

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 J214258.21+440520.2

New Variable Star Discovery

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Observer and affiliation:

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

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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 J214258.21+440520.2

RA(J2000)	Dec(J2000)	Type	$V_{mag.}$	Period	Epoch
21 42 58.212	+44 05 20.21	EW	13.65-14.10	0.617898 ^d	2457660.4129±0.0012

❖ **Cross-identification(s):**

UCAC4 671-102525

2MASS J21425823+4405199

GSC2.3 N2U5044311

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

$\alpha_{2000} = 21\ 42\ 58.234 = 325.7426403$, $\delta_{2000} = +44\ 05\ 19.74 = +44.0888159$

❖ **From The AAVSO Photometric All Sky Survey (APASS) DR9 (Henden+, 2016)**

$\alpha_{2000} = 21\ 42\ 58.212 = 325.742549$, $\delta_{2000} = +44\ 05\ 20.21 = +44.088947$

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

Notes are available at the bottom of the table.

RA	RA _{err} *	Dec.	Dec. _{err} *	# of Obs.	Johnson V	V _{err}	Johnson B	B _{err}	Sloan g'	g' _{err}	Sloan r'	r' _{err}	Sloan i'	i' _{err}
325.742549	0.626	44.088947	0.643	8	13.724	0.077	14.431	0.063	14.011	0.036	13.507	0.092	13.229	0.078

COMPARISON (C): UCAC4 671-102430

❖ **Cross-identification(s):**

2MASS J21424045+4401528

GSC2.3 N1Y0037095

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

$$\alpha_{2000} = 21\ 42\ 40.450 = 325.6685436, \delta_{2000} = +44\ 01\ 52.88 = +44.0313567$$

- ❖ From [The AAVSO Photometric All Sky Survey \(APASS\) DR9 \(Henden+, 2016\)](#)

$$\alpha_{2000} = 21\ 42\ 40.420 = 325.668416, \delta_{2000} = +44\ 01\ 52.64 = +44.031290$$

- ❖ 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
325.668416	0.585	44.03129	0.282	8	13.779	0.02	14.466	0.062	14.064	0.035	13.584	0.014	13.38	0.052

CHACK (K): UCAC4 671-102408

- ❖ **Cross-identification(s):**

[2MASS J21423765+4404427](#)

[GSC2.3 N2U5043480](#)

- ❖ From [The UCAC4 Catalogue \(Zacharias+, 2012\)](#)

$$\alpha_{2000} = 21\ 42\ 37.652 = 325.6568824, \delta_{2000} = +44\ 04\ 42.68 = +44.0785220$$

- ❖ From [The AAVSO Photometric All Sky Survey \(APASS\) DR9 \(Henden+, 2016\)](#)

$$\alpha_{2000} = 21\ 42\ 37.623 = 325.656764, \delta_{2000} = +44\ 04\ 42.03 = +44.078343$$

- ❖ From [The 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
325.656764	0.661	44.078343	0.448	8	14.244	0.028	15.337	0.029	14.744	0.032	13.878	0.032	13.46	0.064

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 filters. Through the observations we found a new variable star which identified in UCAC4 catalog as UCAC4 671-102525. Table 1 demonstrate coordinate of the new discovered variable (V1), comparison(C), and check star (K). Figure 1 shows the finding chart which having the position of the new variable (V1), 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 (V)	671-102525	21 42 58.234	+44 05 19.74
Comparison (C)	671-102430	21 42 40.450	+44 01 52.88
Check (K)	671-102408	21 42 37.652	+44 04 42.68

