The Optical Gravitational Lensing Experiment. Optical Counterparts to the X-ray Sources in the Galactic Bulge *

A. Udalski¹, K. Kowalczyk¹, I. Soszyński¹, R. Poleski¹, M. K. Szymański¹, M. Kubiak¹, G. Pietrzyński^{1,2}, S. Kozłowski¹, P. Pietrukowicz¹, K. Ulaczyk¹, J. Skowron^{3,1}, and Ł. Wyrzykowski¹

¹Warsaw University Observatory, Al. Ujazdowskie 4, 00-478 Warszawa, Poland e-mail: (udalski,kkowalczyk,soszynsk,rpoleski,msz,mk,pietrzyn,simkoz,pietruk, kulaczyk,jskowron,wyrzykow)@astrouw.edu.pl

² Universidad de Concepción, Departamento de Astronomia, Casilla 160–C, Concepción, Chile

³ Department of Astronomy, Ohio State University, 140 W. 18th Ave., Columbus, OH 43210, USA

ABSTRACT

We present a sample of 209 variable objects – very likely optical counterparts to the X-ray sources detected in the direction of the Galactic center by the Galactic Bulge Survey (GBS) carried out with the Chandra satellite. The variable sources were found in the databases of the OGLE long term survey monitoring regularly the Galactic bulge since 1992. The counterpart candidates were searched based on the X-ray source position in the radius of 3."9.

Optical light curves of the candidates comprise a full variety of variability types: spotted stars, pulsating red giants (potentially secondary stars of symbiotic variables), cataclysmic variables, eclipsing binary systems, irregular non-periodic objects including an AGN (GRS 1734–292).

Additionally, we find that positions of 19 non-variable stars brighter than 16.5 mag in the OGLE databases are so well aligned with the X-ray positions (< 0. 75) that these objects are also likely optical counterparts to the GBS X-ray sources.

We provide the OGLE astrometric and photometric information for all selected objects and their preliminary classifications. Photometry of the candidates is available from the OGLE Internet archive.

Key words: X-ray: stars – X-ray: binaries – Stars: activity – binaries: symbiotic – novae, cataclysmic variables – Galaxies: Seyfert

^{*}Based on observations obtained with the 1.3 m Warsaw telescope at the Las Campanas Observatory of the Carnegie Institution for Science.

1. Introduction

Recent years have been witnessing an enormous progress in the X-ray astronomy thanks to many satellite missions with continuously more sensitive state-ofthe-art detectors. The number of detected X-ray sources increased rapidly. For example, the surveys of the Magellanic Clouds led to the discovery of tens of new X-ray pulsars (Coe *et al.* 2005) and AGNs (Kozłowski *et al.* 2012), Galactic center survey discovered more than thousand new X-ray sources toward the Galactic center (Jonker *et al.* 2011), the XMM-Newton catalog of serendipitous X-ray sources includes almost 200 000 objects (Watson *et al.* 2009),

Proper classification and then interpretation of an X-ray source usually requires additional observations in other wavelength bands, usually in the optical or IR range. Therefore, it is crucial to find the X-ray source counterparts in these bands, if the data exist.

The accuracy of positions of X-ray sources detected by the modern instruments is comparable to that obtained in the optical range. This in principle can make the cross-identification of the optical counterparts relatively straightforward. Indeed, it is often true in empty stellar fields, where the X-ray position unambiguously points to an object. The situation is, however, much more difficult in dense stellar fields such as the Magellanic Clouds or Galactic center, where one can detect even several dozen objects within the X-ray position error box. In such cases positive cross-identification can often be non-trivial.

On the other hand, the photometric variability of an object located close to the X-ray source position can be a very good indicator of its close relation with the detected X-ray source. It is well known that many different types of variable objects emit X-rays, for example, all types of cataclysmic variables, low and high mass Xray binaries, chromospherically active and spotted stars, long period variables etc. Thus, the detection of optical variability in an object located in the X-ray position error box practically proves correctness of the cross-identification.

What is more important, variability provides many additional information on the X-ray system for its proper classification and detailed studies of its structure. For example, the detected periodicities can be interpreted as related to orbital or rotational periods. Observed flares or flickering can provide information on the rapid phenomena occurring in accreting systems or on stellar chromospherical activity.

Here, we present the results of our search for variable objects located at the positions of the X-ray sources detected by the Galactic Bulge Survey (GBS, Jonker *et al.* 2011). Altogether, we have found 209 variable optical objects that can be considered as the optical counterparts to X-ray sources detected by the GBS survey. For all of them we provide their basic classification and light curve parameters. The photometric data are available from the OGLE Internet archive (see Section 5).

2. Observational Data

The X-ray sources analyzed in this paper were detected by the GBS project (Jonker *et al.* 2011). They list 1234 sources detected by the Chandra satellite in two regions located symmetrically along the Galactic plane: $-3^{\circ} < l < 3^{\circ}$, $1^{\circ} < |b| < 2^{\circ}$, *i.e.*, covering 12 square degrees near the Galactic center and avoiding the highest extinction regions close to the Galactic plane. The GBS catalog provides the positions of the detected sources with typical accuracy of about 0." 25 in right ascension and declination, although in rare single cases the accuracy of position can be worse than 1." 5.

The main optical dataset comes from the fourth phase of the Optical Gravitational Lensing Experiment (OGLE-IV). Observations were collected between March 2010 and June 2012 (and the data are still being collected as the OGLE-IV project continues). The 1.3-m Warsaw Telescope located at Las Campanas Observatory, Chile, operated by the Carnegie Institution for Science was used with the OGLE-IV 32-chip mosaic camera covering approximately 1.4 square degrees on the sky with the scale of 0.26 arcsec/pixel.

As the OGLE-IV survey focuses on variability, observations have been carried out mostly in the *I*-band filter. About 10% images are taken in the *V*-band to secure color information. The cadence of observations depends on the field. In the regions where the gravitational microlensing phenomena (main target of the OGLE-IV survey in the Galactic bulge) occur most frequently the cadence is very high reaching one observation per 18 minutes. Other fields are observed less frequently but typically not less than one observation per one/two nights during the mid observing season is obtained. The OGLE-IV light curves presented here have from more than 5000 to 100 epochs in the highest and lowest cadence fields, respectively.

Fig. 1 shows the map of the Galactic center with the coverage by the OGLE-IV survey. It can be compared with the map of GBS survey coverage (Fig. 1, Jonker *et al.* 2011).

The exposure time of *I*-band images was set to 100 s and to 150 s for the *V*-band frames. Because of very high stellar density, observations of the Galactic bulge are conducted only during good seeing (less than $1.^{"}8$) and transparency conditions.

Photometry of all objects located in the OGLE-IV Galactic center fields is derived with the image subtraction method (Alard and Lupton 1998, Alard 2000, Wozniak 2000). The data pipeline is based on slightly modified OGLE-III data pipeline (Udalski 2003). At the time of this analysis photometry of the fields marked with the red borders in Fig. 1 was accessible. The databases of these 58 OGLE-IV fields contain photometry of about 250 million stars. OGLE-IV photometry has so far been only roughly calibrated and the uncertainty of the zero point may reach 0.1–0.15 mag.

Astrometry of the OGLE-IV fields was derived in the identical way as for the OGLE-III photometric maps (Szymański *et al.* 2011) and tied to the 2MASS survey coordinate system. Comparison of the positions obtained for thousands of cross-





Fig. 1. Map of the fields observed by the OGLE-IV survey in the Galactic bulge colored according to the cadence of observations. Dashed white lines mark the equatorial and Galactic coordinate grids (every 5° in *l* and *b*). Red field borders indicate fields with photometry available for analysis presented in this paper.

identified stars in OGLE-III and OGLE-IV images indicates the internal accuracy of the astrometry at the 0." 1 level.

OGLE-IV observations cover the largest area overlapping with the sky surveyed by the GBS compared to the previous OGLE phases. However, because of some small "dead" regions on the sky caused by the gaps between detectors of the OGLE-IV mosaic camera and the lack of OGLE-IV photometric databases from a few fields closest to the Galactic plane which still await calibration, supplementary optical data from the OGLE-II (Udalski, Kubiak and Szymański 1997) and OGLE-III (Udalski 2003) phases were also analyzed. These two datasets were also collected with the 1.3-m Warsaw telescope at Las Campanas Observatory but with previous generation CCD cameras. OGLE-II observations were conducted in the

years 1997-2000 and OGLE-III 2001-2009 with typical cadence of one/two observations per night. It is worth noting that while the bright unsaturated limit of the OGLE-III and OGLE-IV photometry is approximately similar, OGLE-II data cover up to 1-1.5 mag brighter objects.

3. Search for the Optical Counterparts to the X-ray Sources

Search for optical counterparts to the GBS survey X-ray sources was performed in a few steps. First, based on the X-ray positions we selected a subsample of Xray sources that fall into the regions of the sky for which OGLE-IV databases are currently available. From 1234 sources listed in the GBS catalog 836 passed this cut. However, a subset of this sample cannot be searched for variability. Some of the X-ray sources are located in the gaps between the CCD detectors of the OGLE-IV mosaic camera on the reference images, some are located so close to the edges of the observed area that due to imperfections of the telescope pointing the number of collected observations is too small for variability analysis. After removing such X-ray sources, we were left with a total of 782 objects for further analysis.

In the second step, we removed from the sample all cases where the X-ray position closely points to a bright object which is overexposed on the OGLE-IV reference image and thus its photometry is unavailable. In most cases the coincidence of the X-ray and optical positions is so good that these stars are very likely the optical counterparts to the X-ray sources. Photometry from shallow surveys like the ASAS survey (Pojmański 2002) should be checked to search for variability in this subsample. There were 87 such cases in our OGLE-IV sample and they were removed in this step.

Finally, we retrieved the OGLE-IV photometry of all objects located within the conservative radius of 15 pixels (3."9) around the X-ray position for all the remaining sources. The size of the circle is well over 3σ X-ray position error for the vast majority of the analyzed X-ray sources. Depending on the stellar density of the field, from a few to several dozen objects were extracted inside each circle.

All extracted stars were searched for optical variability. First we performed a period search to extract periodic variables. We used the FNPEAKS code kindly provided by Z. Kołaczkowski and, independently, the code based on AoV algorithm (Schwarzenberg-Czerny 1989). After the determination of tentative periodicities all these objects were visually inspected and the periods were refined, if necessary. Next, all the non-periodic stars were also inspected visually to look for irregular variable stars. Finally, the positions of all selected variable stars were double checked on the reference images and subtracted images to verify correct identification of each variable object. It is well known that close neighbors blended with a variable star can mimic its variability.

205 variable sources were found within the 3."9 radius of the positions of X-ray sources detected by the GBS project in the OGLE-IV dataset. These objects are very likely their optical counterparts.

Additionally, we repeated the same procedure for the OGLE-III and OGLE-II datasets. Positions of 114 and 58 GBS X-ray sources point to OGLE-III and OGLE-II fields, respectively. Eleven additional X-ray sources could be checked in the OGLE-III dataset including nine objects located outside currently available OGLE-IV fields and two objects in the OGLE-IV "dead" zones. No variable objects were found, however, in the searched areas. For 30 variable objects selected in the OGLE-IV data search OGLE-III photometry was retrieved extending the photometric coverage of these candidates to over a decade.

Six X-ray sources not covered by the OGLE-IV data as well as two sources from OGLE-IV "dead" zones were checked in the OGLE-II photometric databases. One new variable was cross-identified with a GBS X-ray source. For 18 variable objects found in the OGLE-IV data search OGLE-II light curves could also be retrieved.

Additionally, because the OGLE-II photometry has brighter saturation level all saturated in OGLE-IV potential counterparts were rechecked in the OGLE-II databases (nine objects). Three new variables were found among this bright stars sample increasing the total number of variable objects – OGLE optical counterpart candidates to GBS X-ray sources – to 209.

4. Discussion

We performed tentative classification of each discovered variable star based on its photometric behavior. Initially, the variables were divided into two broad categories: those with periodic and irregular variability. From the former group a few sub-categories, sometimes overlapping, were then assigned.

The most numerous sub-group – 81 objects – consists of spotted stars with characteristic pattern of photometric behavior resembling RS CVn type stars. In most cases, we register only the variability caused by spots (rotation, almost synchronized with orbital period in the binary systems) and their slow migration on the stellar surface. However, the classical eclipsing RS CVn type stars are also present in our sample. Typical light curves of spotted stars are shown in Fig. 2.

The second group consists of pulsating red giants (OGLE Small Amplitude Red Giants, OSARGs, SemiRegular Variables, SRVs, Miras - *cf.* Soszyński *et al.* 2011b) – 25 objects. Such stars can be members of X-ray binary systems with a compact companion and accreting processes. Fig. 3 presents typical light curves of objects from this sub-category.

Eclipsing stars subgroup includes 36 objects with clear eclipses. Contact and detached short period binary systems are usually chromospherically active due to fast rotation tidally synchronized with the short orbital period and as a consequence – strong X-ray sources. Upper panels of Fig. 4 show the sample light curves of stars from this class.



Fig. 2. Light curves of spotted stars. Two *upper panels* show time series and phased with the period 12.771 days light curve of the optical counterpart candidate (BLG500.27 22801) to the GBS #29 X-ray source. Two *bottom panels* show the light curves of the eclipsing system BLG501.29 138642 (P = 11.9936 days) – a counterpart to the GBS #701 X-ray source.



Fig. 3. Light curves of pulsating red giants. Two *upper panels* show time series and phased with the period 42.735 days light curve of the OSARG-type optical counterpart candidate (BLG501.24 18825) to the GBS #715 X-ray source. Two *bottom panels* show the light curves of the SRV candidate (BLG504.23 59042; P = 172.4 days) to the GBS #907 X-ray source.



Fig. 4. Phased light curves of eclipsing and periodic counterpart candidates to the GBS X-ray sources: GBS #684 (BLG500.09 136274), GBS #152 (BLG501.25 43802), GBS #289 (BLG504.16 90241) and GBS #428 (BLG500.11 129634).



Fig. 5. Time series of the irregular counterpart candidates to the GBS X-ray sources: GBS #2 (BLG653.01 89053, Seyfert galaxy GRS 1734–292), GBS #212 (BLG654.22.17003) and GBS #332 (BLG654.20.36111).

Two RR Lyr pulsating stars, one of RRab and one of RRc type, were also found in the selected sample of variable stars. Although pulsating stars (Cepheids, RR Lyr) can potentially be soft X-ray emitters only a handful of Cepheids and RR Lyr stars have been detected in the X-ray band so far (Engle and Guinan 2012). Our detection of the coincidence of the positions of two RR Lyr stars with X-ray sources, could be thus an important discovery. However, we suspect that this may be a by chance coincidence. The number of RR Lyr stars detected in the typical Galactic bulge field analyzed in this paper is about 40 per 2048 × 4102 pixel OGLE-IV CCD chip according to Soszyński *et al.* (2011a) OGLE Catalog of Variable Stars. Thus, we may expect about two RR Lyr variable star detections in the probed circle of 15 pixel radius in about 700 random directions toward the Galactic center. Close examination of the finding charts also suggest a by chance coincidence – both RR Lyr stars are relatively far from the X-ray position, one almost at the boundary of the searched circle.



