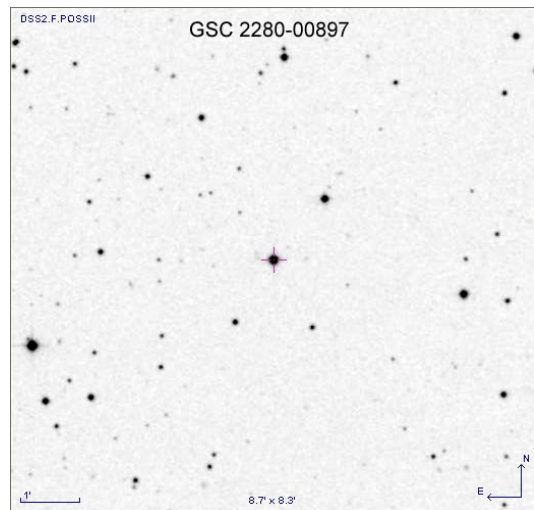
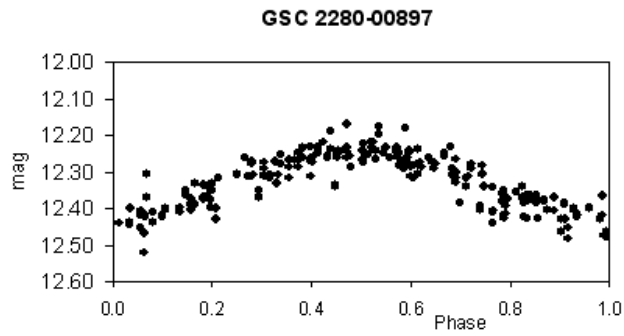
Spectral type: G0 (Simbad), Likely a RS CVn variable



No.21: GSC 2280-00897

NSVS data:

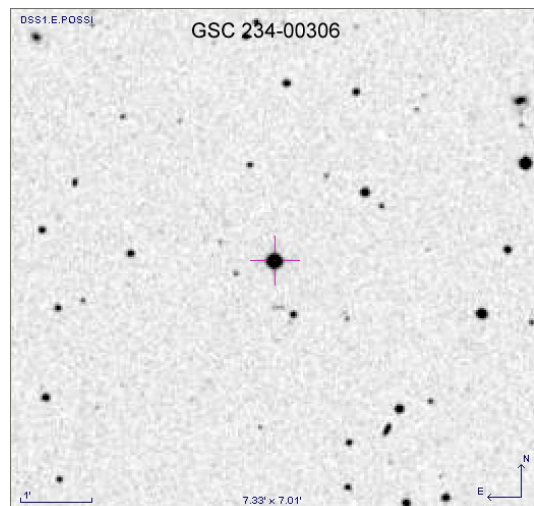
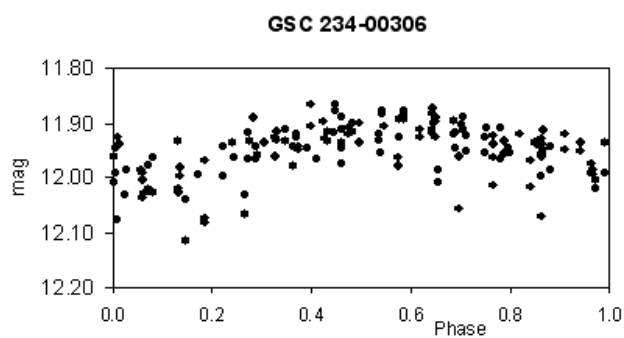
<http://skydot.lanl.gov/nsvs/star.php?num=6366189&mask=32004>



No.22: GSC 234-00306

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=12976829&mask=32004>



No.23: GSC 4912-01357

Tycho-2: 4912-1357-1: Johnson B-V=0.406 (derived from Tycho-2)

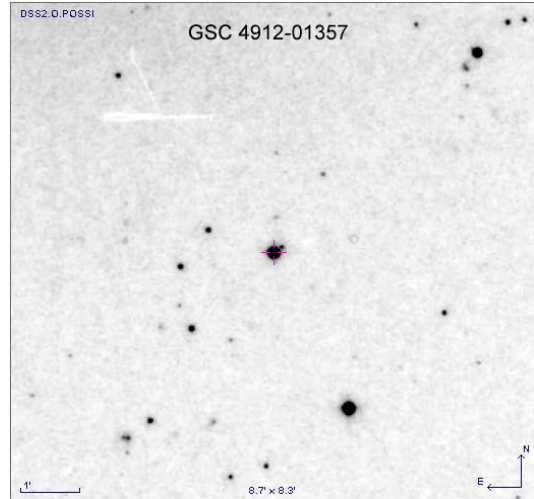
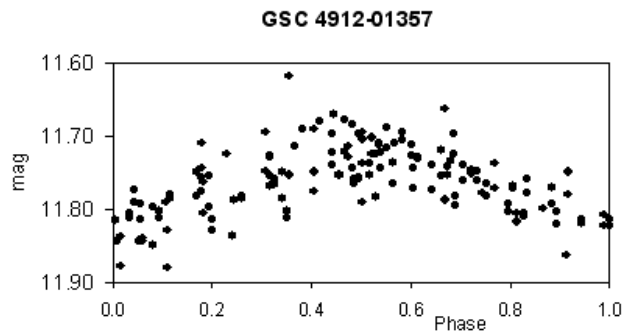
ASAS variable:

<http://vizier.u-strasbg.fr/viz-bin/vizExec/Vgraph?II/264/vareq/103003-0047.5.lc=25687517&>

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=13085670&mask=32004>

Likely a RS CVn variable



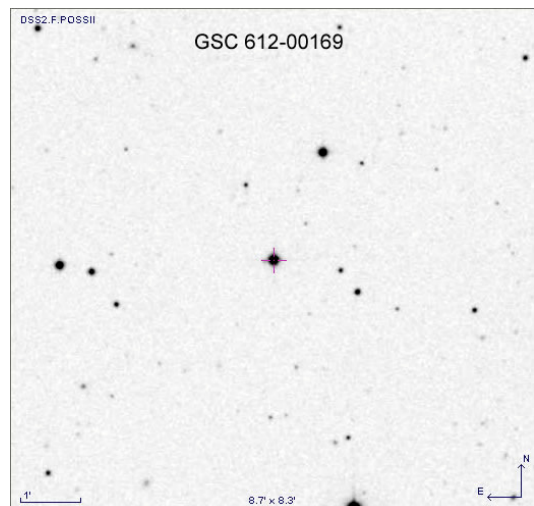
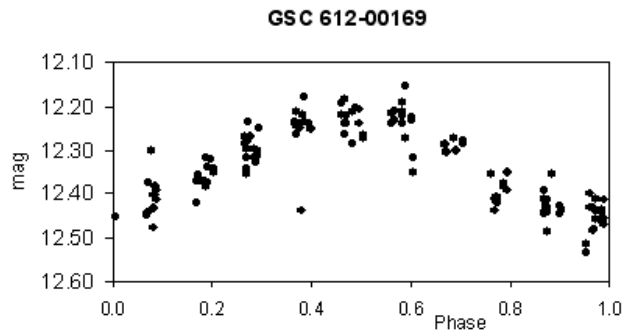
No.24: GSC 612-00169

ASAS variable:

<http://vizier.u-strasbg.fr/viz-bin/vizExec/Vgraph?II/264/vareq/010507%2b0935.1.lc=674560&>

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=9158567&mask=32004>



No.25: GSC 1935-01066

Tycho-2: 1935-1066-1: Johnson B-V=0.881 (derived from Tycho-2)

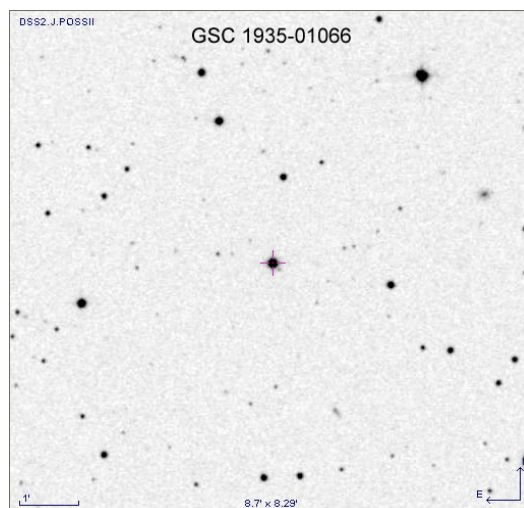
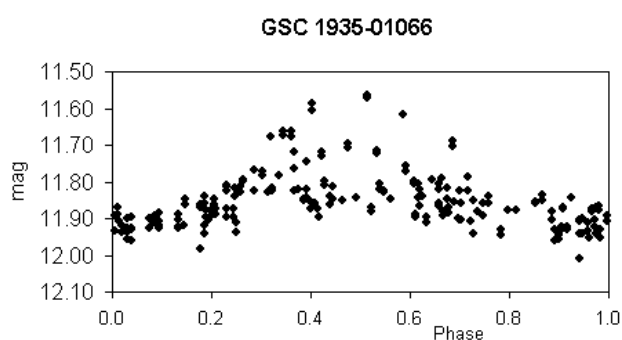
ASAS variable:

<http://vizier.u-strasbg.fr/viz-bin/vizExec/Vgraph?II/264/081035%2b2749.4&P=0.253052>

NSVS data:

<http://skydot.lanl.gov/nsvs/star.php?num=7383299&mask=32004>

Likely a RS CVn variable



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