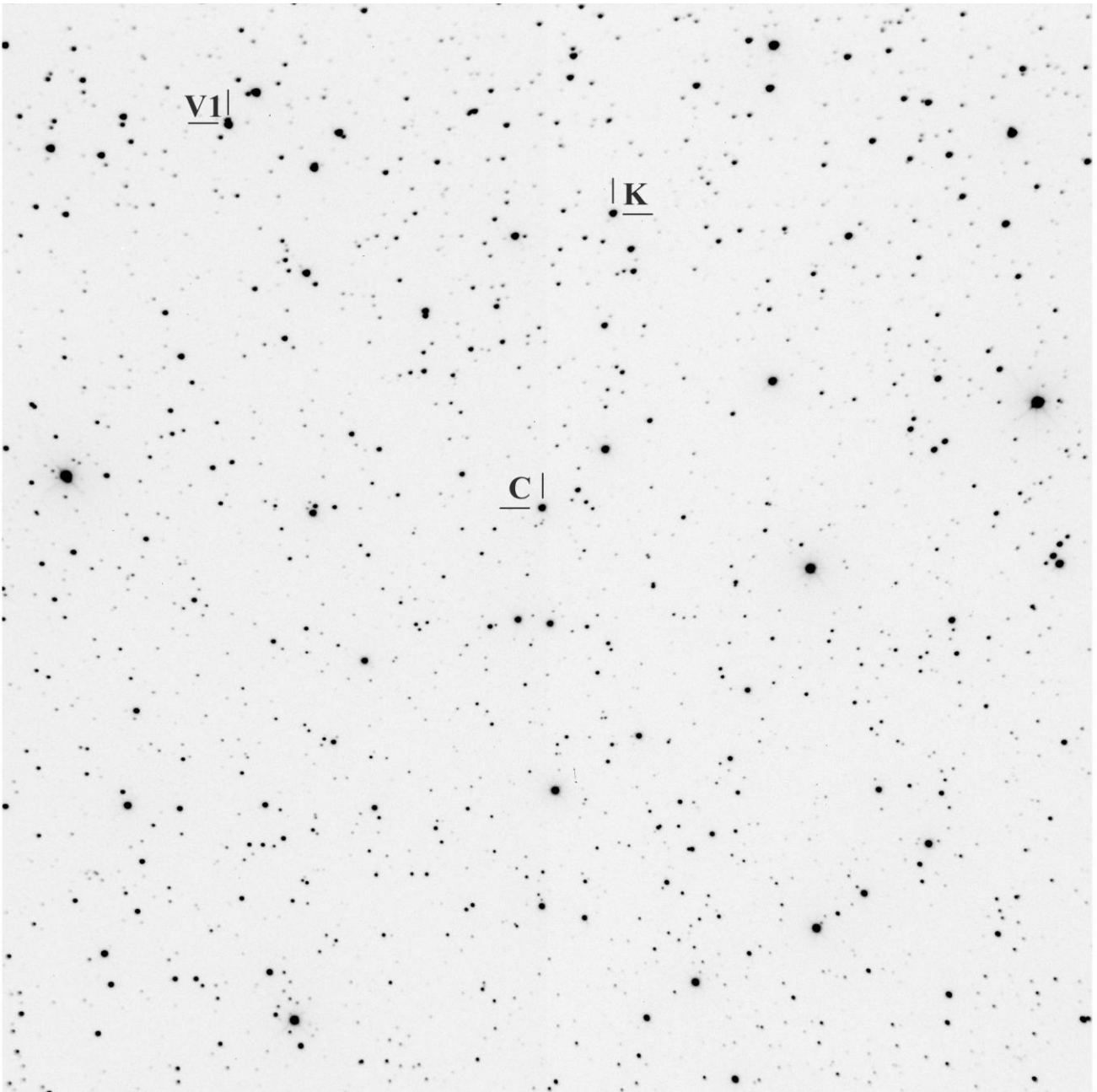


Figure 1. Finding chart which having the new Variable (V1), Comparison (C), and Check (K) stars.

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 479-113658	2457660.4129±0.0012	0.617898 ^d

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

❖ Ephemeris of the new discovered variable star is shown in table 2.

$$\text{HJD. (Min. I)} = 2457660.4129 \pm 0.0012 + 0.617898^d \times E \quad (1)$$

Where E is the integer cycle.

