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# New Variable Stars Discovered Using the Tzec Maun Observatory Telescopes

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| # | Name | Other | Coord (J2000) | Type | Max | Min | System | Period | Epoch (JD) | type | Sp | Comment | L.Curve | Find.Chart | Data |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | GSC 1031-00478, USNO-B1.0 1025-0401150 | 18 28 27.10, +12 30 13.6 | EB | 13.30 | 13.65 | v | 0.7907 | 2454653.6432 | min | | | tm1.png | tm1_chart.png | tm1.txt |
| 2 | | USNO-B1.0 1021-0391794 | 18 24 47.83, +12 11 16.6 | EW | 13.20 | 13.50 | v | 0.4189 | 2454619.7449 | min | | | tm2.png | tm2_chart.png | tm2.txt |
| 3 | | USNO-B1.0 1025-0399971 | 18 27 36.66, +12 32 07.2 | EA | 14.60 | 16.20 | v | 0.78056 | 2454649.6647 | min | | | tm3.png | tm3_chart.png | tm3.txt |
| 4 | | GSC 1031-01061, USNO-B1.0 1025-0401511 | 18 28 42.41, +12 34 28.6 | EB | 13.25 | 13.65 | v | 0.86027 | 2454615.8360 | min | | | tm4.png | tm4_chart.png | tm4.txt |
| 5 | | USNO-B1.0 1021-0391572 | 18 24 39.14, +12 11 43.4 | EW | 14.90 | 15.35 | v | 0.38467 | 2454608.9220 | min | | | tm5.png | tm5_chart.png | tm5.txt |
| 6 | | USNO-B1.0 1018-0379804 | 18 27 49.48, +11 51 50.4 | EA | 15.35 | 16.20 | v | 0.9596 | 2454610.956 | min | | | tm6.png | tm6_chart.png | tm6.txt |
| 7 | | USNO-B1.0 1024-0399198 | 18 25 18.01, +12 28 34.2 | EW | 15.65 | 16.10 | v | 0.58353 | 2454607.9178 | min | | | tm7.png | tm7_chart.png | tm7.txt |
| 8 | | USNO-B1.0 1020-0388501 | 18 24 44.38, +12 05 36.9 | RRAB | 15.80 | 16.90 | v | 0.55129 | 2454608.9035 | max | | | tm8.png | tm8_chart.png | tm8.txt |
| 9 | | USNO-B1.0 1024-0399663 | 18 25 37.02, +12 25 51.9 | LB: | 12.80 | 13.30 | v | | | other | | | tm9.png | tm9_chart.png | tm9.txt |

## Comments:

1. MinII = 13.55. TOA150 observations are added. 2. MinII = 13.45. 3. MinII = 14.90. 4. The star is near the edge of the frame. Imperfectly corrected vignetting noticeably decreases photometric precision. The star is outside the field of view of many AP206 images. TOA150 observations are added. 5. MinII = 15.30. 6. MinII = 15.45. TOA150 observations are added. 7. MinII = 16.0. 8. The star is too faint to be measured on available TOA150 images. 9. 2MASS 18253699+1225521, NSVS 10964768, ASAS 182537+1225.8. 2MASS photometry: J = 7.493+/-0.024, H = 6.600+/-0.024, Ks = 6.187+/-0.026. Our lightcurve, as well as the NSVS data (Wozniak et al. 2004b), show slow irregular light variations. However, we cannot rule out semiregular variations (type SR). Infrared colors do not contradict any of these options (Wozniak et al. 2004a, Schultheis et al. 2004). The All Sky Automated Survey (ASAS-3, Pojmanski 2002) contains 171 V-band measurements of the star (2002.09.09 - 2008.08.31), but the star is too faint for a reliable detection of variability in this dataset. The mean V magnitude measured by ASAS is 14.18, with an r.m.s scatter of 0.34 mag, consistent with the peak-to-peak amplitude of 0.5 mag derived from our observations. The difference in the mean magnitudes derived from ASAS, NSVS, and our unfiltered observations is due to the extremely red color of the star and not to slow large-scale light variations.

## Remarks:

We present 9 new variable stars found during follow-up observations of the recently discovered eclipsing binary with a Cepheid component ASAS 182611+1212.6 (Antipin et al. 2007). The observations were conducted over 25 nights from May 19 to August 4, 2008 using the remotely controlled apochromatic refractor AP206 (D = 206 mm, F = 1620 mm) of the Tzec Maun Observatory (New Mexico, USA) equipped with an unfiltered SBIG STL-11000 CCD camera. Additional observations were conducted on August 6, 2008 using another remotely controlled instrument of the Tzec Maun Observatory - the apochromatic refractor TOA150 (D = 150 mm, F = 1095 mm) located at Pingelly, Western Australia. TOA150 was equipped with a similar unfiltered SBIG STL-11000 CCD camera. The less precise TOA150 photometry was combined with AP206 data for stars where additional time coverage could significantly improve the period. For other stars, only AP206 observations were used.

Star detection, aperture photometry and variability search were conducted using VaST software (http://saistud.sai.msu.ru/vast/) which is based on SExtractor software (Bertin and Arnouts 1996).

The zero point of our instrumental magnitude scale was calibrated assuming V = 11.914 mag for GSC 1031-01796 (18:26:09.43, +12:17:37.0, 2000.0), the star suggested as a comparison star for ASAS 182611+1212.6 by the AAVSO. We use the V magnitude to calibrate our unfiltered photometry because the STL-11000 camera incorporates a blue-sensitive chip which reaches maximum quantum efficiency at around 500 nm. Thus, our photometric system is instrumental v. Since both telescopes were equipped with the same type of CCD, no additional zero-point corrections were necessary to match TOA150 and AP206 observations.

The coordinates were taken from the GSC 1.2 (Morrison et al. 2001) or USNO-B1.0 (Monet et al. 2003) catalogues.

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