Fig. 6. Light curves of cataclysmic variables – optical counterpart candidates to the X-ray sources: GBS #18 (BLG675.14 49163), GBS #714 (BLG501.15 11770) and GBS #426 (BLG501.28 111658).

The variability of the remaining periodic stars (48 objects) may be caused either by the orbital motion (ellipsoidal variations), if they are binaries, or by the rotation. In the case of ellipsoidal variation the real period is twice of that found. Typical examples of stars from this group are shown in the bottom panels of Fig. 4.

Irregular variables form a separate group. This kind of variability may be an indicator of accreting systems like high or low mass X-ray binaries or nova-like variables (flickering). It cannot be ruled out, however, that some of the objects from this subgroup are actually quasi-periodic but the small number of observations collected so far prevented sound period detection.

It is also worth noticing that the optical counterpart to the GBS #2 source, which is a known Seyfert galaxy, GRS 1734–292 (Martí *et al.* 1998), is classified as irregular variable. OGLE provides, thus, long term optical monitoring of this interesting AGN. Three examples of irregular variables from this subgroup, including the counterpart of GBS #2, are shown in Fig. 5.



Fig. 7. Light curves of optical counterpart candidates to the X-ray source GBS #19. *Upper* and *middle panels:* eclipsing system BLG501.24 34934. *Lower panel:* pulsating red giant BLG501.24 34423.

We also found three classical cataclysmic variables, two typical dwarf novae and one Z Cam type star. Cataclysmic variables are well known X-ray emitters so the detection of these stars near the X-ray sources position clearly indicates that they are optical counterparts to these X-ray sources. Fig. 6 shows the light curves of these eruptive variables.

Table 1 lists all the X-ray sources from the GBS catalog cross-identified with OGLE variable objects. For each optical counterpart candidate the OGLE equatorial coordinates and distance from the X-ray source (in arcsecs) are provided, its mean optical photometry (*I*-band magnitude, V - I color, if available), period in days in the case of periodic variable stars and classification. Entries of counterpart candidates found in the OGLE-II databases are marked with italic font.

It should be noted that in the case of five X-ray sources from the GBS catalog more than one variable star were found within our search radius. The best example here is the X-ray source GBS #19 (Fig. 7). A variable red giant and

Table 1

Optical counterparts to the X-ray sources detected by the Galactic Bulge Survey revealing optical variability

| GBS | OGLE-IV | OGLE-IV | RA | DEC | D | Ι | V-I | Р | Remarks |
|-----|------------------------|---------|---|--|------|--------|-------|------------------|---------|
| ID | Field | No | [2000.0] | [2000.0] | ["] | [mag] | [mag] | [days] | |
| 2 | BLG653.01 | 89053 | 17 ^h 37 ^m 28.38 | $-29^{\circ}08'02''_{\cdot}1$ | 0.16 | 16.422 | _ | - | I AGN |
| 16 | BLG504.24 | 65 | 17 ^h 55 ^m 45.84 | -27°58′13.′′9 | 0.18 | 14.572 | 2.383 | 4.95 | SP |
| 18 | BLG675.14 | 49163 | 17 ^h 39 ^m 35. ^s 76 | -27°29′35.′′9 | 0.15 | 17.819 | - | _ | CV |
| 19 | BLG501.24 | 34423 | 17 ^h 49 ^m 54.52 | -29°43′35.″8 | 0.66 | 15.668 | 5.938 | 31.65 | OSARG |
| 19 | BLG501.24 | 34934 | 17 ^h 49 ^m 54.83 | -29°43′35.′′4 | 0.87 | 17.983 | 1.519 | 0.3587 | E |
| 23 | BLG675.02 | 36509 | 17h42m31.57 | -27°43′48″3 | 0.88 | 14.960 | _ | 44.63 | OSARG |
| 24 | BLG501.16 | 59134 | 17 ^h 48 ^m 49.50 | $-30^{\circ}01'10''_{}3$ | 0.40 | 12.342 | 1.711 | 24.038 | SP |
| 29 | BLG500.27 | 22801 | 17 ^h 53 ^m 41.90 | $-28^{\circ}03'53''.7$ | 0.37 | 15.619 | 2.134 | 12.771 | SP |
| 56 | BLG501.32 | 6608 | 17h50m00:36 | -29°24′12″7 | 1.23 | 13.706 | 2.558 | 21.436 | E SP |
| 65 | BLG500.13 | 14897 | 17 ^h 51 ^m 35.26 | -28°43′45″.3 | 0.42 | 12.977 | 0.909 | 0.70676 | SP |
| 71 | BLG675.06 | 5524 | 17h39m49s29 | -27°54′20″6 | 0.28 | 14.056 | _ | _ | Ι |
| 89 | BLG653.11 | 44462 | 17h36m24s28 | -28°45′32″7 | 0.24 | 14.228 | _ | 18.382 | SP |
| 103 | BLG501.29 | 50854 | 17 ^h 51 ^m 55.79 | -29°23′10″1 | 3.72 | 14.714 | 1.684 | _ | Ι |
| 106 | BLG500.08 | 191736 | 17 ^h 54 ^m 34 ^s 47 | $-28^{\circ}41'48''_{}9$ | 0.37 | 12.908 | 1.676 | 32.57329 | SP |
| 122 | BLG653.08 | 10840 | 17 ^h 38 ^m 37.16 | $-28^{\circ}45'44.''9$ | 0.44 | 13.369 | _ | 43.668 | SP |
| 124 | BUL_SC5 | 134677 | 17 ^h 50 ^m 07.00 | $-30^{\circ}01'53''.9$ | 0.77 | 12.481 | 2.097 | _ | Ι |
| 127 | BLG500.18 | 12184 | 17 ^h 54 ^m 21 ^s 19 | -28°30′02″2 | 2.87 | 16.552 | 3.901 | 144.93 | Р |
| 133 | BLG501.29 | 45257 | 17h52m01s41 | -29°25′07."9 | 1.04 | 13.191 | 3.700 | 19.292 | OSARG |
| 134 | BLG648.28 | 31469 | 17 ^h 47 ^m 14 ^s 97 | $-26^{\circ}16'49''_{}0$ | 0.05 | 13.711 | _ | 18.526 | OSARG |
| 137 | BLG504.14 | 157126 | 17 ^h 55 ^m 53 ^s 26 | $-28^{\circ}16'33''_{9}$ | 0.69 | 15.113 | 1.315 | 0.43104 | E SP |
| 143 | BLG675.26 | 84886 | 17 ^h 42 ^m 49 ^s 73 | $-26^{\circ}48'23''_{0}$ | 0.23 | 13.946 | _ | 1.72473 | P |
| 144 | BLG654.25 | 20335 | 17 ^h 33 ^m 00 ^s 32 | $-29^{\circ}36'14''_{9}$ | 0.47 | 14.469 | _ | 2.47771 | E |
| 152 | BLG501.25 | 43802 | 17 ^h 48 ^m 56 ^s 72 | -29°38′35″9 | 1.05 | 15.461 | 1.384 | 0.378895 | E |
| 155 | BLG504.07 | 23237 | 17 ^h 55 ^m 42 ^s 07 | -28°27'39″5 | 0.69 | 16 515 | 2 057 | 0 53454 | E |
| 163 | BLG504.15 | 66246 | 17 ^h 55 ^m 32 ^s 43 | $-28^{\circ}04'31''4$ | 0.33 | 15.041 | 2.501 | 2.02896 | Ē |
| 174 | BLG654.27 | 54219 | 17 ^h 36 ^m 58 ^s 35 | $-29^{\circ}23'51''7$ | 1.33 | 12.848 | | 217.4 | P |
| 180 | BLG500.20 | 154077 | 17 ^h 52 ^m 20 ^s 78 | $-28^{\circ}23'40''6$ | 0.56 | 13.544 | _ | 2.5896 | Ē |
| 185 | BLG654 21 | 59612 | 17 ^h 35 ^m 27 ^s 56 | $-29^{\circ}45'16''6$ | 0.53 | 12 936 | _ | 44.25 | P |
| 190 | BLG653 12 | 5 | 17 ^h 35 ^m 44 ^s 39 | $-28^{\circ}54'00''4$ | 0.92 | 14 678 | _ | 225.2 | MIRA |
| 195 | BLG654 30 | 14819 | 17 ^h 35 ^m 07 ^s 54 | $-29^{\circ}19'05''1$ | 0.29 | 14 712 | _ | 28.5 | F |
| 196 | BLG500.07 | 1605 | 17 ^h 50 ^m 03 ^s 35 | $-29^{\circ}11'50''4$ | 1.28 | 17 089 | 1 854 | 1 9972 | SP |
| 200 | BLG504.16 | 58311 | 17 ^h 54 ^m 45 ^s 46 | $-28^{\circ}07'43''6$ | 2 79 | 18 350 | - | 72 464 | P |
| 200 | BLG553.05 | 39870 | 17 ^h 34 ^m 55 ^s 60 | $-28^{\circ}58'56''9$ | 2.17 | 13 949 | _ | 9 38086 | SP |
| 203 | BLG500 10 | 172048 | 17 ^h 53 ^m 12 ^s 45 | $-28^{\circ}47'46''5$ | 0.97 | 15 267 | 1 692 | 2 014 | SP |
| 212 | BLG654 22 | 17003 | 17 ^h 35 ^m 10 ^s 15 | $-29^{\circ}36'06''1$ | 0.78 | 15 209 | - | _ | I |
| 212 | BLG653.09 | 79513 | 17 ^h 37 ^m 21 ^s 71 | $-28^{\circ}53'57''3$ | 0.32 | 13 216 | _ | 16 42036 | SP |
| 210 | BLG655.07 | 1012 | 17 ^h 44 ^m 05 ^s 45 | $-27^{\circ}00'13''3$ | 0.11 | 15 514 | _ | 46 083 | SP |
| 222 | BLG501 28 | 155033 | 17 ^h 52 ^m 19 ^s 58 | $-29^{\circ}21'09''8$ | 0.08 | 14 191 | 2 300 | 2 947 | SP |
| 227 | BLG501.20 BLG534 32 | 97586 | 17 ^h 49 ^m 24 ^s 63 | $-30^{\circ}34'44''7$ | 0.00 | 13 089 | 1.835 | 29.916 | SP |
| 220 | BI G648 28 | 36747 | 17 ^h 47 ^m 14 ^s 73 | -26°09'38"2 | 0.42 | 13.140 | - | 69.32 | OSARG |
| 234 | BLG675 28 | 21714 | 17 ^h 41 ^m 47 ^s 68 | $-26^{\circ}46'49''8$ | 2.86 | 16 539 | _ | 26.455 | P |
| 234 | BLG654 17 | 56669 | 17 ^h 38 ^m 15 ^s 98 | _20° 40° 49° 0 _20° 30′ 30″ 0 | 0.72 | 14 138 | _ | 0 273/83 | F |
| 240 | BLG654.21 | 7012 | 17 ^h 35 ^m 47 ^s 78 | $-29^{\circ}/3/33''$ | 0.72 | 12 523 | | 0.275405 | I |
| 240 | BLG004.21 | 87530 | 17 ^h 54 ^m 27 ^s 60 | _27°47'32″0 | 0.90 | 12.525 | 0 9/3 | - 1 3173/ | F SP |
| 233 | BLG504.25 | 550 | 17h36m34s43 | _28°53'33″0 | 0.05 | 18 322 | 0.743 | 0 72760 | D |
| 202 | BLG055.11 | 00151 | 17h5/m20815 | -28°08/50//0 | 0.05 | 14 722 | 2 400 | <i>5.121</i> 00 | SD |
| 207 | BLC504.10 | 002/1 | 17h5/m39800 | 28°08'51"4 | 3.56 | 15 575 | 4 250 | 25.38 | D |
| 209 | BLC500 10 | 186047 | 17h52m11801 | $-20\ 00\ 31.4$ $28^{\circ} A 2^{\prime} 27^{\prime\prime} 7$ | 0.25 | 13.373 | 4.230 | 23.30 2 02227 | sd |
| 293 | BL0300.10 | 10004/ | 1/ 55 11:01 | -20 42 21.1 | 0.23 | 13.432 | 1.009 | 2.72221 | 31 |

