

FOUR NEW VARIABLE STARS DISCOVERED IN AURIGA DURING NORTHERN SKY SURVEY

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Abstract: This paper describes the discovery of four new variable stars in Auriga. These are three binary systems and a pulsating star discovered between 2012 and 2016, included in the Variable Star Index, but only now published due to a lack of time. I encourage all observers to observe these stars further, to characterise them better.

1 Introduction

In this paper, I present the results of a discovery of four new variable stars between 2012 and 2016 during a scheduled northern sky surveillance session at the Astronomical Observatory “Nastro Verde” of Sorrento.

2 Observation – theoretical background of the used methods

All the observations have been made between 2012 and 2016 using a Schmidt Cassegrain Telescope 0.25m f/10 with focal reducer (f/6.3) and a CCD Sbig ST-7 and Sbig ST8. All observations are unfiltered. The new variable stars were searched with the Muniwin software, and the differential photometry was done with Maxim DL. The light curve and the calculation of its main parameters were done with Peranso. The light curve and the calculation of its main parameters were done with Peranso. For calculating periods, I used CLEANest, which is a sophisticated algorithm of the Peranso period analysis software.

Table 1. Main information and results for the new variables discovered

Star (VSX identifier)	R.A. (J2000) h m s	Dec. (J2000) ° ' "	Const.	V	Period (days)	Epoch (HJD)	Type
2MASS J05511976+3105581	05 51 19.76	+31 05 58.0	Aur	15.44 - 15.75	0.280433	2456709.51652 +/- 0.00001	EW
2MASS J05463084+3150158	05 46 30.84	+31 50 15.8	Aur	17.1 – 17.43	0.388889	2457003.563 +/- 0.001	EW
UCAC4 609-022916	05 45 52.25	+31 42 20.0	Aur	14.63 – 15.05	1.6736	2457010.6304 +/- 0.001	EA
UCAC4 609-023099	05 46 32.95	+31 42 35.9	Aur	15.36 – 15.46	0.1156	2457003.4479+ /- 0.0001	DSCT

2.1. 2MASS J05511976+3105581

2MASS J05511976+3105581 is an EW star with a period of 0.280433 d (6.7304 h) and an amplitude of about 0.31 magnitude between 15.44 and 15.75 V. In Figure 1, the light curve is phased with the main period of the binary, and in Figure 2, it is possible to see the field from Aladin with the new variable star marked with a cross in the centre.

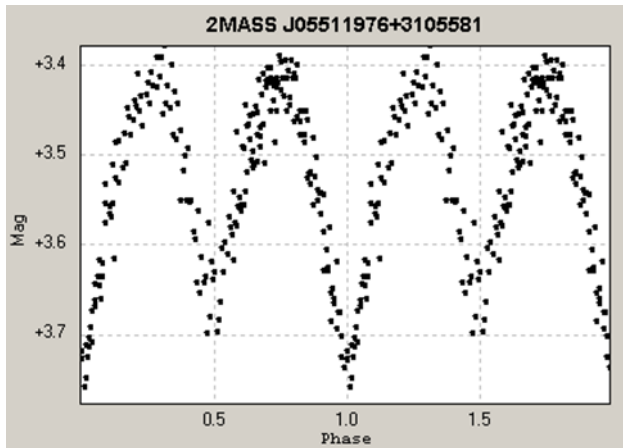


Figure 1. Light curve of 2MASS J05511976+3105581



Figure 2. Field from Aladin 2MASS J05511976+3105581

2.2. 2MASS J05463084+3150158

2MASS J05463084+3150158 is an EW star with a period of 0.388889 d (9.3333 h) and an amplitude of about 0.33 magnitude between 17.1 and 17.43 V. In Figure 3, the light curve is phased with the main period of the binary, and in Figure 4, it is possible to see the field from Aladin with the new variable star marked with a cross in the centre.

