

1.88m Telescope



KAO

Ministry of Scientific Research
National Research Institute of
Astronomy and Geophysics (NRIAG)
Helwan, Cairo, Egypt
Kottamia Astronomical Observatory
(KAO)



Report for New Variable Star Discovery

KAO-EGYPT J214216.38+440015.1

New Variable Star Discovery

Report Date: 17 November 2016

Observer and affiliation:

M. A. El-Sadek, A. Essam, G. M. Hamed and M. Shaban

National Research Institute of Astronomy and Geophysics (NRIAG)

Astronomy Department, Kottamia Astronomical Observatory (KAO), 1.88m reflector telescope.
(80 km east of Cairo)

11421 Helwan, Cairo, Egypt

sadek2001eg@yahoo.com, essam60@yahoo.com,

Remark: Detected in the FoV of the star NOVA Cyg 1978

The observations have been carried out over two nights (27&28/9/2016)

VARIABLE: KAO-EGYPT J214216.38+440015.1

RA(J2000)	Dec(J2000)	Type	V_{mag}	Period	Epoch
21 42 16.38	+44 00 15.1	EW	16.44-16.65	0.3686 ^d	2457659.3084

❖ Cross-identification(s):

UCAC4 671-102307

2MASS J21421638+4400149

GSC2.3 N2U5038884

❖ From **The UCAC4 Catalogue (Zacharias+, 2012)**

$\alpha_{2000} = 21\ 42\ 16.381 = 325.5682556$, $\delta_{2000} = +44\ 00\ 15.11 = +44.0041981$

❖ From **APASS Data Release 9 Query Results**

Notes are available at the bottom of the table.

RA	RAerr*	Dec.	Dec. err*	# of Obs.	Johnson V	Verr	Johnson B	Berr	Sloan g'	g'err	Sloan r'	r'err	Sloan i'	i'err
325.582727	1.467	44.011456	0.828	3	16.507	0.064	17.391	0.236	16.873	-0	16.182	-0	NA	NA

COMPARISON (C): UCAC4 671-102321

❖ Cross-identification(s):

2MASS J21421846+4401029

GSC2.3 N2U5039746

❖ From **The UCAC4 Catalogue (Zacharias+, 2012)**

$\alpha_{2000} = 21\ 42\ 18.469 = 325.5769542$, $\delta_{2000} = +44\ 01\ 02.96 = +44.0174900$

❖ **From APASS Data Release 9 Query Results**

Notes are available at the bottom of the table.

RA	RAerr*	Dec.	Dec. err*	# of Obs.	Johnson V	Verr	Johnson B	Berr	Sloan g'	g'err	Sloan r'	r'err	Sloan i'	i'err
325.576895	0.697	44.017261	0.416	7	14.325	0.027	15.526	0.043	14.897	0.041	13.92	0.028	13.458	0.051

CHECK (K): UCAC4 671-102320

❖ **Cross-identification(s):**

2MASS J21421810+4400441

GSC2.3 N2U5039379

❖ **From The UCAC4 Catalogue (Zacharias+, 2012)**

$\alpha_{2000} = 21\ 42\ 18.102 = 325.5754248$, $\delta_{2000} = +44\ 00\ 44.26 = +44.0122950$

1. OBSERVATIONS

- ❖ All the photometric observations have been carried out by using the EEV CCD 42-40 camera with a format of 2048*2048 pixels, cooled by liquid nitrogen attached on the Newtonian focus of the 1.88m Kottamia reflector telescope in **Kottamia Astronomical Observatory (KAO)**, Egypt.
- ❖ The location of Kottamia Astronomical Observatory (KAO) as follows:
Latitude: 29° 56' 02.43" N
Longitude: 31° 49' 40.10" E
Height: 467 m
- ❖ Our main target was studying variability of short period NOVA Cyg 1978 by observed in V, R and I filter. Through the observations we found a new variable star which identified in UCAC4 catalog as UCAC4 671-102307. Table 1 demonstrate coordinate of the new discovered variable (V2), comparison(C), and check star (K). Figure 1 show the finding chart which having the position of the new variable (V2), comparison (C), and check (K) stars.

Table 1: Coordinates and magnitude of variable, Comparison, and Check stars

Star	ID in UCAC4 Catalog	R.A	Dec
Variable (V2)	671-102307	21 42 16.381	+44 00 15.11
Comparison (C)	671-102321	21 42 18.469	+44 01 02.96
Check (K)	671-102320	21 42 18.102	+44 00 44.26