Table 1

Continued

| GBS | OGLE-IV | OGLE-IV | RA | DEC | D | Ι | V-I | Р | Remarks |
|-----|------------|---------|---|------------------------------------|------|--------|-------|-----------|---------|
| ID | Field | No | [2000.0] | [2000.0] | ["] | [mag] | [mag] | [days] | |
| 200 | DI CICELLA | 66707 | 1 Thoom 5 18 5 7 | 2000 / 20/10 | 0.60 | 15.000 | - | 01.1.1.17 | GD |
| 300 | BLG654.14 | 00/8/ | 1/"33""51.5/ | $-30^{\circ}06'30''9$ | 0.62 | 15.282 | - | 21.1417 | SP |
| 303 | BLG504.31 | 31220 | 17 ^h 56 ^m 02.11 | $-27^{\circ}39^{\circ}21^{\circ}2$ | 2.17 | 12.755 | 1.213 | 0.8313 | SP |
| 304 | BLG504.51 | 51220 | 17 ^h 30 ^m 02 [*] .11 | -27 39 21.2 | 1.57 | 12.755 | 1.213 | 0.8313 | SP D |
| 320 | BLG6/5.20 | 013// | 1/"41" 31:30 | $-27^{\circ}09^{\circ}59^{\circ}2$ | 0.32 | 15.827 | _ | 0.23462 | P T |
| 330 | BLG653.19 | 81200 | 1/"36"43.88 | $-28^{\circ}21^{\circ}21^{\circ}3$ | 0.82 | 15.069 | - | - | I CD |
| 331 | BLG654.28 | 28452 | 1/"36""23.4/ | $-29^{\circ}22'34.''$ | 0.14 | 17.277 | - | 18.215 | SP |
| 332 | BLG054.20 | 30111 | 17 ^h 36 ^m 20.20 | $-29^{\circ}35^{\circ}38.9$ | 0.80 | 15.150 | _ | - | I CD |
| 336 | BLG654.04 | 45052 | 1/"35" 31:42 | $-30^{\circ}24'23''3$ | 0.38 | 15.696 | - | 9.99 | SP |
| 354 | BLG500.18 | 1/2010 | 1/"53"52",75 | $-28^{\circ}25'15''2$ | 0.79 | 15.092 | 2.074 | 8.21018 | SP |
| 302 | BUL_SCS | 284033 | 1/"50" 5/:55 | $-29^{-}40'45''5$ | 0.20 | 11.420 | 2.272 | 107.55 | P |
| 363 | BLG501.31 | 34121 | 1/ ⁿ 50 ^m 33.73 | $-29^{\circ}21'33''5$ | 0.35 | 14.005 | 1.679 | 8.7413 | SP |
| 3/5 | BLG6/5.1/ | 11128 | 1/"43" 5/.95 | $-27^{2}10'34''0$ | 1.00 | 15.365 | - | 62.8 | SP |
| 387 | BLG654.2/ | 27852 | 1/ ⁿ 3/ ^m 05.58 | $-29^{\circ}24'52''5$ | 0.86 | 13.044 | - | 4.831 | P |
| 391 | BLG654.11 | 4/010 | 1/ ⁿ 36 ^m 06.42 | $-30^{\circ}03'11''0$ | 0.33 | 13.977 | - | 11.4/ | E SP |
| 395 | BLG654.31 | 30300 | 17 ⁿ 34 ^m 18.96 | -29°28′33″8 | 1.12 | 14.868 | - | 5.965 | SP |
| 397 | BLG654.23 | 61348 | 1/ ⁿ 33 ^m 59:54 | -29°49′47″2 | 0.50 | 13.190 | - | 0.77471 | E |
| 414 | BLG504.30 | 6878 | 17 ⁿ 57 ^m 09.75 | -27°32′49″7 | 0.25 | 13.715 | 1.585 | 0.40826 | SP |
| 416 | BLG504.16 | 83867 | 17 ⁿ 54 ^m 35.04 | $-28^{\circ}11'52''.5$ | 1.43 | 14.998 | - | 16.5563 | P |
| 417 | BLG504.16 | 130997 | 17 ^h 54 ^m 27.75 | $-28^{\circ}07'49''_{3}$ | 0.29 | 13.749 | 0.532 | 0.95923 | P |
| 426 | BLG501.28 | 111658 | 17 ⁿ 52 ^m 36.05 | -29°19'39.'9 | 0.17 | 17.293 | 0.439 | - | CV |
| 428 | BLG500.11 | 129634 | 17 ⁿ 52 ^m 32.88 | -28°37′48″5 | 0.55 | 17.698 | 1./10 | 2.56279 | P |
| 429 | BLG500.20 | 120943 | 17 ⁿ 52 ^m 32.43 | -28°21′01″1 | 0.28 | 16.839 | 2.037 | 10.94092 | SP |
| 432 | BLG500.13 | 29005 | 17 ⁿ 51 ^m 19.17 | $-28^{\circ}53'08''9$ | 0.49 | 14.163 | 1.781 | 11.876 | SP |
| 434 | BLG500.05 | 84278 | 17 ⁿ 51 ^m 10.63 | -29°01′1′.″/ | 0.62 | 14.479 | 1.101 | 0.69871 | SP |
| 439 | BLG534.25 | 65908 | 17 ⁿ 48 ^m 40.65 | $-30^{\circ}55'53''2$ | 1.75 | 16.443 | - | 64.516 | SRV |
| 472 | BLG675.22 | 60741 | 17 ⁿ 40 ^m 25.65 | $-27^{\circ}05'40''_{4}$ | 0.29 | 14.623 | - | 21.834 | SP |
| 483 | BLG654.26 | 59596 | 17 ⁿ 37 ^m 31.10 | -29°24′28″8 | 3.47 | 13.476 | - | 0.6462 | E |
| 484 | BLG654.19 | 17980 | 17 ⁿ 37 ^m 19:57 | $-29^{\circ}33'23''8$ | 0.57 | 16.433 | - | 7.062 | SP |
| 491 | BLG653.04 | 15499 | 17 ⁿ 35 ^m 43.46 | $-29^{\circ}03'11''8$ | 1.99 | 14.561 | - | 16.10306 | P |
| 494 | BLG654.05 | 47692 | 17 ⁿ 34 ^m 58.69 | $-30^{\circ}13'29''_{0}$ | 1.74 | 16.667 | - | - | l |
| 495 | BLG654.22 | 76376 | 17 ⁿ 34 ^m 47.61 | $-29^{\circ}35'10''5$ | 2.09 | 16.623 | - | 0.48629 | P |
| 497 | BLG654.14 | 1240 | 17 ⁿ 34 ^m 22.10 | -30°05′05′′9 | 0.20 | 14.057 | - | 3.4965 | SP |
| 500 | BLG654.16 | 68256 | 17 ⁿ 32 ^m 39.40 | -30°02′22″′ | 0.22 | 15.163 | - | 1.8954 | P |
| 501 | BLG500.11 | 55525 | 17 ⁿ 52 ^m 52.63 | -28°48′05″4 | 0.67 | 14.142 | 1.975 | 15.03759 | SP |
| 502 | BLG500.20 | 154130 | 17 ⁿ 52 ^m 23.57 | -28°24′10.′9 | 1.38 | 15.218 | 1.471 | 6.9252 | SP |
| 505 | BLG648.16 | 31001 | 17 ⁿ 43 ^m 53.28 | $-26^{\circ}53'53''$ | 0.67 | 13.048 | - | 11.147 | SP |
| 513 | BLG504.22 | 107805 | 17 ⁿ 56 ^m 46.04 | -27°45′47″.6 | 0.25 | 13.097 | 2.450 | 11.8343 | OSARG |
| 515 | BLG504.24 | 65 | 17 ⁿ 55 ^m 45.84 | -27°58′13″9 | 3.14 | 14.572 | 2.383 | 4.95 | SP |
| 516 | BLG504.24 | 57283 | 17"55" 34.69 | -2/°4/′59″/ | 3.12 | 15.751 | - | 33.333 | SRV |
| 522 | BLG500.17 | 158208 | 17 ⁿ 54 ^m 32.61 | $-28^{\circ}29'19''_{}6$ | 1.96 | 12.971 | 5.007 | 147.3 | SRV |
| 526 | BLG500.01 | 144233 | 17"54"01.04 | $-29^{\circ}00'46''_{2}$ | 3.71 | 15.429 | 2.513 | 135.1 | P |
| 532 | BLG500.21 | 2338 | 17 ⁿ 52 ^m 15.84 | $-28^{\circ}34'15''3$ | 0.73 | 12.890 | 1.873 | 44.25 | SP |
| 538 | BLG501.22 | 116664 | 17 ⁿ 50 ^m 54.10 | $-29^{\circ}46'16''_{}0$ | 0.60 | 13.799 | 1.176 | 6.0533 | SP |
| 543 | BLG501.24 | 78370 | 17 ⁿ 49 ^m 32.70 | -29°49′55″9 | 0.41 | 14.280 | 2.918 | 61.35 | SP |
| 556 | BLG648.29 | 41317 | 17 ⁿ 46 ^m 30.18 | $-26^{\circ}22'04''_{\cdot}4$ | 0.20 | 14.675 | _ | - | 1 |
| 561 | BLG648.30 | 8035 | 17"46"07.68 | $-26^{\circ}15'47''_{1}$ | 0.54 | 16.121 | - | 12.4915 | E |
| 575 | BLG648.14 | 72850 | 17"44" 59.28 | $-26^{\circ}51'10''_{2}$ | 0.68 | 14.951 | - | 6.5147 | SP |
| 594 | BLG675.18 | 76442 | 1/"42""46.29 | -27°13′53′′3 | 0.16 | 16.472 | - | 27.322 | SP |
| 611 | BLG675.23 | 21477 | 17"39"50.50 | -2/~09'16.''5 | 1.70 | 13.201 | - | 1.3776 | Р Г |
| 611 | BLG6/5.23 | 21504 | 1/"39"50.34 | -2/~09'17.''3 | 2.98 | 14./93 | _ | - | I |
| 633 | BLG654.15 | 41782 | 17"33"18.72 | $-30^{\circ}05'22''_{3}$ | 0.67 | 14.615 | - | 0.73185 | P |
| 634 | BLG654.24 | 67281 | 17"33"16.65 | -29°40′03.′′2 | 0.20 | 14.744 | - | 0.76104 | SP |