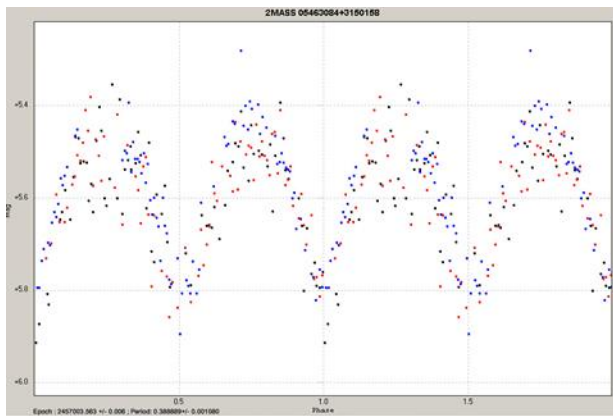


Figure 3. Light curve of 2MASS J05463084+3150158

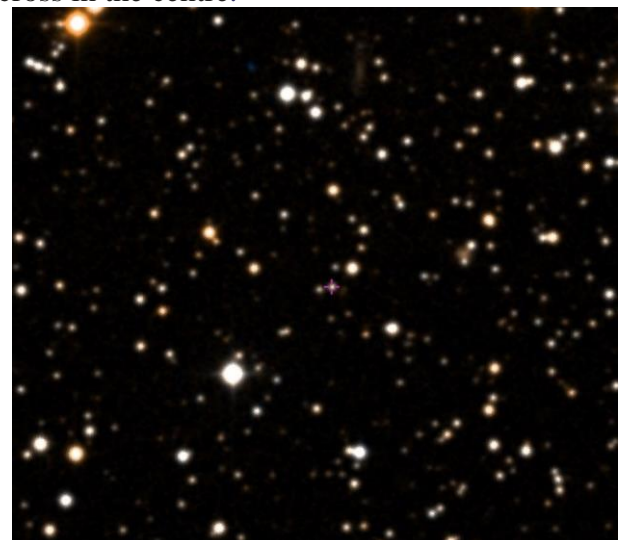


Figure 4. Field from Aladin 2MASS J05463084+3150158

2.3. UCAC4 609-022916

UCAC4 609-022916 is an EA star with a period of 1.6736 d and an amplitude of about 0.42 magnitude between 14.63 and 15.05 V. In Figure 5, the light curve is phased with the main period of the binary, and in Figure 6, it is possible to see the field from Aladin with the new variable star marked with a cross in the centre.