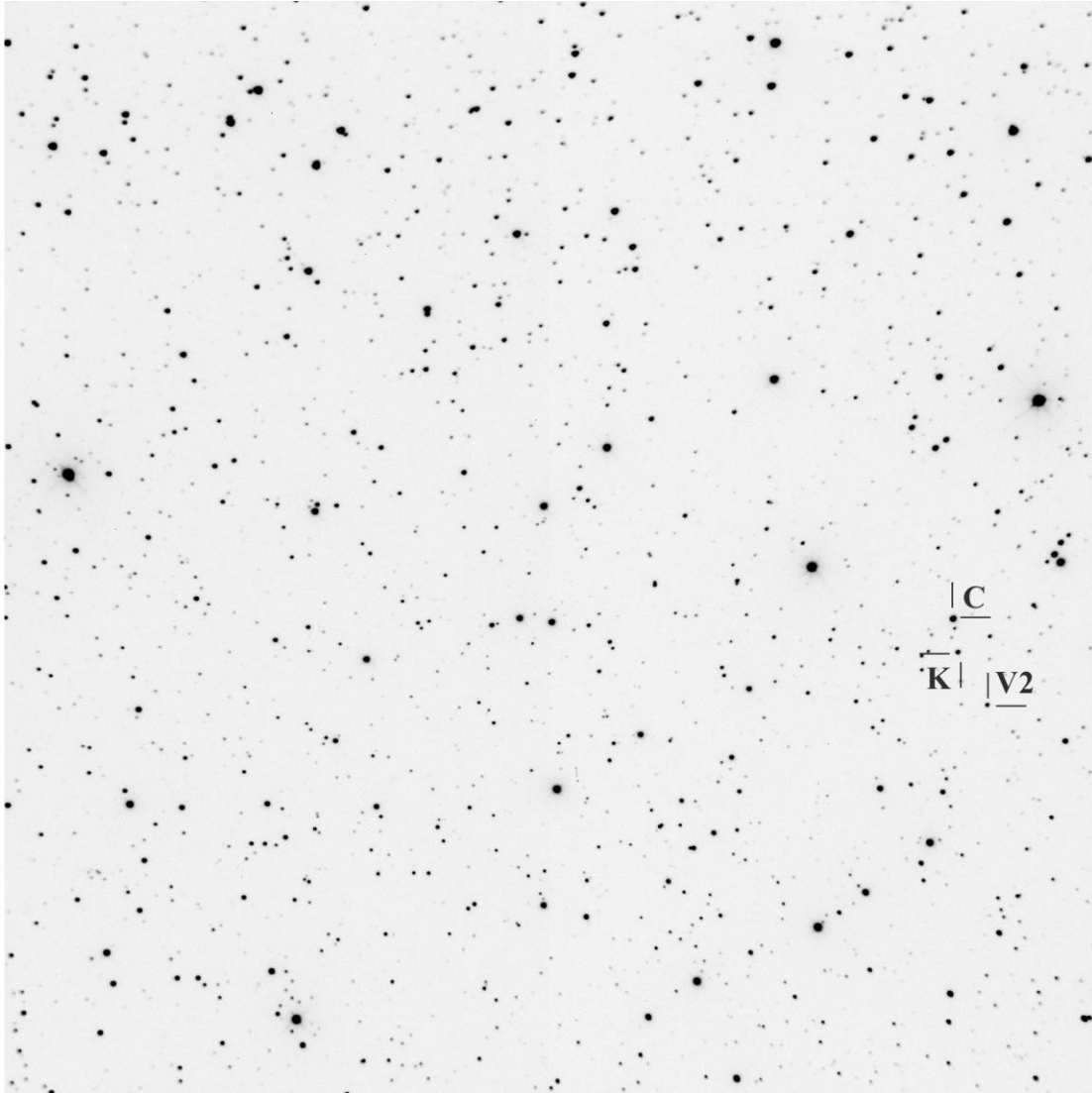


Figure 1. Finding chart which having the new Variable (V2), Comparison (C), and Check (K) stars.

1. PERIOD AND EPOCH OF THE NEW VARIABLE.

- ❖ The Epoch of primary minimum and period had determined using the Peranso software Version 2.50 CBA Belgium Observatory (2011) as shown in Table 2.

Table 2: Epoch and Period of the new discovered variable star UCAC4 479-113658

Object	Epoch HJD (Min I)	Period
UCAC4 671-102307	2457659.3084	0.3686 ^d

- ❖ Using the Epoch and the Period in Table 2 to determined the new ephemeris as follows:

$$\text{HJD. (Min. I)} = 2457659.3084 + 0.3686^d \times E \quad (1)$$

Where E is the integer cycle.

- ❖ Using ephemeris in eq. 1, we determine the phase of our observation as shown in Fig (2).