Table 1

Continued

| ID Field No [200.0] [200.0] [""] [mag] [mag] [days] 637 BLG654.15 75839 17 ^h 33"0855 -2957727° 1.21 1.3.429 $-$ 4.97018 P 642 BLG504.15 98233 17 ^h 55"24:65 $-28^{\circ}10'36''8$ 0.79 1.3.431 2.935 30.67485 SP 650 BLG642.28 448425 17 ¹ 37"37837 $-2751'05''8$ 0.18 1.3.485 $-$ I 657 BLG642.04 31741 17 ^h 57"3670 $-277'31'09''_9$ 0.53 1.3.495 2.450 2.4.691 SP 668 BLG504.31 17810 17 ^h 55"0978 $-277'5'022''_5$ 0.14 1.414 2.660 0.6.4 SP 674 BLG500.18 50697 17 ^h 44'''_44'''_63'' 3.68 15.111 3.425 - I I 678 BLG500.17 15923'' 17 ^h 5'''''''''''''''''''''''''''''''''''' | GBS | OGLE-IV | OGLE-IV | RA | DEC | D | Ι | V - I | Р | Remarks |
|---|------------|------------------------|---------------|--|--|------|--------|----------------|-----------------------------|---------|
| 637 BLG654.15 75839 $17^{h}33^{m}08:55$ $-29^{\circ}57'27'6$ 1.2 $1.4,224$ 1.948 2.924 SP 642 BLG500.15 98231 $17^{h}55^{m}5514$ $-28^{\circ}01'58''$ 0.713 12.839 4.751 31.5 SRV 651 BLG500.09 64937 $17^{h}54^{m}08:51$ $-28^{\circ}48'28''8$ 32.91 12.849 4.751 31.5 SRV 651 BLG604.29 1566 $17^{h}57''''''''''''''''''''''''''''''''''''$ | ID | Field | No | [2000.0] | [2000.0] | ["] | [mag] | [mag] | [days] | |
| b) bL0094.15 (353) (753 | (27 | DI C(54.15 | 75920 | 17h22m00855 | 20057/27/16 | 1.01 | 12 420 | | 4.07010 | |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | 642 | BLG034.13 | 102340 | 1755 00.33 17h55m55814 | $-29^{\circ}01'58''0$ | 1.21 | 13.429 | 1 0/18 | 4.97018 | r SD |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 649 | BLG504.14 | 08233 | $17^{h}55^{m}24^{s}65$ | $-28^{\circ}10'36''8$ | 0.79 | 13/31 | 2 935 | 2.924 | SP |
| b) b | 650 | BLG500.09 | 64937 | 17 ^h 54 ^m 08 ^s 51 | $-28^{\circ}48'28''8$ | 3.29 | 12 849 | 2.755 4.751 | 31.5 | SRV |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | 651 | BLG500.07 | 18/195 | 17 ^h /7 ^m 03 ^s 70 | $-26^{\circ}11'08''8$ | 0.18 | 13/185 | 4.751 | 51.5 | I |
| $ \begin{array}{c} 0.5 \\ 0.5 $ | 657 | BLG048.28 BLG504.29 | 15566 | 17 ^h 57 ^m 46 ^s 88 | $-20^{\circ}11^{\circ}03.8$ $-27^{\circ}33'09''8$ | 0.10 | 16 280 | 1 562 | 16 58375 | I P |
| $ \begin{array}{c} 0.5 \\ 0.5 $ | 659 | BLG504.27 | 31747 | 17 ^h 57 ^m 38 ^s 37 | $-27^{\circ}19'55''2$ | 0.32 | 14 556 | 1.502 | 74 627 | SP |
| 605 bLG500.23 118900 17b 55m 5786 -27 56 724448% 0.31 14.104 1.522 2.6201 ESP 666 BLG504.14 188107 17b 55m 5786 -28°655% 0.41 14.104 2.669 160.4 SP 676 BLG500.17 159235 17b 54m 32*45 -28°28'13*4 3.73 17.241 2.748 0.30728 RLYR 679 BLG500.018 50697 17b 54m 05*63 -28°47'32'/6 0.04 13.865 0.826 2.0736 SP 684 BLG500.09 128064 17b 54m 05*63 -28°47'32'/6 0.04 13.865 0.826 2.0736 SP 688 BLG500.09 128146 17b 53m 39*84 -28°23'31'/6 0.36 16.640 3.175 8.231 SP 691 BLG500.19 1453 17b 53m 39*84 -28°29'31'/6 1.36 16.640 3.175 8.231 SP 692 BLG501.28 6421 17 17b 53m 39*84 -28°29'31'/6 1.33 1.609 | 663 | BLG504 30 | 69//8 | 17 ^h 56 ^m 30 ^s 96 | $-27^{\circ}31'39''9$ | 0.20 | 13/05 | 2 4 5 0 | 24 691 | SP |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | 666 | BLG504.30 | 118000 | 17 ^h 56 ^m 01 ^s 69 | $-27^{\circ}11' 39.9$ | 0.33 | 14 104 | 1 522 | 2 4.071 | E SP |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | 668 | BLG504.14 | 188107 | 17 ^h 55 ^m 55 ^s 86 | $-27^{\circ} + + + 0.0$ | 0.41 | 14.104 | 2 669 | 106.4 | SP |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 674 | BLG504.14 | 74705 | 17 ^h 55 ^m 10 ^s 78 | -20°05'55.5 | 1.07 | 14.147 | 2.007 | 24.73 | OSARG |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 676 | BLG500.17 | 150235 | 17 ^h 54 ^m 32 ^s 45 | -27 30 32.3 $28^{\circ}28'13''4$ | 3 73 | 17 241 | 2 7 1 8 | 0.30728 | DDIVD |
| 019 DLC500.09 128064 17 ¹⁵ 54 ^{m05563} $-28^{2}47^{3}32''_{1}$ 0.04 13.85 0.826 2.0736 SP 684 BLC500.09 136274 17 ¹⁵ 54 ^{m05563} $-28^{2}43'32''_{1}$ 2.47 17.369 2.566 2.5844 ESP 685 BLC500.09 128146 17 ^{h5} 5 ^{m3} 5651 $-28^{2}43'32''_{1}$ 0.04 13.855 1.525 189 P 688 BLC500.19 125229 17 ^{h5} 5 ^{m3} 39 ^s 84 $-28^{2}3'31''_{10}''_{8}$ 0.63 61.640 3.175 8.231 SP 691 BLC500.19 125229 17 ^{h5} 5 ^{m3} 39 ^s 84 $-28^{2}9'31''_{10}''_{8}$ 0.26 15.703 2.757 0.30988 P 691 BLC501.28 64217 17 ^{h5} 2 ^{m4} 0 ¹⁹ $-29^{2}23'42''_{10}''_{10}$ 8.26 15.703 2.757 0.30988 P 705 BLC501.12 122438 17 ^{h5} 1 ^{m3} 9 ^{h1} 10 ^{h1} 1 $-29^{2}23'42''_{10}''_{10}$ 8.21 1.5751 1.579 - I 705 BLC501.13 35400 17 ^{h5} 1 ^m 19 ^{h1} 1 ^h 17 -29^{2}23'42''_{10}''_{10}''_{10} 8.26 5.556 | 670 | BLG500.17 | 50607 | 17 54 52.45 17h54m13808 | $-28^{\circ}28'13.4$ | 3.75 | 17.241 | 2.740 | 0.30728 | I |
| 641BLG500.091362717171512.50.0013.632.5662.5864E SP648BLG500.0912814617175356:51 $-28^{\circ}43'32'$ 2.4717.3692.5662.5864E SP668BLG500.1934817175339.584 $-28^{\circ}29'31''_6$ 0.3613.8551.525189P669BLG500.1912522917175339.584 $-28^{\circ}29'31''_6$ 0.3613.8551.525189P692BLG500.1216381317175332421 $-28^{\circ}29'31''_6$ 0.3613.83511.9936E SP695BLG501.2864217171753921''_57''0.7133.11.83811.9936E SP702BLG501.1212243817171592''_18'57'0.771.5311.5301.50011705BLG501.3035398171715''-29'2'_21''_21''0.681.5.6492.32213.73SP712BLG501.1410892417*50''''29'2''_10'''0.681.5.6492.32213.73SP712BLG501.241882517*49''''90''''3.7615.5562.4856.84SP714BLG501.121770''''''''''''''''''''''''''''''''''' | 681 | BLG500.09 | 128064 | $17^{h}54^{m}05^{s}63$ | $-28^{\circ}33^{\circ}41.0$ $-28^{\circ}47'32''6$ | 0.04 | 13.111 | 0.826 | - 2 0736 | SD I |
| 064BLC500.0912814617"553"5651 $-28^{\circ}45'83''$ 0.58 17.50 2.369 2.7894 SP688BLC500.1934817"53"5651 $-28^{\circ}25'31''8$ 0.3616.6403.1758.231SP689BLC500.1912522917"53"392421 $-28^{\circ}27'10''8$ 1.209.629-2.794P691BLC500.1212522917"53"392421 $-28^{\circ}27'10''8$ 1.209.629-2.794P692BLC501.286421717"52"40'19 $-29^{\circ}28'57''2$ 0.7713.5311.8381.9936E SP701BLC501.1213864217"51"41'10 $-29^{\circ}18'55''2$ 0.7713.5311.8381.5001E705BLC501.303540017"51"16'15 $-29^{\circ}23'44''_4$ 0.8715.975-I705BLC501.313540017"51"16'15 $-29^{\circ}23'44''_4$ 0.8715.975-I716BLC501.343540017"50"14'77 $-30^{\circ}03'19'_5$ 0.7615.5562.4856.84SP712BLC501.1410892417"50"14'77 $-30^{\circ}03'19'_5$ 0.7615.5562.4856.84SP718BLC501.241882517"49"59'15 $-29^{\circ}24'3'3'_1$ 0.7615.5562.4856.84SP718BLC501.241882517"49"59'15 $-29^{\circ}24'3'0'_1$ 0.5112.8271.1040.32200E724BUL534.3210758317"49"59'2 $-29^{\circ}2$ | 684 | BLG500.09 | 126004 | 17 ^h 54 ^m 00 ^s 38 | $-28^{\circ}43'32''$ | 2 47 | 17 369 | 2 566 | 2.0750 | E SP |
| 0605DLC500.1917171717171717171717688BLC500.19171 | 685 | BLG500.09 | 1281/6 | 17 ^h 53 ^m 56 ^s 51 | $-28^{\circ}46'58''3$ | 0.58 | 1/.50) | 1 345 | 2.5804 | SP |
| 0639BLG500.19175717 <td>688</td> <td>BLG500.09</td> <td>3/8</td> <td>17^h53^m42^s30</td> <td>-20 40 50.5</td> <td>0.50</td> <td>16.640</td> <td>3 175</td> <td>2.70)4 8.231</td> <td>SD</td> | 688 | BLG500.09 | 3/8 | 17 ^h 53 ^m 42 ^s 30 | -20 40 50.5 | 0.50 | 16.640 | 3 175 | 2.70) 4 8.231 | SD |
| bb | 680 | BLG500.19 | 17570 | 17 55 42.50 17h53m30884 | -28°30'31"6 | 0.05 | 13 825 | 1 5 2 5 | 180 | D |
| b) b | 601 | BLG500.19 | 125220 | 17 ^h 53 ^m 24 ^s 21 | $-28^{\circ}29^{\circ}31.0$ | 1.20 | 10.620 | 1.525 | 2 704 | I D |
| 002DLGS01210301817301130018143011430314303130013001300059BLGS012864217 $17^h52^m40^{51}$ $-29^\circ 0^577^{8}$ 0.2615.7032.7570.30988P701BLG50129138642 $17^h51^m41^{51}$ $-29^\circ 0^{577/8}$ 0.2615.7032.7570.30988P705BLG501.3035398 $17^h51^m16^{51}$ $-29^\circ 23'44'^4$ 0.8715.9751.579-I705BLG501.3134198 $17^h51^m16^{51}$ $-29^\circ 23'42'^8$ 2.7615.400-326.8MIRA711BLG501.14108924 $17^h50^m32^{549}$ $-29^\circ 23'42'^8$ 2.7615.5562.4856.84SP712BLG501.1511770 $17^h49^m59^{531}$ $-29^\circ 23'43'^8$ 1.0714.836-42.735OSARG717BLG501.2418825 $17^h49^m59^{531}$ $-29^\circ 24'30'^4$ 2.9014.836-42.735OSARG718BLG501.0745474 $17^h49^m59^{532}$ $-29^\circ 24'30'^4$ 2.9014.836-42.735OSARG718BLG541.32107883 $17^h49^m59^{532}$ $-29^\circ 24'30'^4$ 2.921.1040.32200E724BLG648.2969672 $17^h49^m35^{543}$ $-27^\circ 16'46''_8$ 3.571.4375.824P721BLG541.1678697 $17^h49^m35^{543}$ $-27^\circ 6'_30''_1$ 0.4417.822-6.079P74BLG6 | 602 | BLG500.02 | 163813 | 17 55 24.21 17h53m05 ^s 18 | $-28^{\circ}27^{\circ}10.8$ | 1.20 | 14.600 | 3 706 | 03.3 | I D |
| 000001000 | 605 | BLG501.28 | 64217 | 17 55 05.18 17h52m40s10 | $-29^{\circ}13^{\circ}00.0$ | 0.26 | 15 703 | 2 757 | 0 30088 | I D |
| 702BLG500.12122438 $17^{9}5^{1}m^{3}9^{4}1$ $-28^{9}23'42''_{3}$ 0.44 1.550 1.560 1.5001 E705BLG501.30 35398 $17^{9}5^{1}m^{1}6^{5}15$ $-29^{2}23'42''_{4}$ 0.87 15.975 1.579 $-$ I705BLG501.30 35400 $17^{9}5^{1}m^{1}5^{5}91$ $-29^{2}23'42''_{4}$ 2.76 15.400 $ 326.8$ MIRA711BLG501.31 34198 $17^{9}5^{0}m^{1}2^{5}7$ $-29^{2}21'00''_{1}$ 0.68 15.649 2.322 13.73 SP712BLG501.14 108924 $17^{9}49^{m}32^{5}49$ $-29^{2}21'00'_{1}$ 0.68 15.649 2.322 13.73 SP714BLG501.15 11770 $17^{h}49^{m}59^{3}15$ $-29^{2}57'11''_{1}$ 0.71 18.874 $ -$ CV715BLG501.24 18825 $17^{h}49^{m}59^{5}15$ $-29^{2}34'36''_{1}$ 0.77 14.836 $ 42.735$ $OSARG$ 717BLG501.24 18825 $17^{h}49^{m}50^{5}32$ $-29^{2}4'_{2}'0''_{1}$ 0.65 15.335 1.437 5.824 P721BLG534.32 107583 $17^{h}49^{m}50^{5}32$ $-29^{2}3'_{1}5''_{1}''_{1}$ 0.51 12.827 1.104 0.25207 E724BLG648.29 69672 $17^{h}46^{m}19^{5}94$ $-26^{2}12'28''_{1}''_{1}$ 0.44 17.822 -6.079 P738BLG648.16 78697 $17^{h}46^{m}19^{5}94$ $-27^{2}5'30''_{1}''_{2}$ 0.44 17.82 | 701 | BLG501.20 | 138642 | 17 ^h 51 ^m 41 ^s 10 | -29 20 57.0 | 0.20 | 13.703 | 1.838 | 11 0036 | E SD |
| 705BLG501.20122.331735.41 -2.23 24.470.8715.9751.5791.501E705BLG501.303530017 ^h 51 ^m 15 ^s 91 $-29^{\circ}23'44''_{\circ}$ 0.8715.9751.579-I705BLG501.313419817 ^h 50 ^m 32 ^s 49 $-29^{\circ}23'42''_{\circ}$ 2.7615.400-326.8MIRA711BLG501.1410892417 ^h 50 ^m 477 $-30^{\circ}03'19'_{\circ}$ 0.7615.5652.4856.84SP714BLG501.241882517 ^h 49 ^m 59 ^s 13 $-29^{\circ}57'11''_{\circ}$ 0.7615.5652.4856.84SP715BLG501.241882517 ^h 49 ^m 59 ^s 13 $-29^{\circ}3'38''_{\circ}$ 0.7914.836-42.735OSARG717BLG501.241882517 ^h 49 ^m 59 ^s 12 $-29^{\circ}34'38''_{\circ}$ 0.7914.836-0.54767RRLYR*718BLG510.074547417 ^h 49 ^m 48 ^s 54 $-30^{\circ}12'21''_{\circ}$ 0.6515.3351.4375.824P721BLG653.3210758317 ^h 49 ^m 48 ^s 54 $-30^{\circ}12'28''_{\circ}$ 0.1114.430-0.25321P724BLG648.296967217 ^h 46 ^m 19 ^s 94 $-26^{\circ}12'28''_{\circ}$ 0.1114.430-0.25321P774BLG675.032288117 ^h 41 ^m 18 ^s 28 $-27^{\circ}8'30''_{\circ}$ 0.7819.209-0.11786E?796BLG675.037338017 ^h 40 ^m 17 ^s 79 $-27^{\circ}6'6'07'_{\circ}$ 1.2614.581 <t< td=""><td>701</td><td>BLG500.12</td><td>122/28</td><td>$17^{h}51^{m}30^{s}41$</td><td>$-29^{\circ}18^{\circ}53.2$ $28^{\circ}52'43''5$</td><td>0.77</td><td>15.531</td><td>1.656</td><td>1 50011</td><td>ESI</td></t<> | 701 | BLG500.12 | 122/28 | $17^{h}51^{m}30^{s}41$ | $-29^{\circ}18^{\circ}53.2$ $28^{\circ}52'43''5$ | 0.77 | 15.531 | 1.656 | 1 50011 | ESI |