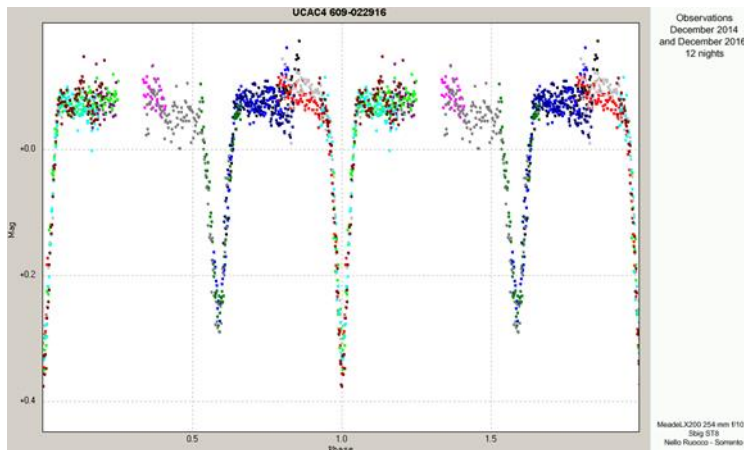


Figure 5. Light curve of UCAC4 609-022916

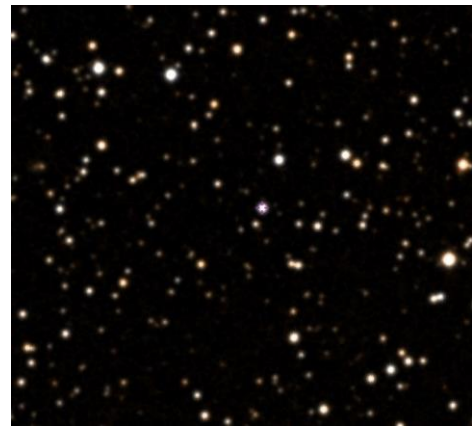


Figure 6. Field from Aladin UCAC4 609-022916

2.4. UCAC4 609-023099

UCAC4 609-023099 is a delta Scuti star with a period of 0.10229 day (2.455 h) and an amplitude of about 0.10 magnitude between 15.36 and 15.46 V. In Figure 7, the light curve is phased with the main period of the pulsator, and in Figure 8, it is possible to see the field from Aladin with the new variable star marked with a cross in the centre.

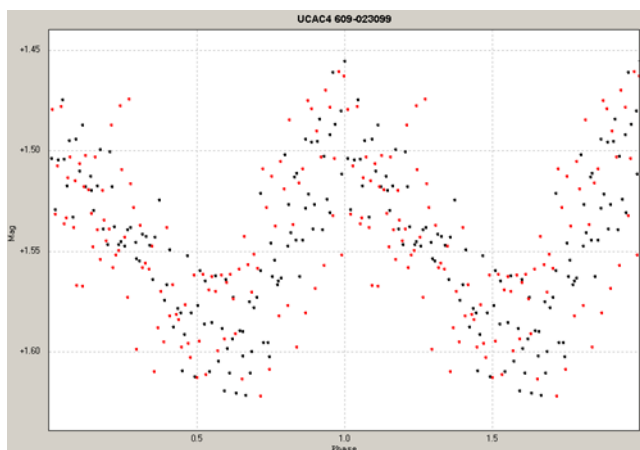


Figure 5. Light curve of UCAC4 609-023099

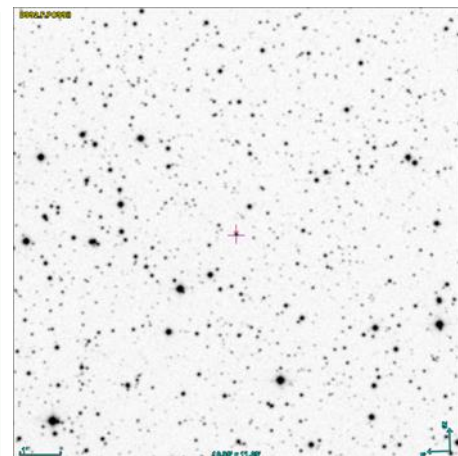


Figure 6. Field from Aladin UCAC4 609-023099

3 Results

Table 1 summarises the main parameters for the three new variables. Each can easily be found in the AAVSO VSX database through its identifier, as it appears in the first column. In the table, Epoch means the time of maximum brightness for pulsating stars and the time of primary minimum for eclipsing binaries.

Acknowledgements:

Many thanks to Fabio Salvalaggio & Massimo Banfi for helping in the determination period of UCAC4 609- 022916

After my discovery, these stars have also been seen and reported by the Atlas, SuperWasp and ASAS-SN surveys and reported in the following publications:

- A) 2MASS J05511976+3105581 – Skarka et al. 2017 OEJV 185, also LC in ASAS-SN Survey
- B) 2MASS J05463084+3150158 - Heinze et al, 2018 AJ, 156, 241 (ATLAS Survey)
- C) UCAC4 609-022916 - Heinze et al, 2018 AJ, 156, 241 (ATLAS Survey), Zasche et al. 2018, A&A, 619, A85, SuperWASP Survey, ASAS-SNSurvey
- D) UCAC4 609-023099 - Heinze et al, 2018 AJ, 156, 241 (ATLAS Survey)

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