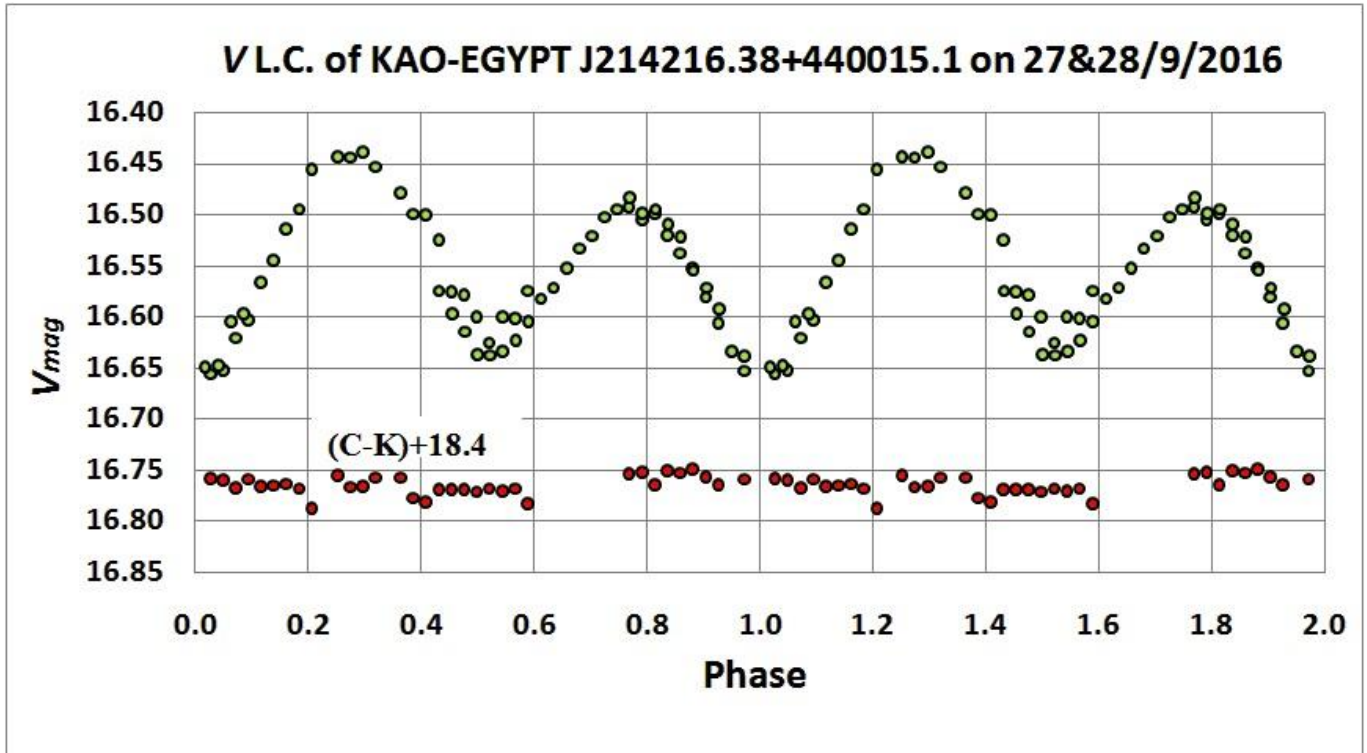


Figure 2. The new discovered variable star KAO-EGYPT J214216.38+440015.1 = UCAC4 671-102307 with the [(C-K)+18.4] values in V filter

Notes:

- The system shows slightly different maximum height which indicate that we have an O'Connell effect.
- Min II = 16.63 V

Data File for V Filter

#	HJD	V-C	S
2457659.2183	2.167	0.006	
2457659.2266	2.179	0.006	
2457659.2349	2.174	0.006	
2457659.2431	2.195	0.006	
2457659.2514	2.213	0.007	
2457659.2598	2.227	0.007	
2457659.2682	2.256	0.007	
2457659.2765	2.282	0.009	
2457659.2932	2.328	0.008	
2457659.3135	2.331	0.007	
2457659.3217	2.328	0.007	
2457659.3300	2.296	0.006	
2457659.3383	2.278	0.006	
2457659.3466	2.241	0.006	
2457659.3548	2.220	0.006	
2457659.3632	2.188	0.005	
2457659.3715	2.170	0.006	
2457659.3798	2.131	0.007	
2457659.3964	2.119	0.005	
2457659.4047	2.119	0.005	

2457659.4129	2.114	0.006
2457659.4212	2.128	0.006
2457659.4378	2.153	0.007
2457659.4460	2.174	0.007
2457659.4543	2.175	0.007
2457659.4626	2.199	0.008
2457659.4709	2.250	0.008
2457659.4791	2.253	0.008
2457659.4874	2.275	0.008
2457659.4956	2.300	0.009
2457659.5040	2.275	0.009
2457659.5123	2.276	0.009
2457659.5205	2.249	0.010
2457660.2001	2.249	0.006
2457660.2084	2.272	0.005
2457660.2167	2.289	0.006
2457660.2250	2.312	0.006
2457660.2333	2.313	0.005
2457660.2417	2.308	0.005
2457660.2501	2.298	0.005
2457660.2584	2.280	0.005
2457660.2667	2.257	0.005
2457660.2749	2.246	0.005
2457660.2833	2.227	0.005
2457660.2915	2.208	0.004
2457660.2998	2.196	0.004
2457660.3081	2.178	0.004
2457660.3164	2.170	0.004
2457660.3247	2.158	0.005
2457660.3329	2.173	0.004
2457660.3413	2.170	0.004
2457660.3495	2.184	0.004
2457660.3578	2.196	0.005
2457660.3661	2.229	0.005
2457660.3745	2.247	0.005
2457660.3828	2.268	0.005
2457660.3912	2.309	0.006
2457660.3995	2.313	0.006
2457660.4161	2.324	0.006
2457660.4244	2.322	0.007
2457660.4327	2.280	0.007
2457660.4410	2.272	0.010

Submitted By
Mohammed El-Sadek