| 705BLG501.3035401716.15 $-29^{2}2^{3}42.''8$ 2.7615.400-326.8MIRA711BLG501.313419817 ^h 50 ^m 32.'49 $-29^{2}2^{1}0.''1$ 0.6815.6492.32213.73SP712BLG501.1410892417 ^h 50 ^m 14'77 $-30^{\circ}03'19'.'5$ 0.7615.5562.4856.84SP714BLG501.241882517 ^h 49 ^m 59'.15 $-29^{\circ}27'11.''_1$ 0.7118.874CV715BLG501.241882517 ^h 49 ^m 59'.15 $-29^{\circ}42'.30'.'4$ 2.9218.600-0.54767RRLYR*718BLG501.074547417 ^h 49 ^m 48'.54 $-30^{\circ}12'21.''_0$ 0.6515.3351.4375.824P721BLG534.3210758317 ^h 49 ^m 48'.54 $-30^{\circ}12'21.''_0$ 0.5112.8271.1040.32200E724BUL_SC441298617 ^h 48 ^m 54'.26 $-30^{\circ}18'39'.5$ 0.5112.8271.1040.32200E724BLG648.296967217 ^h 46 ^m 19.'94 $-26^{\circ}12'28'.'7$ 0.1114.430-0.25321P774BLG675.032288117 ^h 41 ^m 21'.62 $-27^{\circ}8'39'.'2$ 0.4814.229-1.06571E800BLG675.037338017 ^h 41 ^m 27.62 $-27^{\circ}8'39'.'2$ 0.4814.229-1.06571E800BLG675.075613817 ^h 39 ^m 48'.50 $-27^{\circ}45'59'.'7$ 0.3213.954-213MIRA </td <td>702</td> <td>BLG500.12 BLG501.30</td> <td>35308</td> <td>$1751 	{} 59.41 	{} 17^{h} 	{} 51^{m} 	{} 16^{s} 	{} 15$</td> <td>$-28^{\circ}32^{\circ}43.5$</td> <td>0.44</td> <td>15.075</td> <td>1.500</td> <td>1.50011</td> <td>L</td> | 702 | BLG500.12 BLG501.30 | 35308 | $1751 	{} 59.41 	{} 17^{h} 	{} 51^{m} 	{} 16^{s} 	{} 15$ | $-28^{\circ}32^{\circ}43.5$ | 0.44 | 15.075 | 1.500 | 1.50011 | L |
| 711BLG501.30 34493 $17^{h}50^{m}12^{s}249$ $-29^{2}2^{1}00^{\prime}1$ 0.68 15.469 2.322 13.73 SP712BLG501.14 108924 $17^{h}50^{m}14^{s}77$ $-30^{\circ}03'19'_{5}$ 0.68 15.649 2.322 13.73 SP714BLG501.15 11770 $17^{h}49^{m}59^{s}15$ $-29^{\circ}57'11''_{1}$ 0.71 18.874 $ CV$ 715BLG501.24 18825 $17^{h}49^{m}59^{s}15$ $-29^{\circ}34'38'_{1}$ 0.79 14.836 $ 42.735$ $OSARG$ 717BLG501.24 18825 $17^{h}49^{m}59^{s}15$ $-29^{\circ}24'30'_{4}$ 2.92 18.600 $ 0.54767$ $RRLYR^*$ 718BLG501.07 45474 $17^{h}49^{m}28^{s}4$ $-30^{\circ}12'21'_{10}$ 0.65 15.335 1.437 5.824 P721BLG534.32 107583 $17^{h}49^{m}28^{s}4$ $-30^{\circ}12'21'_{10}$ 0.65 15.335 1.437 5.824 P724BLG648.29 69672 $17^{h}46^{m}19^{s}94$ $-26^{\circ}12'28'_{17}$ 0.11 14.430 $ 0.25321$ P744BLG675.03 22811 $17^{h}44^{m}01^{s}34$ $-27^{\circ}16'46'_{18}$ 3.57 14.530 $ 43.47826$ P778BLG675.03 22811 $17^{h}41^{m}42^{s}38$ $-27^{\circ}58'30'_{13}$ 0.78 19.209 $ 0.11786$ E?796BLG675.04 85070 $17^{h}40^{m}17^{s}79$ $-27^{\circ}6'6'0'_{18}$ 1.26 14.581 | 705 | BLG501.30 | 35400 | 17 ^h 51 ^m 15 ^s 91 | $-29^{\circ}23'42''8$ | 2.76 | 15.775 | 1.577 | 326.8 | MIRA |
| 711BLG501.1410892417 ^b 5012.47-20210.110.5552.4856.84SP712BLG501.151177017 ^h 49 ^m 59 ^s 31 $-29^{\circ}57'11''_1$ 0.7118.874CV715BLG501.241882517 ^h 49 ^m 59 ^s 15 $-29^{\circ}34'38''_1$ 0.7914.836-42.735OSARG717BLG501.243590917 ^h 49 ^m 50 ^s 32 $-29^{\circ}42'30''_4$ 2.9218.600-0.54767RRLYR*718BLG501.074547417 ^h 49 ^m 50 ^s 32 $-29^{\circ}42'30''_4$ 2.9218.600-0.54767RRLYR*718BLG648.1210758317 ^h 49 ^m 20 ^s 74 $-30^{\circ}28'05''_9$ 0.3415.633-2.66207E724BLG648.296967217 ^h 48 ^m 54 ^s 26 $-30^{\circ}18'39''_5$ 0.5112.8271.1040.25321P774BLG648.167869717 ^h 44 ^m 01 ^s 34 $-27^{\circ}16'46''_8$ 3.5714.530-43.47826P778BLG648.167869717 ^h 44 ^m 01 ^s 34 $-27^{\circ}58'30''_3$ 0.7819.209-0.11786E?796BLG675.032288117 ^h 41 ^m 17 ^s 79 $-27^{\circ}64'3'57'_1$ 0.4417.822-6.079P796BLG675.142866117 ^h 39 ^m 48 ^s 60 $-27^{\circ}24'59'_17$ 0.3213.954-213MIRA809BLG675.142866117 ^h 39 ^m 38 ^s 65 $-27^{\circ}24'3'_34'$ 0.3616.978-35.< | 703 | BLG501.30 | 3/108 | 17 ^h 50 ^m 32 ^s 49 | $-29^{\circ}23'42.0$ $-29^{\circ}21'00''1$ | 0.68 | 15.400 | 2 322 | 13 73 | SP |
| 714BLG501.151177017 ¹⁰ 49 ^m 59 ⁵ 31-29°57'11.''10.7118.874CV715BLG501.2418825 $17^{h}49^{m}59^{5}15$ -29°34'38''0.7914.836-42.735OSARG717BLG501.2435909 $17^{h}49^{m}50^{5}32$ -29°42'30''42.9218.600-0.54767RRLYR*718BLG501.07 45474 $17^{h}49^{m}50^{5}32$ -29°42'30''42.9218.600-0.54767RRLYR*718BLG534.32107583 $17^{h}49^{m}20^{5}74$ -30°28'05''90.3415.633-2.66207E724BUL_SC4412986 $17^{h}48^{m}54^{5}26$ -30°18'39''50.5112.8271.1040.32200E724BLG648.2969672 $17^{h}46^{m}19^{5}94$ -26°12'28''70.1114.430-0.25321P774BLG675.174519 $17^{h}44^{m}01^{5}34$ -26°48'57'.10.4417.822-6.079P78BLG648.1678697 $17^{h}44^{m}01^{5}34$ -27°58'39''.20.4814.229-1.06571E800BLG675.0322881 $17^{h}41^{m}27^{5}62$ -27°58'39''.20.4814.229-1.06571E800BLG675.1428661 $17^{h}39^{m}35^{6}36$ -27°24'3'.3''0.361.6.978-35.7P811BLG675.1428661 $17^{h}39^{m}38^{5}6^{5}46$ -27°4'8'.3''.40.3616.978-35.SP <td>712</td> <td>BLG501.14</td> <td>108924</td> <td>$17^{h}50^{m}14^{s}77$</td> <td>$-30^{\circ}03'19''5$</td> <td>0.00</td> <td>15.556</td> <td>2.322</td> <td>6.84</td> <td>SP</td> | 712 | BLG501.14 | 108924 | $17^{h}50^{m}14^{s}77$ | $-30^{\circ}03'19''5$ | 0.00 | 15.556 | 2.322 | 6.84 | SP |
| 715BLG501.24187.017.4793.11 $-29^{\circ}34'38''1$ 0.79 14.836 -42.735 OSARG715BLG501.2435909 $17^{h}49^{m}50^{3}32$ $-29^{\circ}42'30''4$ 2.92 18.600 $ 0.54767$ RRLYR*718BLG501.07 45474 $17^{h}49^{m}50^{5}32$ $-29^{\circ}42'30''4$ 2.92 18.600 $ 0.54767$ RRLYR*718BLG501.07 45474 $17^{h}49^{m}20^{5}74$ $-30^{\circ}28'05''9$ 0.34 15.633 $ 2.66207$ E724 BUL_SC44 12986 $17^{h}48^{m}54^{s}26$ $-30^{\circ}18'39''5$ 0.51 12.827 1.104 0.32200 E742BLG648.2969672 $17^{h}46^{m}19^{s}94$ $-26^{\circ}12'28''7$ 0.11 14.430 $ 0.25321$ P774BLG675.174519 $17^{h}44^{m}01^{5}34$ $-27^{\circ}16'46''8$ 3.57 14.530 $ 43.47826$ P778BLG675.0322881 $17^{h}41^{m}28^{3}8$ $-27^{\circ}58'30''3$ 0.78 19.209 $ 0.11786$ E?796BLG675.0322881 $17^{h}41^{m}27^{5}62$ $-27^{\circ}58'39''2$ 0.32 13.954 -213 MIRA809BLG675.04 85070 $17^{h}40^{m}17^{5}79$ $-27^{\circ}0'6'7''8$ 1.2668 $ 43.3$ P811BLG675.1428661 $17^{h}30^{m}48^{s}50$ $-27^{\circ}2'4'16''0$ 0.59 14.668 43.3 P819BLG675.1428661 $17^{h}30^{m}48^{s}50$ <td>714</td> <td>BLG501.14</td> <td>11770</td> <td>17^h/0^m50^s31</td> <td>$-29^{\circ}57'11''1$</td> <td>0.70</td> <td>18 874</td> <td>2.405</td> <td>0.04</td> <td>CV</td> | 714 | BLG501.14 | 11770 | 17 ^h /0 ^m 50 ^s 31 | $-29^{\circ}57'11''1$ | 0.70 | 18 874 | 2.405 | 0.04 | CV |
| 717BLG501.24 1362.5 $17^{+}49^{m}50;32$ $-29^{\circ}42'30''_{*}4$ 2.92 18.600 $ 0.54767$ RRLYR*718BLG501.07 45474 $17^{h}49^{m}48;54$ $-30^{\circ}12'21''_{*}0$ 0.55 15.335 1.437 5.824 P721BLG534.32 107583 $17^{h}49^{m}20;74$ $-30^{\circ}28'05''_{*}9$ 0.34 15.633 $ 2.66207$ E724 BUL_SC44 12986 $17^{h}49^{m}20;74$ $-30^{\circ}28'05''_{*}9$ 0.34 15.633 $ 2.66207$ E742BLG648.29 69672 $17^{h}49^{m}95'_{*}42$ $-26^{\circ}12'28''_{*}7$ 0.11 14.430 $ 0.25321$ P774BLG675.17 4519 $17^{h}49^{m}35'_{*}43$ $-27^{\circ}16'46''_{*}8$ 3.57 14.530 $ 43.47826$ P778BLG648.16 78697 $17^{h}43^{m}35'_{*}43$ $-26^{\circ}8'57''_{*}1$ 0.44 17.822 $ 6.079$ P794BLG675.03 22881 $17^{h}41^{m}25'_{*}62$ $-27^{\circ}58'30''_{*}3$ 0.78 19.209 $ 0.11786$ E?796BLG675.04 85070 $17^{h}40^{m}17^{*}79$ $-27^{\circ}64'07''_{*}8$ 1.26 14.581 $ 35.7$ P811BLG675.14 28661 $17^{h}39^{m}48^{*}50$ $-27^{\circ}24'16''_{*}0$ 0.59 14.668 $ 43.3$ P819BLG653.26 52494 $17^{h}37^{m}38^{*}66$ $-27^{\circ}24'16''_{*}0$ 0.59 14.668 $ 43.$ | 715 | BLG501.15 | 18825 | 17 ^h /9 ^m 59 ^s 15 | $-29^{\circ}34'38''1$ | 0.79 | 1/ 836 | | 12 735 | OSARG |
| 718BLG501.1745030171710121210.00010.010110.010110.0101718BLG501.07454741717494830°12'21''00.6515.3351.4375.824P721BLG534.3210758317h4990?4-30°28'05''90.3415.633-2.66207E724BUL_SC441298617h4994-26°12'28''70.1114.430-0.25321P774BLG675.17451917h4994-26°12'28''70.1114.430-0.25321P778BLG648.167869717h4335'43-26°48'57''10.4417.822-6.079P794BLG675.032288117h41m42's38-27°58'30''30.7819.209-0.11786E?796BLG675.048507017h40m17':79-27°66'07''81.2614.581-35.7P801BLG675.142866117h3948*50-27°44'33''40.3616.978-35.7P811BLG675.075613817h3948*50-27°44'33''40.3616.978-35.7P829BLG653.265249417h3948*50-27°44'33''40.3616.978-35.8SP830BLG653.265249417h37 <m3*66< td="">-29°21'44''80.4215.767<td>717</td><td>BLG501.24</td><td>35909</td><td>17^h49^m50^s32</td><td>$-29^{\circ}42'30''4$</td><td>2.92</td><td>18 600</td><td></td><td>0 54767</td><td>RRI VR*</td></m3*66<> | 717 | BLG501.24 | 35909 | 17 ^h 49 ^m 50 ^s 32 | $-29^{\circ}42'30''4$ | 2.92 | 18 600 | | 0 54767 | RRI VR* |
| 710BLG651.6163.7417763.74101210.56313.5351.4.5753.6241721BLG534.3210758317 ^h 49 ^m 20;74 $-30^{\circ}28'05''9$ 0.3415.633 $-$ 2.66207E724BUL_SC441298617 ^h 48 ^m 54:26 $-30^{\circ}18'39''5$ 0.5112.8271.1040.32200E742BLG648.296967217 ^h 46 ^m 19594 $-26^{\circ}12'28'7$ 0.1114.430 $-$ 0.25321P774BLG675.17451917 ^h 44 ^m 01*34 $-27^{\circ}16'46''8$ 3.5714.530 $-$ 43.47826P778BLG648.167869717 ^h 43 ^m 35*43 $-26^{\circ}8'57''.1$ 0.4417.822 $-$ 6.079P794BLG675.032288117 ^h 41 ^m 27*62 $-27^{\circ}58'30''.3$ 0.7819.209 $-$ 0.11786E?796BLG675.048507017 ^h 40 ^m 51*59 $-27^{\circ}58'39''.2$ 0.4814.229 $-$ 1.06571E800BLG675.048507017 ^h 40 ^m 1*79 $-27^{\circ}06'07''.8$ 1.2614.581 $-$ 35.7P811BLG675.075613817 ^h 39 ^m 48*50 $-27^{\circ}24'16''.0$ 0.5914.668 $-$ 43.3P819BLG653.265249417 ^h 37 ^m 38*06 $-29^{\circ}21'44''.8$ 0.4215.767 $-$ I830BLG653.196117617 ^h 36 ^m 47*64 $-28^{\circ}22'21''.7$ 2.4115.714 $-$ 15.18P843< | 718 | BLG501.24 | 45474 | 17 ^h 49 ^m 48 ^s 54 | $-30^{\circ}12'21''0$ | 0.65 | 15 335 | 1 437 | 5 824 | P |
| 724BLG 53.5210730317 47 250^{-14} 50 20 63.713.63512.607413.635724BUL_SC441298617 ^h 48 ^m 54 ² 26 $-30^{\circ}18'39''_{15}$ 0.5112.8271.1040.32200E742BLG648.296967217 ^h 46 ^m 19 ⁵ 94 $-26^{\circ}12'28''_{17}$ 0.1114.430-0.25321P774BLG648.167869717 ^h 44 ^m 01 ⁵ 34 $-27^{\circ}16'46''_{18}$ 3.5714.530-43.47826P778BLG648.167869717 ^h 43 ^m 35 ⁵ 43 $-26^{\circ}48'57''_{11}$ 0.4417.822-6.079P794BLG675.032288117 ^h 41 ^m 42 ⁵ 38 $-27^{\circ}58'30''_{23}$ 0.7819.209-0.11786E?796BLG675.048507017 ^h 40 ^m 51 ⁵ 59 $-27^{\circ}58'39''_{23}$ 0.4814.229-1.06571E800BLG675.048507017 ^h 40 ^m 51 ⁵ 59 $-27^{\circ}45'59''_{17}$ 0.3213.954-213MIRA809BLG675.075613817 ^h 39 ^m 48 ⁵ 50 $-27^{\circ}24'16''_{10}$ 0.5914.668-43.3P811BLG653.265249417 ^h 37 ^m 38 ⁵ 64 $-27^{\circ}48'33''_{14}$ 0.3616.978-35SP829BLG653.196117617 ^h 37 ^m 38 ⁵ 64 $-28^{\circ}22'21''_{17}$ 2.4115.767I830BLG653.196117617 ^h 36 ^m 47 ⁵ 64 $-28^{\circ}22'21''_{17}$ 2.4115.714-15.18P <t< td=""><td>721</td><td>BLG534 32</td><td>107583</td><td>17^h49^m20^s74</td><td>$-30^{\circ}28'05''9$</td><td>0.34</td><td>15.555</td><td>-</td><td>2 66207</td><td>F</td></t<> | 721 | BLG534 32 | 107583 | 17 ^h 49 ^m 20 ^s 74 | $-30^{\circ}28'05''9$ | 0.34 | 15.555 | - | 2 66207 | F |
| 742BCL_50441200174074012001000011000120011000742BLG648.2969672 $17^{h}46^{m}19.94$ $-26^{\circ}12'28''_{10}$ 0.11 14.430 -0.25321P774BLG648.1678697 $17^{h}44^{m}01.34$ $-27^{\circ}16'46''_{10}$ 3.57 14.530 - 43.47826 P778BLG648.1678697 $17^{h}43^{m}35'_{13}$ $-26^{\circ}48'57'_{11}$ 0.44 17.822 - 6.079 P794BLG675.0322881 $17^{h}41^{m}42^{*}_{13}38$ $-27^{\circ}58'30''_{13}$ 0.78 19.209 - 0.11786 E?796BLG675.0373380 $17^{h}40^{m}51^{*}_{559}$ $-27^{\circ}58'39''_{20}$ 0.48 14.229 - 1.06571 E800BLG675.04 85070 $17^{h}40^{m}17^{*}_{17}79$ $-27^{\circ}06'07''_{18}$ 1.26 14.581 - 35.7 P811BLG675.14 28661 $17^{h}39^{m}48^{*}50$ $-27^{\circ}24'16''_{10}$ 0.59 14.668 - 43.3 P819BLG651.26 41915 $17^{h}37^{m}38^{*}66$ $-29^{\circ}21'44''_{18}$ 0.42 15.767 -I830BLG653.26 52494 $17^{h}37^{m}29^{*}94$ $-28^{\circ}07'59''_{15}$ 0.58 13.127 - 8.288 E837BLG654.03 59545 $17^{h}36^{m}47^{*}64$ $-28^{\circ}22'21''_{17}$ 2.41 15.714 - 15.18 P843BLG654.12 30313 $17^{h}35^{m}3$ | 724 | RUL SC44 | 12986 | 17 ^h 48 ^m 54 ^s 26 | $-30^{\circ} 18' 39'' 5$ | 0.54 | 12 827 | 1 104 | 0.32200 | F |