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

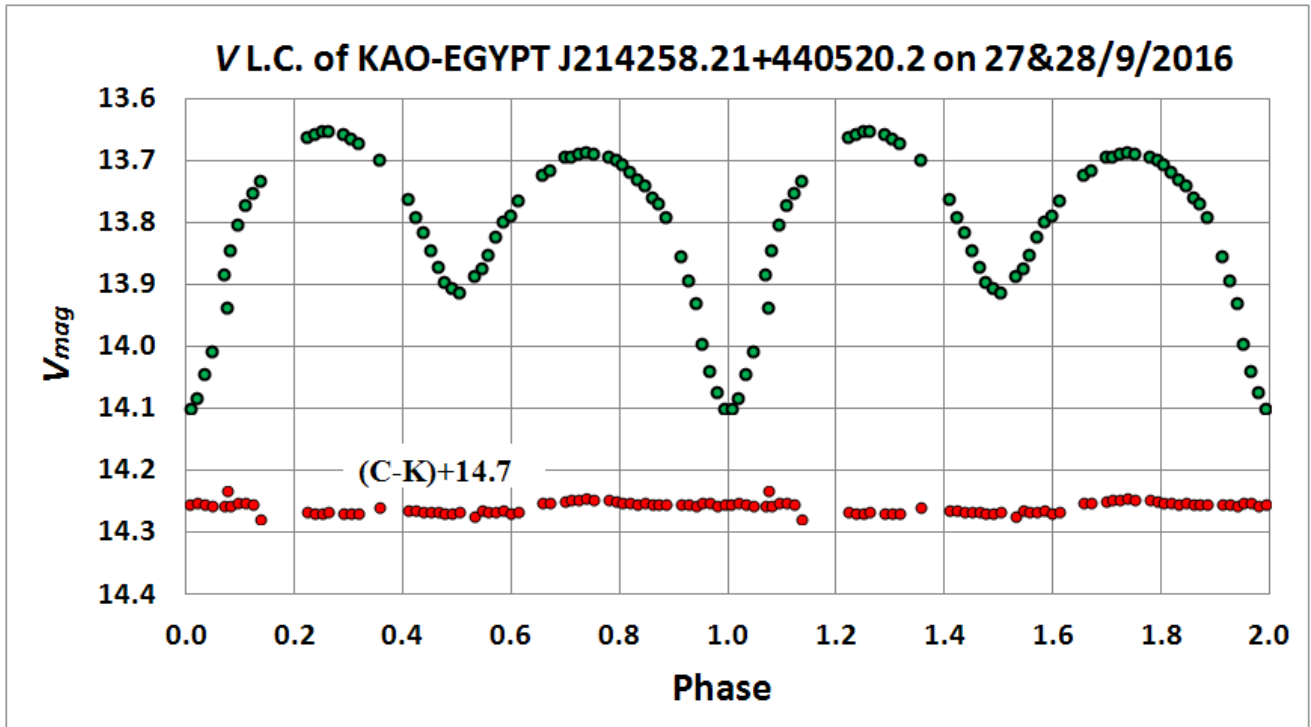


Figure 2. The new discovered variable star KAO-EGYPT J214258.21+440520.2= UCAC4 671-102525 with the [(C-K)+14.7] values in V filter

Notes:

- The system shows slightly different maximum height which indicate that we have an "O'Connell effect".

#	Data File for Filter: V		
#	HJD	V-C	S
2457659.2183	0.103	0.002	
2457659.2266	0.064	0.002	
2457659.2349	0.024	0.002	
2457659.2431	-0.007	0.002	
2457659.2514	-0.028	0.002	
2457659.2598	-0.046	0.002	
2457659.3135	-0.119	0.002	
2457659.3217	-0.123	0.002	
2457659.3300	-0.128	0.002	
2457659.3383	-0.129	0.002	
2457659.3548	-0.122	0.002	
2457659.3632	-0.116	0.002	
2457659.3715	-0.108	0.002	

2457659.3964	-0.081	0.002
2457659.4294	-0.017	0.003
2457659.4378	0.010	0.003
2457659.4460	0.037	0.003
2457659.4543	0.064	0.003
2457659.4626	0.092	0.003
2457659.4709	0.116	0.004
2457659.4791	0.125	0.003
2457659.4874	0.134	0.004
2457659.5040	0.107	0.004
2457659.5123	0.093	0.004
2457659.5205	0.073	0.004
2457659.5288	0.042	0.004
2457659.5371	0.020	0.004
2457659.5454	0.009	0.005
2457659.5537	-0.016	0.005
2457660.2001	-0.057	0.001
2457660.2084	-0.064	0.001
2457660.2250	-0.086	0.001
2457660.2333	-0.086	0.001
2457660.2417	-0.091	0.001
2457660.2501	-0.093	0.001
2457660.2584	-0.090	0.001
2457660.2749	-0.087	0.001
2457660.2833	-0.082	0.001
2457660.2915	-0.073	0.001
2457660.2998	-0.062	0.001
2457660.3081	-0.049	0.001
2457660.3164	-0.040	0.001
2457660.3247	-0.021	0.001
2457660.3329	-0.010	0.001
2457660.3413	0.012	0.001
2457660.3578	0.075	0.001
2457660.3661	0.115	0.001
2457660.3745	0.150	0.001
2457660.3828	0.216	0.002
2457660.3912	0.259	0.002
2457660.3995	0.294	0.002
2457660.4078	0.320	0.002
2457660.4161	0.321	0.002
2457660.4244	0.303	0.002
2457660.4327	0.266	0.002
2457660.4410	0.229	0.003
2457660.4576	0.156	0.004

Submitted By
Ahmed-Essam