| 742BLG65.1760.612174010.74 -27° 16/46/83.5714.530-60.2531 f774BLG675.17451917^h44^m01*34 -27° 16/46/83.5714.530-43.47826 P778BLG648.167869717^h43^m35*33 -26° 48'57''10.4417.822-6.079 P794BLG675.032288117^h41^m42*38 -27° 58'30''30.7819.209-0.11786 E?796BLG675.037338017^h41^m27*62 -27° 58'39''20.4814.229-1.06571 E800BLG675.048507017^h40^m17*79 -27° 06'07''81.2614.581-35.7 P811BLG675.142866117^h39^m48*50 -27° 24'16''00.5914.668-43.3 P819BLG655.075613817^h38^m56*46 -27° 48'33''.40.3616.978-35SP829BLG653.265249417^h37^m38*06 -29° 21'44''.80.4215.767I830BLG653.196117617^h36^m47*64 -28° 22'2'1'72.4115.714-15.18P843BLG654.035954517^h36^m5*70 -30° 18'16''.83.2714.403-49.5OSARG845BLG654.123031317^h35^m37*78 -29° 29'15''.00.0816.443-3.158P847BLG654.123031317^h35^m37*78 -29° 29'15''.00.08 | 742 | BI G648 29 | 69672 | 17 ^h /6 ^m 19 ^s 9/ | $-26^{\circ}12'28''7$ | 0.11 | 14.430 | 1.104 | 0.25321 | P |
| 778BLG673.17451571747015717710710714710710714715711714715711714715711< | 774 | BLG675 17 | /519 | 17 ^h // ^m 01 ^s 3/ | $-20^{\circ}12'20.7$ $-27^{\circ}16'46''8$ | 3.57 | 14.530 | | 13 17826 | P |
| 794BLG675.0322881 $17^{h}41^{m}42^{s}38$ $-27^{\circ}58'30''_{3}$ 0.78 19.209 $ 0.01786$ E?796BLG675.0373380 $17^{h}41^{m}27^{s}62$ $-27^{\circ}58'39''_{2}$ 0.48 14.229 $ 1.06571$ E800BLG675.04 85070 $17^{h}40^{m}51^{s}59$ $-27^{\circ}58'39''_{2}$ 0.48 14.229 $ 1.06571$ E800BLG675.04 85070 $17^{h}40^{m}51^{s}59$ $-27^{\circ}45'59''_{1}7$ 0.32 13.954 $ 213$ MIRA809BLG675.22 60737 $17^{h}40^{m}17^{s}79$ $-27^{\circ}06'07''_{1}8$ 1.26 14.581 $ 35.7$ P811BLG675.07 56138 $17^{h}39^{m}48^{s}50$ $-27^{\circ}24'16''_{1}0$ 0.59 14.668 $ 43.3$ P819BLG653.07 56138 $17^{h}37^{m}38^{s}66$ $-29^{\circ}21'44''_{1}8$ 0.42 15.767 $ -$ I830BLG653.26 52494 $17^{h}37^{m}29^{s}94$ $-28^{\circ}07'59'_{1}5$ 0.58 13.127 $ 8.288$ E837BLG654.03 59545 $17^{h}36^{m}05^{s}70$ $-30^{\circ}18'16''_{1}8$ 3.27 14.403 $ 49.5$ OSARG845BLG654.03 59545 $17^{h}36^{m}05^{s}78$ $-29^{\circ}29'15''_{1}0$ 0.08 16.443 $ 3.158$ P847BLG654.12 30313 $17^{h}35^{m}37^{s}78$ $-29^{\circ}29'15''_{1}0$ 0.08 16.443 $ 3.158$ P <td>778</td> <td>BLG648 16</td> <td>78697</td> <td>$17^{h}43^{m}35^{s}43$</td> <td>-27''''''''''''''''''''''''''''''''''''</td> <td>0.44</td> <td>17 822</td> <td></td> <td>6.079</td> <td>P</td> | 778 | BLG648 16 | 78697 | $17^{h}43^{m}35^{s}43$ | -27'''''''''''''''''''''''''''''''''''' | 0.44 | 17 822 | | 6.079 | P |
| 796BLG675.037238017 + 17 + 17 + 23027 * 58 ' 59' ' 20.1617.60D.17.60D.17.70796BLG675.037338017 + 17 + 17 + 230 $-27^{\circ} 58' 39'' 2$ 0.4814.229 -1.06571 E800BLG675.048507017 + 40 m 51 * 59 $-27^{\circ} 45' 59'' 7$ 0.3213.954 -213 MIRA809BLG675.226073717 + 40 m 17 * 79 $-27^{\circ} 06' 07'' 8$ 1.2614.581 -35.7 P811BLG675.142866117 + 39 m 48 * 50 $-27^{\circ} 24' 16'' 0$ 0.5914.668 -43.3 P819BLG675.075613817 + 38 m 56 * 64 $-27^{\circ} 48' 33'' 4$ 0.3616.978 -35 SP829BLG654.264191517 + 37 m 38 * 66 $-29^{\circ} 21' 44'' 8$ 0.4215.767 $ -$ I830BLG653.265249417 + 37 m 29 * 94 $-28^{\circ} 07' 59'' 5$ 0.5813.127 $-$ 8.288E837BLG654.035954517 + 36 m 05 * 70 $-30^{\circ} 18' 16'' 8$ 3.2714.403 $-$ 49.5OSARG845BLG654.035954517 + 36 m 05 * 70 $-30^{\circ} 18' 16'' 8$ 3.2714.403 $-$ 49.5OSARG845BLG654.123031317 + 35 m 37 * 78 $-29^{\circ} 56' 01'' 3$ 1.0014.470 $-$ 17.212P848BLG654.133268117 + 35 m 33 * 43 $-30^{\circ} 17' 44'' 0$ 0.4218.294 $-$ 7.4405SP852 <t< td=""><td>794</td><td>BLG675.03</td><td>22881</td><td>$17^{h}41^{m}42^{s}38$</td><td>-20° $+0^{\circ}$ 57.1° -27° $58'$ $30''$ 3</td><td>0.78</td><td>19 209</td><td></td><td>0.11786</td><td>F?</td></t<> | 794 | BLG675.03 | 22881 | $17^{h}41^{m}42^{s}38$ | -20° $+0^{\circ}$ 57.1° -27° $58'$ $30''$ 3 | 0.78 | 19 209 | | 0.11786 | F? |
| 800BLG673.0585030 $17^{+}41^{-}913.02^{-}27^{+}63^{-}59^{+}7^{-}0.32^{-}13.954^{-}-213^{-}13.127^{-}-213^{-}13.954^{-}-213^{-}13.127^{-}173^{-}13.127^{-}173^{-}13.127^{-}-213^{-}13.127^{-}-213^{-}13.127^{-}173.12^{-}173.12^{-}173.12^{-}173.12^{-}173.12^{-}13.127^{-}173.12^{-}13.127^{-}173.12^{-}13.127^{-}1$ | 796 | BLG675.03 | 73380 | 17 ^h 41 ^m 27 ^s 62 | _27°58′39″2 | 0.48 | 14 229 | _ | 1.06571 | E. F |
| 800BLG673.046001017 40175027 4059.7713.5413571157809BLG675.2260737 $17^{h}40^{m}17^{s}79$ $-27^{\circ}06'07''_{8}$ 1.26 14.581 $ 35.7$ P811BLG675.1428661 $17^{h}39^{m}48^{s}50$ $-27^{\circ}24'16''_{0}$ 0.59 14.668 $ 43.3$ P819BLG675.07 56138 $17^{h}38^{m}56^{s}46$ $-27^{\circ}48'33''_{4}$ 0.36 16.978 $ 35.7$ P829BLG654.2641915 $17^{h}37^{m}38^{s}66$ $-29^{\circ}21'44''_{8}$ 0.42 15.767 $ -$ I830BLG653.26 52494 $17^{h}37^{m}29^{s}94$ $-28^{\circ}07'59'_{5}$ 0.58 13.127 $ 8.288$ E837BLG654.03 59545 $17^{h}36^{m}05^{s}70$ $-30^{\circ}18'16''_{8}$ 3.27 14.403 $ 49.5$ OSARG843BLG654.03 59545 $17^{h}36^{m}05^{s}70$ $-30^{\circ}18'16''_{8}$ 3.27 14.403 $ 49.5$ OSARG845BLG654.12 30313 $17^{h}35^{m}37^{s}78$ $-29^{\circ}29'15''_{0}$ 0.08 16.443 $ 3.158$ P848BLG654.04 55881 $17^{h}35^{m}33^{s}43$ $-30^{\circ}17'44''_{0}$ 0.42 8.294 $ 7.4405$ SP852BLG654.13 32681 $17^{h}35^{m}02^{s}21$ $-30^{\circ}3'54''_{7}$ 0.93 14.742 $ 0.29857$ P853 <td>800</td> <td>BLG675.04</td> <td>85070</td> <td>17^h40^m51^s59</td> <td>$-27^{\circ}45'59''7$</td> <td>0.40</td> <td>13 954</td> <td>_</td> <td>213</td> <td>MIRA</td> | 800 | BLG675.04 | 85070 | 17 ^h 40 ^m 51 ^s 59 | $-27^{\circ}45'59''7$ | 0.40 | 13 954 | _ | 213 | MIRA |
| 801BLG675.12 200737 $17^{+}40^{-}177^{-}27^{-}000778^{-}1000778^{-}1000778^{-}1000778^{-}1000778^{-}1000778^{-}1000778^{-}1000778^{-}1000778^{-}1000778^{-}1000778^{-}1000778^{-}1000078^{-}1000078^{-}1000078^{-}100078^{-}1000078^{-}1000078^{-}1000078^{-}1000078^{$ | 800 | BLG675 22 | 60737 | $17^{h}40^{m}17^{s}79$ | $-27^{\circ}06'07''8$ | 1.26 | 14 581 | _ | 35.7 | P |
| 811BLG675.0756138 $17^{1}37^{1}38^{m}56^{8}46$ $-27^{\circ}48'33''_{*}4$ 0.36 16.978 $ 35$ SP829BLG654.2641915 $17^{h}37^{m}38^{8}06$ $-29^{\circ}21'44''_{*}8$ 0.42 15.767 $ -$ I830BLG653.2652494 $17^{h}37^{m}29^{5}94$ $-28^{\circ}07'59''_{*}5$ 0.58 13.127 $ 8.288$ E837BLG653.19 61176 $17^{h}36^{m}47^{5}64$ $-28^{\circ}22'21''_{*}7$ 2.41 15.714 $ 15.18$ P843BLG654.03 59545 $17^{h}36^{m}05^{s}70$ $-30^{\circ}18'16''_{*}8$ 3.27 14.403 $ 49.5$ OSARG845BLG654.02 2771 $17^{h}35^{m}47^{s}48$ $-29^{\circ}29'15''_{*}0$ 0.08 16.443 $ 3.158$ P847BLG654.12 30313 $17^{h}35^{m}37^{s}78$ $-29^{\circ}56'01''_{*}3$ 1.00 14.470 $ 17.212$ P848BLG654.04 55881 $17^{h}35^{m}33^{s}43$ $-30^{\circ}17'44''_{*}0$ 0.42 18.294 $ 7.4405$ SP852BLG654.13 32681 $17^{h}35^{m}02^{s}21$ $-30^{\circ}03'54''_{*}7$ 0.93 14.742 $ 0.29857$ P853BLG654.13 74975 $17^{h}34m46^{h}24$ $-29^{\circ}26'4''_{*}7$ 0.64145 $ 0.29857$ P853BLG654.13 74975 $17^{h}3m46^{h}46^{h}4$ $-29^{\circ}26'4''_{*}7$ 0.64145 $ 0.29857$ P | 811 | BLG675 14 | 28661 | 17 ^h 39 ^m /8 ^s 50 | $-27^{\circ}24'16''0$ | 0.59 | 14.561 | | 13.3 | P |
| 819BLG654.0641915 $17^{h}37^{m}38^{\circ}06$ $-29^{\circ}21'44''.8$ 0.42 15.767 $ -$ I829BLG653.26 52494 $17^{h}37^{m}38^{\circ}06$ $-29^{\circ}21'44''.8$ 0.42 15.767 $ -$ I830BLG653.26 52494 $17^{h}37^{m}29^{\circ}94$ $-28^{\circ}07'59''.5$ 0.58 13.127 $ 8.288$ E837BLG653.19 61176 $17^{h}36^{m}47^{\circ}64$ $-28^{\circ}22'21''.7$ 2.41 15.714 $ 15.18$ P843BLG654.03 59545 $17^{h}36^{m}05^{\circ}70$ $-30^{\circ}18'16''.8$ 3.27 14.403 $ 49.5$ OSARG845BLG654.12 30313 $17^{h}35^{m}37^{\circ}78$ $-29^{\circ}29'15''.0$ 0.08 16.443 $ 3.158$ P847BLG654.04 55881 $17^{h}35^{m}37^{\circ}78$ $-29^{\circ}56'01''.3$ 1.00 14.470 $ 17.212$ P848BLG654.04 55881 $17^{h}35^{m}33^{\circ}43$ $-30^{\circ}17'44''.0$ 0.42 18.294 $ 7.4405$ SP852BLG654.13 32681 $17^{h}35^{m}02^{\circ}21$ $-30^{\circ}3'54''.7$ 0.93 14.742 $ 0.29857$ P853BLG654.13 74975 $17^{h}34m46^{\circ}94$ $-29^{\circ}26'4''.64''.65$ 0.64 16.1418 0.04405 F | 819 | BLG675.07 | 56138 | 17 ^h 38 ^m 56 ^s 46 | $-27^{\circ}48'33''4$ | 0.35 | 16 978 | | 35 | SP |
| 825BLG651.2652494 $17^{h}37^{m}29^{s}94$ $-28^{\circ}07'59''_{.5}5$ 0.58 13.127 $ 8.288$ E837BLG653.26 52494 $17^{h}37^{m}29^{s}94$ $-28^{\circ}07'59''_{.5}5$ 0.58 13.127 $ 8.288$ E837BLG653.19 61176 $17^{h}36^{m}47^{s}64$ $-28^{\circ}22'21''_{.7}7$ 2.41 15.714 $ 15.18$ P843BLG654.03 59545 $17^{h}36^{m}05^{s}70$ $-30^{\circ}18'16''_{.8}8$ 3.27 14.403 $ 49.5$ OSARG845BLG654.29 2771 $17^{h}35^{m}47^{s}48$ $-29^{\circ}29'15''_{.0}0$ 0.08 16.443 $ 3.158$ P847BLG654.12 30313 $17^{h}35^{m}37^{s}78$ $-29^{\circ}56'01''_{.3}3$ 1.00 14.470 $ 17.212$ P848BLG654.04 55881 $17^{h}35^{m}33^{s}43$ $-30^{\circ}17'44''_{.0}0$ 0.42 18.294 $ 7.4405$ SP852BLG654.13 32681 $17^{h}35^{m}02^{s}21$ $-30^{\circ}03'54''_{.7}7$ 0.93 14.742 $ 0.29857$ P853BLG654.13 74975 $17^{h}34m46^{s}94$ $-29^{\circ}26'1''_{.7}6$ 0.64 15.18 0.1405 E | 829 | BLG654.26 | 41915 | 17 ^h 37 ^m 38 ^s 06 | $-29^{\circ}21'44''$ | 0.42 | 15 767 | _ | _ | I |
| 837BLG653.1961176 $17^{h}36^{m}47^{s}64$ $-28^{\circ}22'21''.7$ 2.41 15.714 $ 15.18$ P843BLG654.0359545 $17^{h}36^{m}05^{s}70$ $-30^{\circ}18'16''.8$ 3.27 14.403 $ 49.5$ OSARG845BLG654.29 2771 $17^{h}35^{m}47^{s}48$ $-29^{\circ}29'15''.0$ 0.08 16.443 $ 3.158$ P847BLG654.12 30313 $17^{h}35^{m}37^{s}.78$ $-29^{\circ}56'01''.3$ 1.00 14.470 $ 17.212$ P848BLG654.04 55881 $17^{h}35^{m}33^{s}43$ $-30^{\circ}17'44''.0$ 0.42 18.294 $ 7.4405$ SP852BLG654.13 32681 $17^{h}35^{m}02^{s}21$ $-30^{\circ}03'54''.7$ 0.93 14.742 $ 0.29857$ P853BLG654.13 74975 $17^{h}34^{m}46^{5}94$ $-29^{\circ}23'1''_{16}$ 0.64 16.118 0.1405 F | 830 | BLG653.26 | 5749/ | 17h37m20s04 | $-28^{\circ}07'59''5$ | 0.58 | 13 127 | _ | 8 288 | Ē |
| 837 BLG654.03 59545 $17^{h}36^{m}05^{s}70$ $-30^{\circ}18'16''.8$ 3.27 14.403 $ 49.5$ OSARG 843 BLG654.03 59545 $17^{h}36^{m}05^{s}70$ $-30^{\circ}18'16''.8$ 3.27 14.403 $ 49.5$ OSARG 845 BLG654.02 2771 $17^{h}35^{m}47^{s}48$ $-29^{\circ}29'15''.0$ 0.08 16.443 $ 3.158$ P 847 BLG654.12 30313 $17^{h}35^{m}37^{s}78$ $-29^{\circ}56'01''.3$ 1.00 14.470 $ 17.212$ P 848 BLG654.04 55881 $17^{h}35^{m}33^{s}43$ $-30^{\circ}17'44''.0$ 0.42 18.294 $ 7.4405$ SP 852 BLG654.13 32681 $17^{h}35^{m}02^{s}21$ $-30^{\circ}03'54''.7$ 0.93 14.742 $ 0.29857$ P 853 BLG654.13 74975 $17^{h}34^{m}46^{5}94$ $-29^{\circ}26'54''.16''.0$ 0.64 5.140 0.1405 E | 837 | BLG653 10 | 61176 | 17 ^h 36 ^m 47 ^s 64 | $-28^{\circ}22'21''7$ | 2 41 | 15 714 | _ | 15.18 | P |
| 845 BLG654.09 2771 $17^{h}35^{m}47^{s}48$ $-29^{\circ}29'15''_{}0$ 0.8 16.443 $ 3.158$ P 847 BLG654.12 30313 $17^{h}35^{m}37^{s}78$ $-29^{\circ}56'01''_{}3$ 10.0 14.470 $ 17.212$ P 848 BLG654.04 55881 $17^{h}35^{m}33^{s}43$ $-30^{\circ}17'44''_{}0$ 0.42 18.294 $ 7.4405$ SP 852 BLG654.13 32681 $17^{h}35^{m}02^{s}21$ $-30^{\circ}03'54''_{}7$ 0.93 14.742 $ 0.29857$ P 853 BLG654.13 74975 $17^{h}3^{m}46^{5}04$ $-29^{\circ}54'21''_{}6$ 0.64 14.518 0.1405 E | 8/2 | BLG055.19 | 505/5 | 17 ^h 36 ^m 05 ^s 70 | _30°18′16″9 | 2.71 | 1/ /02 | _ | 10.10 | OSAPC |
| 847 BLG654.12 30313 $17^{h}35^{m}37^{s}78$ $-29^{\circ}56'01''_{$ | 845 | BLG054.05 | 57545 2771 | 17h35m/7s/12 | $-30^{\circ}10^{\circ}10.8$ | 0.08 | 14.403 | _ | 3 158 | P |
| 847 BLG654.02 50515 $17'55'''55'''''''''''''''''''''''''''''$ | 847 | BLG654.12 | 20313 | 17h35m37s78 | $-29^{\circ}29^{\circ}13.0$ $-29^{\circ}56'01''3$ | 1.00 | 14 470 | _ | 17 212 | I D |
| b b c c c c c c c c c c | 047 849 | BLG054.12 | 55991 | 17h35m22842 | -29 50 01.3 $-30^{\circ}17' 44''0$ | 0.42 | 19.470 | _ | 7 1105 | SD |
| 852 BEG654.13 52001 17 55 02.21 $-50.0554.7 0.75$ 14.742 -0.22007 F | 852 | BLG65/ 12 | 32681 | 17h35m02s21 | $-30^{\circ}03'54''7$ | 0.42 | 14 7/2 | _ | 0.20857 | P |
| | 853 | BLG65/ 12 | 7/075 | 17 ^h 34 ^m 46 ^s 04 | _29°56'31″6 | 0.95 | 16 119 | - | 0.29037 | F |

* OGLE-BLG-RRLYR-03686 (Soszyński et al. 2011a)

Table1

Concluded

| GBS | OGLE-IV | OGLE-IV | RA | DEC | D | Ι | V - I | Р | Remarks |
|-------|-----------|---------|---|---|------|--------|---------|----------|---------|
| ID | Field | No | [2000.0] | [2000.0] | ["] | [mag] | [mag] | [davs] | |
| | | | | [| | 1 | 1 | [| |
| 858 | BLG654.24 | 63566 | 17 ^h 33 ^m 26 ^s 90 | $-29^{\circ}42'11.''7$ | 0.27 | 15.403 | - | 11.174 | SP |
| 869 | BLG648.13 | 45934 | 17 ^h 45 ^m 36 ^s 79 | $-26^{\circ}51'32''_{}7$ | 0.31 | 14.130 | - | 23.81 | SP |
| 877 | BLG504.24 | 106420 | 17 ^h 55 ^m 14.65 | $-27^{\circ}59'01''_{\cdot}4$ | 0.36 | 12.763 | 2.472 | 27.933 | SP |
| 878 | BLG501.24 | 8191 | 17h50m01s72 | -29°42′56″.7 | 0.71 | 15.848 | 1.646 | 0.64616 | E |
| 895 | BLG654.23 | 73640 | 17h34m05s41 | $-29^{\circ}42'43''_{8}$ | 0.81 | 15.979 | _ | 0.42973 | Е |
| 896 | BLG645.03 | 63999 | 17 ^h 58 ^m 12 ^s 28 | $-27^{\circ}21'39''_{\cdot}3$ | 0.77 | 13.707 | _ | 3.8534 | Е |
| 898 | BLG504.29 | 96872 | 17 ^h 57 ^m 28 ^s 81 | $-27^{\circ}33'10''7$ | 0.60 | 14.798 | 3.099 | 44.84 | SP |
| 899 | BLG504.29 | 118157 | 17 ^h 57 ^m 18 ^s 94 | $-27^{\circ}36'08''7$ | 0.34 | 12.976 | 3.020 | 49.751 | SP |
| 901 | BLG504 30 | 59047 | 17 ^h 56 ^m 51 ^s 19 | $-27^{\circ}23'50''6$ | 0.75 | 13 094 | 0.829 | 0 39967 | E |
| 906 | BLG504.31 | 26678 | 17 ^h 56 ^m 16 ^s 81 | $-27^{\circ}26'34''2$ | 0.55 | 13 798 | 2 126 | 0 29347 | SP |
| 907 | BLG504.31 | 59042 | 17 ^h 56 ^m 11 ^s 47 | 27 20 34.2 | 3 13 | 15 710 | 2.120 | 172 4 | SDV |
| 009 | BLG504.23 | 22200 | 17 ^h 56 ^m 10 ^s 20 | -27 52 55.5 | 1.09 | 17.149 | _ | 67.1 | SDV |
| 908 | BL0504.31 | 22399 | 17 50 10.29 | -27 32 30.1 | 1.00 | 17.140 | 2516 | 4 0067 | SUL |
| 909 | BL0304.31 | 20500 | 17 50 09.94 | -273517.5 | 0.42 | 15.909 | 2.310 | 4.0907 | SP |
| 910 | BLG504.23 | 90667 | 17 ^h 56 ^m 07.52 | -27 57 20.4 | 0.23 | 15.288 | 1.947 | 1.24425 | SP |
| 912 | BLG504.31 | 42181 | 1/"56"03.86 | -27°28′33″6 | 0.62 | 15.458 | 2.346 | 0.37699 | P |
| 914 | BLG504.31 | 33921 | 17"55"59:55 | -27°37′44″9 | 0.65 | 13.769 | 0.833 | - | I |
| 915 | BLG504.31 | 58984 | 17 ⁿ 55 ^m 58.61 | $-27^{\circ}29'56''_{$ | 2.29 | 16.630 | 1.647 | 1.1609 | P - |
| 924 | BLG500.17 | 36873 | 17 ⁿ 55 ^m 00.48 | -28°19′56″5 | 0.20 | 13.777 | 1.991 | 77.5 | Р |
| 926 | BLG504.16 | 57832 | 17 ⁿ 54 ^m 49.47 | $-28^{\circ}07'36''_{6}$ | 0.42 | 17.195 | 2.210 | 3.787 | Р |
| 929 | BLG500.17 | 144211 | 17 ^h 54 ^m 30 ^s 83 | $-28^{\circ}33'35''_{}5$ | 0.19 | 16.227 | 1.695 | 0.59379 | SP |
| 930 | BLG500.17 | 151398 | 17 ^h 54 ^m 29 ^s 31 | $-28^{\circ}31'52''_{8}$ | 2.99 | 16.716 | 1.665 | - | Ι |
| 933 | BLG500.09 | 120810 | 17 ^h 54 ^m 05 ^s 77 | $-28^{\circ}48'23.''4$ | 2.27 | 15.607 | 3.306 | _ | Ι |
| 938 | BLG500.09 | 190630 | 17 ^h 53 ^m 52 ^s 05 | $-28^{\circ}44'52''_{}7$ | 1.33 | 13.735 | 0.786 | 2.42096 | E |
| 940 | BLG500.19 | 52204 | 17 ^h 53 ^m 30 ^s 09 | $-28^{\circ}32'47.''7$ | 0.39 | 15.330 | 1.337 | _ | Ι |
| 944 | BLG500.28 | 13 | 17 ^h 52 ^m 54 ^s 34 | $-28^{\circ}16'29.''9$ | 2.48 | 14.334 | 5.269 | 42.02 | SRV |
| 946 | BLG500.11 | 55525 | 17 ^h 52 ^m 52 ^s 63 | $-28^{\circ}48'05.''4$ | 3.22 | 14.142 | 1.975 | 15.03759 | SP |
| 947 | BLG500.03 | 89767 | 17h52m45.16 | -28°59′15″1 | 3.42 | 15.918 | 5.493 | 14.881 | OSARG |
| 948 | BLG500.03 | 100501 | 17 ^h 52 ^m 41.86 | $-29^{\circ}12'52''_{}6$ | 0.36 | 14.925 | 1.430 | 1.9577 | SP |
| 953 | BLG500.21 | 34612 | 17 ^h 52 ^m 03 ^s 78 | $-28^{\circ}33'51''_{1}$ | 0.34 | 15.901 | 1.534 | 1.0989 | SP |
| 955 | BLG500.12 | 106387 | 17 ^h 51 ^m 51 ^s 42 | $-28^{\circ}42'46''_{5}$ | 0.35 | 16.386 | _ | _ | I |
| 964 | BUL SC5 | 172053 | 17 ^h 50 ^m 15 ^s 31 | $-29^{\circ}39'13''8$ | 0.19 | 12.289 | 1.681 | 81.97 | Р |
| 966 | BLG501.15 | 49578 | 17 ^h 49 ^m 42 ^s 67 | $-30^{\circ}02'44''5$ | 1.96 | 16.881 | 3,170 | 9.662 | SP |
| 969 | BLG501.15 | 71683 | 17 ^h 49 ^m 32 ^s 21 | $-30^{\circ}03'50''4$ | 0.60 | 18 335 | _ | 32 154 | P |
| 970 | BLG501.13 | 80876 | 17 ^h 49 ^m 28 ^s 07 | $-29^{\circ}46'29''1$ | 0.70 | 12 504 | 0.970 | - | T |
| 970 | BLG53432 | 100700 | 17 ^h /9 ^m 23 ^s 67 | $-20^{\circ}32'16''2$ | 0.70 | 12.304 | 0.970 | 0 33/09/ | E |
| 073 | BLG501.16 | 60 | 17 ^h /0 ^m 21 ^s 61 | -30° 32 10. 2 | 0.30 | 16.672 | 2 8 3 8 | 10 352 | SD |
| 079 | BLG501.10 | 42282 | 17 49 21.01 17h49m50854 | $-30^{\circ}07^{\prime}39.2$ | 0.45 | 16.675 | 2.030 | 10.552 | D |
| 0.001 | BLG501.25 | 42282 | 17 48 59.54 17h49m54804 | $-29^{\circ}39^{\circ}40.0$ | 0.51 | 15.075 | 1.700 | 01.7 | I D |
| 981 | DLG301.10 | 49089 | 17 ^h 46 ^m 34.94 | -29 34 10.7 | 0.31 | 15.825 | 1.555 | 91.7 | r E |
| 1019 | DLG048.13 | 40390 | 17 ^h 45 ^m 48.35 | $-20^{\circ} 30^{\circ} 30^{\circ} 30^{\circ} 30^{\circ}$ | 0.10 | 10.400 | - | 0.55145 | E CD |
| 1033 | BLG648.31 | 60638 | 1/"45""02.19 | $-26^{\circ}14'49''4$ | 0.23 | 13.104 | - | 54.07799 | SP |
| 1070 | BLG6/5.26 | 56/0/ | 1/"42" 58. /3 | -26°55′01.′′4 | 0.39 | 14.560 | - | 47.17 | SP |
| 1071 | BLG675.01 | 49220 | 17 ⁿ 42 ^m 57.12 | $-27^{\circ}46'30''2$ | 0.55 | 15.767 | - | 37.175 | P _ |
| 1074 | BLG675.26 | 74928 | 1/"42" 52.61 | -26°57′14″1 | 0.96 | 15.156 | _ | 3.1616 | E |
| 1078 | BLG675.19 | 37341 | 17"42 ^m 24.03 | -27°11′57″8 | 2.61 | 16.536 | - | _ | 1 |
| 1086 | BLG675.03 | 34167 | 17 ⁿ 41 ^m 46 ^s 47 | -27°49′54″7 | 0.03 | 16.526 | - | 11.768 | E |
| 1090 | BLG675.11 | 107190 | 17 ⁿ 41 ^m 25.07 | $-27^{\circ}31'43''_{}6$ | 0.67 | 14.827 | - | 49.26 | SP |
| 1104 | BLG675.21 | 104241 | 17 ⁿ 40 ^m 40.67 | $-27^{\circ}08'07.''9$ | 3.88 | 15.119 | - | 109.89 | Р |
| 1110 | BLG675.13 | 40278 | 17 ^h 40 ^m 17.69 | $-27^{\circ}30'57.''1$ | 0.44 | 13.617 | - | 30.612 | E |
| 1112 | BLG675.22 | 79334 | 17 ^h 40 ^m 12.92 | $-27^{\circ}12'35.''7$ | 1.26 | 14.275 | - | 17.699 | SP |
| 1151 | BLG653.01 | 1611 | 17 ^h 37 ^m 55 ^s 27 | $-29^{\circ}10'10''_{\cdot}1$ | 2.67 | 14.616 | _ | 78.125 | SRV |
| 1155 | BLG654.26 | 59596 | 17 ^h 37 ^m 31. ^s 10 | $-29^{\circ}24'28.''8$ | 0.38 | 13.476 | _ | 0.6462 | E |
| 1155 | BLG654.26 | 59618 | 17 ^h 37 ^m 31. ^s 33 | -29°24′28″9 | 3.35 | 15.531 | _ | 56.8 | SRV |

| 1 4 0 1 0 1 | Т | a | b | 1 | e | 1 |
|-------------|---|---|---|---|---|---|
|-------------|---|---|---|---|---|---|

Concluded

| (| GBS ID | OGLE-IV Field | OGLE-IV No | RA [2000.0] | DEC [2000.0] | D ["] | <i>I</i> [mag] | V - I [mag] | P [days] | Remarks |
|---|-----------|------------------|---------------|---|-------------------------------|----------|-------------------|-------------|-------------|---------|
| | | | | L | L | | 1 | 1 | [] | |
| 1 | 1161 | BLG653.19 | 67406 | 17 ^h 36 ^m 45 ^s 56 | -28°34′14″.8 | 3.15 | 15.511 | _ | 94.3 | SRV |
| 1 | 1165 | BLG653.20 | 10600 | 17 ^h 36 ^m 33 ^s .67 | -28°30′03.′′9 | 0.14 | 13.703 | _ | 74.1 | SRV |
| 1 | 1168 | BLG654.03 | 26666 | 17 ^h 36 ^m 27.84 | $-30^{\circ}12'14''_{\cdot}1$ | 0.52 | 13.823 | _ | 65.79 | Р |
| 1 | 1179 | BLG654.11 | 52361 | 17h36m06s21 | $-29^{\circ}55'40''_{}5$ | 2.14 | 15.369 | _ | _ | Ι |
| 1 | 1185 | BLG653.12 | 9604 | 17 ^h 35 ^m 48.65 | $-28^{\circ}47'09''_{\cdot}7$ | 0.94 | 14.880 | _ | 2.1497 | Е |
| 1 | 1187 | BLG653.04 | 7005 | 17h35m45.r3 | $-29^{\circ}08'02''_{}7$ | 2.71 | 15.012 | _ | 16.92 | OSARG |
| 1 | 1194 | BLG654.04 | 62415 | 17h35m27.50 | -30°14′01″3 | 2.51 | 16.015 | _ | 1.91022 | SP |
| 1 | 1208 | BLG654.06 | 16127 | 17 ^h 34 ^m 23. ^s 71 | $-30^{\circ}17'05''_{\cdot}1$ | 0.90 | 14.935 | _ | 24.876 | SP |
| 1 | 1228 | BLG500.03 | 188094 | 17 ^h 52 ^m 31 ^s 10 | $-28^{\circ}58'03''_{\cdot}9$ | 1.58 | 14.929 | 2.458 | 3.4235 | Р |
| 1 | 1229 | BLG500.12 | 106361 | 17 ^h 51 ^m 56 ^s 83 | $-28^{\circ}41'45''_{\cdot}7$ | 0.34 | 14.649 | 1.770 | - | Ι |
| | | | | | | | | | | |

• Italic font entry highlights the counterpart candidates selected from the OGLE-II databases.

• Boldface GBS number highlights the cases when two variable stars are located in the search region.

• Variability type abbreviations: SP – spotted star, OSARG/SRV/MIRA – pulsating giant, E – eclipsing system, P – periodic system, RRLYR – RR Lyr pulsating star, CV – cataclysmic variable, I – irregular star, AGN – active galactic nucleus.

• The same optical counterpart candidates for two close GBS X-ray sources: GBS #16/GBS #515, GBS #303/GBS #304, GBS #483/GBS #1155, GBS #501/GBS #946.

fainter eclipsing system are detected very close to the X-ray position. Only further, preferably spectroscopic, observations may solve the cross-identification ambiguity in this case. However, it may turn out that both these stars are X-ray sources. A one day long flare of ≈ 1 mag amplitude observed on HJD = 2455349.7 and HJD = 2456071.7 in the eclipsing star may indicate stellar activity. On the other hand the light curve of the red giant resembles that of other X-ray binary systems.

There are also four cases where two separate X-rays sources from the GBS catalog point very close to each other (*e.g.*, #16 and #515 are separated by only 3.''3). In such cases the same optical variable stars are selected as potential counterparts to these X-ray sources. Additional observations can resolve the issue of the real connections of the sources in such cases.

Fig. 8 shows the histogram of the angular distances between the OGLE equatorial coordinates of the counterpart candidates and their X-ray positions in $0.^{\prime\prime}$ 1 bins. It is clearly seen that for the vast majority of objects the coincidence of positions is better than $1^{\prime\prime}$. In the remaining cases it is possible that the X-ray coordinates are less accurate or a variable optical candidate is aligned by chance on the sky with the corresponding X-ray source. Conservative selection of the 15 pixel (3.^{''}9) radius ensures high completeness of our search.

Finally, it is worth noticing that in the case of 19 X-ray sources where we did not find any optically variable objects in their neighborhood, the position of the X-ray source points with a high accuracy – better than $0.^{\prime\prime}75$ – to a well separated



Fig. 8. Histogram of the angular distances in the sky between the OGLE and X-ray position of the optical counterpart candidates. The bin size is 0." 1.

| Т | а | b | 1 | e | 2 |
|---|---|---|---|---|---|
| | | _ | _ | _ | _ |

Possible bright non-variable optical counterparts to the X-ray sources detected by the Galactic Bulge Survey

| GBS | OGLE-IV | OGLE-IV | RA | DEC | D | Ι | V-I |
|------|-----------|---------|---|-------------------------------|------|--------|-------|
| ID | Field | No | [2000.0] | [2000.0] | ["] | [mag] | [mag] |
| 88 | BLG654.24 | 96086 | 17h33m08:04 | -29°37′52″.7 | 0.36 | 15.423 | _ |
| 149 | BLG675.27 | 31995 | 17 ^h 42 ^m 26. ^s 78 | $-26^{\circ}47'31''_{\cdot}3$ | 0.57 | 12.636 | - |
| 170 | BLG654.18 | 34390 | 17 ^h 37 ^m 55.18 | $-29^{\circ}35'40''_{\cdot}3$ | 0.13 | 12.980 | - |
| 294 | BLG504.25 | 67635 | 17 ^h 54 ^m 35.37 | $-27^{\circ}44'59''_{\cdot}4$ | 0.49 | 14.041 | 1.783 |
| 393 | BLG654.29 | 66612 | 17h35m30.83 | $-29^{\circ}18'31''_{}9$ | 0.23 | 14.145 | - |
| 403 | BLG500.02 | 184262 | 17h53m06.53 | $-29^{\circ}05'30''_{1}$ | 0.33 | 14.384 | 1.055 |
| 454 | BLG648.23 | 8019 | 17h45m25s15 | $-26^{\circ}39'08''_{}0$ | 0.49 | 12.490 | - |
| 631 | BLG653.05 | 53272 | 17 ^h 34 ^m 43.92 | -29°09′49″.7 | 0.60 | 13.521 | _ |
| 646 | BLG654.30 | 12088 | 17h35m06.17 | $-29^{\circ}21'12''_{\cdot}1$ | 0.36 | 13.802 | _ |
| 662 | BLG504.22 | 107804 | 17 ^h 56 ^m 42.18 | $-27^{\circ}45'54''_{\cdot}3$ | 0.10 | 13.144 | 1.859 |
| 675 | BLG500.17 | 150996 | 17 ^h 54 ^m 34.00 | $-28^{\circ}32'19''.7$ | 0.36 | 13.360 | 0.906 |
| 773 | BLG648.16 | 12494 | 17 ^h 44 ^m 01 ^s 99 | $-26^{\circ}50'49''_{}7$ | 0.75 | 13.285 | - |
| 880 | BLG501.16 | 47309 | 17 ^h 49 ^m 00:89 | $-29^{\circ}54'32''_{8}$ | 0.22 | 13.102 | 0.794 |
| 967 | BLG534.32 | 76738 | 17 ^h 49 ^m 37.15 | $-30^{\circ}32'57''_{\cdot}8$ | 0.34 | 13.074 | 0.719 |
| 1045 | BLG648.32 | 45146 | 17 ^h 44 ^m 29.95 | $-26^{\circ}19'49''_{}5$ | 0.29 | 15.861 | - |
| 1049 | BLG648.16 | 1014 | 17 ^h 44 ^m 08.94 | $-26^{\circ}59'58''_{}6$ | 0.35 | 15.554 | - |
| 1123 | BLG675.06 | 51526 | 17 ^h 39 ^m 38.91 | $-27^{\circ}43'56''_{}5$ | 0.15 | 16.286 | - |
| 1200 | BLG654.22 | 10352 | 17h35m13.17 | -29°40′23.″8 | 0.27 | 14.655 | - |
| 1209 | BLG654.31 | 13876 | 17 ^h 34 ^m 23.62 | $-29^{\circ}21'55.''0$ | 0.67 | 13.471 | - |
| | | | | | | | |

star brighter than 16.5 mag. Therefore, it is very likely that these stars may also be potential optical counterparts. As can be seen from the light curves in the OGLE X-ray optical counterparts monitoring system, XROM (Udalski 2008), many optical counterparts to the X-ray sources can be optically quiet for years. Table 2 lists these potential non-variable optical counterparts to the X-ray sources.

Table 1 can be a good starting point for further follow-up observations of the selected optical counterparts. In particular extracting new low-mass and massive X-ray binaries would be of great importance for further studies of these objects in the Galactic center environment. We plan to include a subsample of the most interesting objects presented here to the list of objects monitored regularly by the OGLE XROM system (Udalski 2008). This can facilitate follow-up observations providing information on the current optical behavior of the observed objects.

5. Data Availability

The OGLE-IV photometric data presented in this paper are available to the astronomical community from the OGLE Internet Archive:

http://ogle.astrouw.edu.pl ftp://ftp.astrouw.edu.pl/ogle4/XRAY-GBS/

Usage of the data is allowed under the proper acknowledgment to the OGLE project.

Acknowledgements. The OGLE project has received funding from the European Research Council under the European Community's Seventh Framework Programme (FP7/2007-2013)/ERC grant agreement No. 246678 to AU.

REFERENCES

Alard, C., and Lupton, R. 1998, ApJ, 503, 325. Alard, C. 2000, A&AS, 144, 363. Coe, M.J., Edge, W.R.T., Galache, J.L., and McBride, V.A. 2005, MNRAS, 356, 502. Engle, S.G., and Guinan, E.F. 2012, Journal of Astronomy and Space Sciences, 29, 181. Jonker, P.G., et al. 2011, ApJS, 194, 18. Kozłowski, S., et al. 2012, ApJ, 746, 27. Martí, J., Mirabel, I.F., Chaty, S., and Rodriguez, L.F. 1998, A&A, 330, 72. Pojmański, G. 2002, Acta Astron., 52, 397. Schwarzenberg-Czerny, A. 1989, MNRAS, 241, 153. Soszyński, I., et al. 2011a, Acta Astron., 61, 1. Soszyński, I., et al. 2011b, Acta Astron., 61, 217. Szymański, M.K., Udalski, A., Soszyński, I., Kubiak, M., Pietrzyński, G., Poleski, R., Wyrzykowski, Ł., and Ulaczyk, K. 2011, Acta Astron., 61, 83. Udalski, A., Kubiak, M., and Szymański, M. 1997, Acta Astron., 47, 319. Udalski, A. 2003, Acta Astron., 53, 291. Udalski, A. 2008, Acta Astron., 58, 187. Watson, M.G., et al. 2009, A&A, 493, 339.

Wozniak, P.R. 2000, Acta Astron., 50, 421.